

Vol. 17 No. 1 Spring 1994 Published by the American Homebrewers Association \$6.00

# ZYMURGY

FOR THE HOMEBREWER AND BEER LOVER

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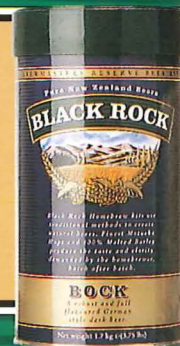
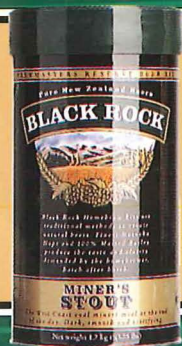
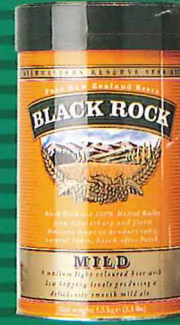
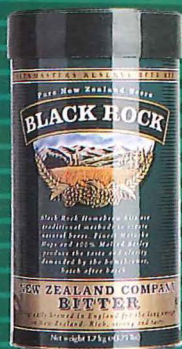




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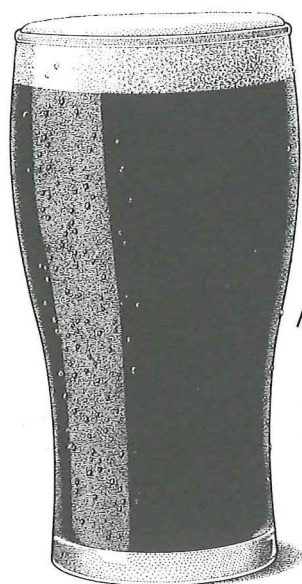
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To promote public awareness and appreciation of the quality and variety of beer through education, research and the collection and dissemination of information; to serve as a forum for the technological and cross-cultural aspects of the art of brewing;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

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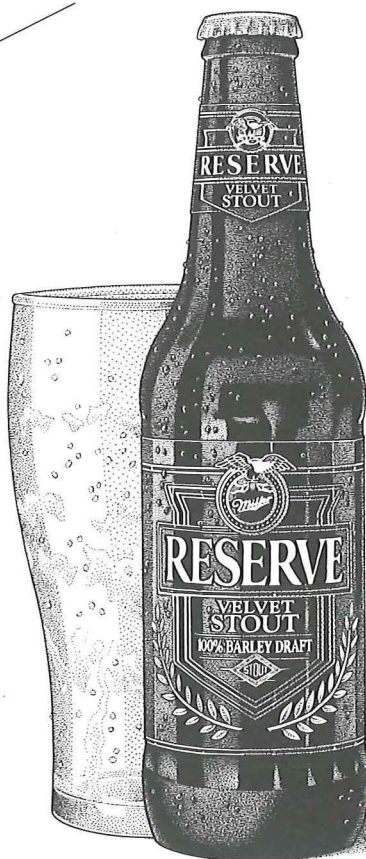
*It pours out  
dark and  
mysterious.  
Light barely  
passes through  
it. Kinda like  
looking into a  
woman's eyes.*

*You can taste  
it long before  
it hits your lips.  
A full, nutty,  
roasted aroma  
bursts on the  
scene.  
This is big.*



*Let's try that  
again. Slower  
this time. There  
are a lot of  
good taste  
sensations  
going on here.  
A milk shake  
for grown ups.*

*Reserve Velvet  
Stout has an  
easily acquired  
taste. We  
encourage  
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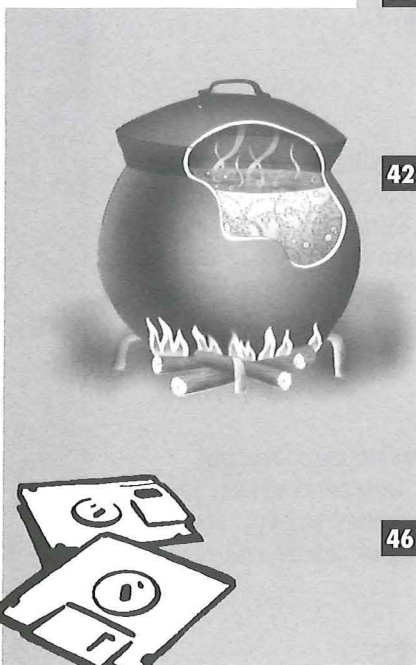


# ZYMURGY

*Zymurgy* \zī'mərjē\ n:  
the art and science of fer-  
mentation, as in brewing.



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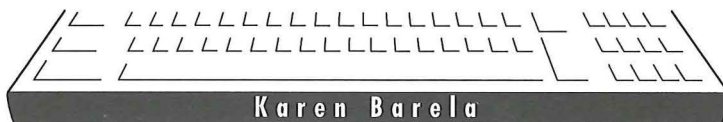
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# EDITORIAL



Karen Barela

**O**K, I admit it. I am a bit nervous about being the president of the American Homebrewers Association. After all, look at my one and only role model. How can I possibly fill those shoes? Luckily Charlie is not a physically big guy — he's about 5'9" and I'm about 5'7" so there really is not much difference between our shoe sizes. There are, however, some differences in the way we think and in the way we accomplish things (and, by the way, in the way we look! Among other things, I have no beard!) and therein lie both my strengths and my weaknesses as I begin this journey into presidential territory. You are already familiar with Charlie's style, with his brewing expertise, with the way he presents information and with his persona. The following two short stories should help bring my picture into focus.

I went to the Dixie Cup in Houston last October and while on a pub crawl ordered a beer, a Paulaner Oktoberfest. A gentleman standing behind me said, "Hmm, you drink beer? Rumor has it you don't even like beer." I was instantly amused and thought, "Obviously, you don't know me very well!" Well, why should he? We'd never met before and I guess I can understand why someone might be suspicious of who the new AHA president is and what happened to Charlie and what the hell does she know about beer and brewing anyway?

So let me set the record straight. Yes, I do drink beer and, in fact, I really, really enjoy beer. I brew occasionally and wish I made the time to brew more often. (Would you believe me if I said I have a demanding job and sometimes find it hard to relax?) I started brewing a few years before I started working at the AHA and yes, I used *The Complete Joy of Home Brewing* as my brewing bible long before I ever met Charlie. Brewing at my house is more like a fiesta than a scientific study. I invite the neighbors and their dogs, crank up the stereo, open bottles of whatever happens to be in my fridge to get us in the mood and organize everyone into a brewing frenzy. We rotate stirring the brewpot so no one's arm gets too tired, begin sanitizing the bottles either in the ice chest on the patio (if it's warm outside) or the bathtub (if

## PRESIDENTIAL PERSONAS

there is snow on the ground) and we all try to not trip over the dogs. We have strong debates about music, beer styles and mutts vs. purebreds. Most of the time we brew successfully and learn something new.

The other day I was meeting with Charlie to discuss a new project he'd been thinking about. To explain the new idea he began by saying, "I might be way ahead of my time here, but ...." I couldn't resist replying, "Well, it wouldn't be the first time." Charlie's kind of innovative thinking is what made the AHA what it is today and will keep it going tomorrow. It's the kind of thinking he is really good at. It's the kind of thinking

we want Charlie to continue doing and, in fact, do even more of. It's the kind of thinking that I like to make happen — it's what brainstorming sessions are for and what happens when you allow yourself and the people around you to dream.

What I'm here to do is make sure that innovative thinking continues and then to take those ideas into reality. To make it all happen. To gather the pieces necessary to accomplish whatever goals we set out to achieve. Charlie has simply removed himself from the doing stage but not the thinking stage. Rest assured that Charlie is still very much involved with homebrewing and he remains the core of the AHA.

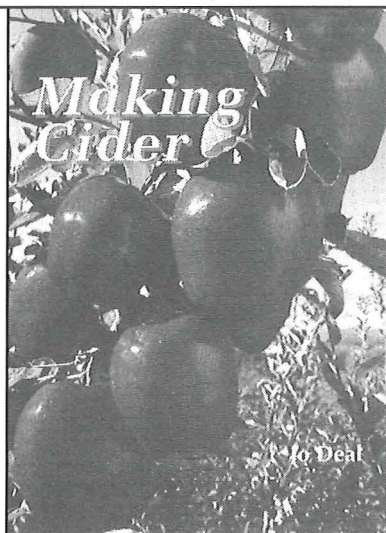
I tell you these things because I want you to know where I'm coming from and why I'm here. I want you to understand the shoes that Charlie and I each fill and to know that I am anxious, excited, happy, scared, thrilled and nervous all at the same time. I want you to know I am one of the luckiest people because I really like my job. I'm in a great

industry and happen to run one of the most successful and unusual associations. I also want you to know that working at the AHA is rarely easy, but it's never boring and it's always rewarding. Just like a good batch of homebrew, I love the taste of it.





"Making Cider was far and away the single most valuable guide I had in learning to make hard cider"



**Gabriel Ostriker**  
1993 AHA Cidermaker of the year

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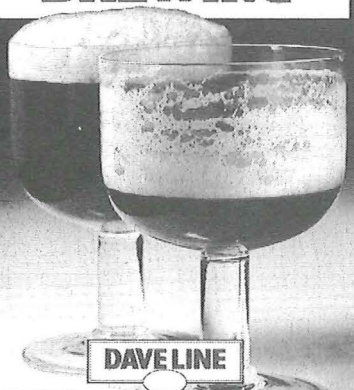


Written by  
**Bill Owens, Brewmaster,**  
Buffalo Bill's Microbrewery

Bill Owens shows you how to build the entire brewing system at home and how to produce beers from all grain in just 10 days; the same brew-

ing techniques used by the author at his brewpub.

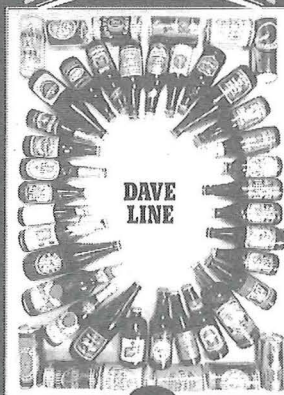
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# DEAR ZYMURGY

Our Readers

## Corrections

In the 1993 Special Issue (Vol. 16, No. 4), the recipes on pages 40 and 41 are for one U.K. or 1.2 U.S. gallon. Multiply all ingredients by 4.2 to adjust for a five-U.S.-gallon batch.

The Izar Weizen recipe on pages 22 and 23 should call for 2 2/5 pounds pale barley malt only once.

## A New White Glue

Dear *zymurgy*,

It was with great interest that I read your article, "Take Pride in Your Label" in *zymurgy* Fall 1993 (Vol. 16, No. 3). While I fully agree with the author that commercial labels left on bottles are unsightly and show little pride in the homebrewer's craft, I found the talk of multiple color separations and mezzotint screens to be a bit beyond most homebrewers' budget or interest.

What many homebrewers do have access to is a personal computer. With minimal effort and a simple word processor, most brewers can create custom labels for every batch they brew. Throw in a graphics program or a desktop publisher and you can get some pretty amazing covers for those bottles.

And you missed the best trick of all. Forget about gummed labels and glue — use milk! That's right, a plain paper label lightly dipped in milk adheres as well as any glue and peels right off when wet. It's fast, cheap and requires only a quick trip to the fridge. I wish I could take credit for that trick, but I learned it in the Bacchus Wine Forum on CompuServe. Give credit where credit is due!

Brew often and well,  
Tom Smith  
Columbia, Missouri

## Edible Labels

Dear *zymurgy*,

Any homebrewer who has spent his or her time and muscle power soaking, scrubbing and scraping labels off their bottles knows what a pain this task can be. This summer, however, I discovered a virtually effortless way to accomplish this job.

Upon entering my basement to select a few bottles of my exceptional wheat beer, I noticed that many of them had slugs clinging to the glass. "Disgusting!" I thought as I flicked the intruders off. Then I observed that the labels were tattered and softened and could easily be scraped off with only my fingernails. My theory is that the slugs were eating the labels to get at the glue.

I have new respect for these repugnant creatures. Now if they would just stay off the tomatoes.

Sincerely,  
Greg Bryan  
Youngsville, New York

## Good Stuff

Dear *zymurgy*,

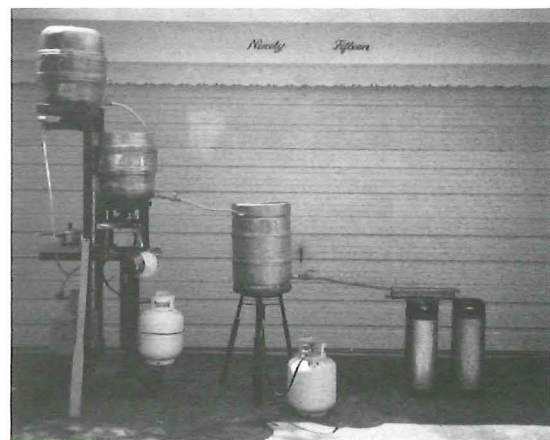
In *zymurgy* 1992 Special Issue (Vol. 15, No. 4) there were several articles about turning junk into usable brewing equipment. I built a gravity-flow brewery using items bought and salvaged at junkyards, plumbing companies, gas companies and from friends.

The sparge tank and mash tun with burners is one unit mounted on wheels so I can roll it out of my garage already set up. The mash tun has a heavy-gauge removable stainless-steel mesh for sparging. The boiler and its burner are a separate unit that sets up

easily along with an all-copper wort chiller. Fermentation is done in soda kegs.

I had fun building this brewery and it works great, but I'm constantly looking for ways to improve it, and searching for more junk. Thanks!

Sincerely,  
Dan Gildea  
Largo, Florida



## Label Magic

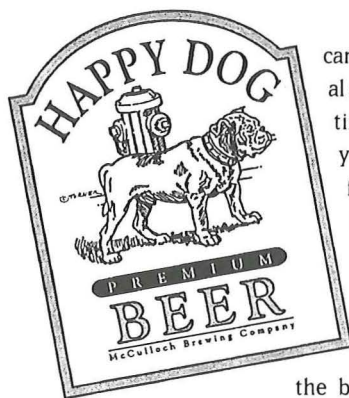
Dear *zymurgy*,

I have just finished reading Dana Rowe's article on labeling your beers. I agree that adding a label to your homebrew really classifies up the bottle and your friends won't think you just brewed a batch in the bathtub.

I have an easier way to affix the labels than the author outlined. Instead of gluing the labels to the bottle, I use the following method.

Design your custom homebrew label and put four labels above one another on the short edge of paper that is 8 1/2 by 11 inches. Use a copy machine to duplicate about 15 pages (60 labels). Cut so each label is about 2 1/8 high by 11 inches long. A paper cutter





can do several sheets at a time. After you have filled and capped the bottles, wrap the label around the bottle and

secure with a piece of clear tape where the ends meet, leaving about a quarter inch of tape affixed to the bottle above and below the label so it doesn't slip off.

This method is fast, cheap and easy to remove so the bottle will be ready for the next custom label.

Sincerely,  
Jerry Trancik  
Ada, Michigan

### More Glue Tips

Dear *zymurgy*,

I read with pleasure your article in *zymurgy* Fall 1993 (Vol. 16, No. 3), on labeling your homebrew. Since I first started brewing I've found the impressive pleasure of surveying dozens of labeled bottles of your own brew to be second only to the pleasure of actually tasting it!

Labeling your brew is especially nice if you make a holiday batch to give as gifts, as I do. One little touch that really dresses up a bottle is to make label strips about three inches by one-half inch to go over the cap like the ones that seal Grolsch and some other beers.

I'd like to offer one detail that makes labeling easy and practical: a good recipe for a label glue that is cheap, easy, holds well and dissolves in water.

- 4    **tablespoons flour**
- 1    **cup water**

Stir the flour into the water and bring to a boil, stirring to dissolve the lumps. The heat not only kills any infection that might live in leftover glue if you reuse it, but more importantly, it breaks the longer starch molecules into smaller molecules of glucose. As soon as the mixture comes to a boil, you'll notice it takes on a gluey texture.

Remove from heat and let cool. It can be



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applied with a brush, but the simplest and most effective way to glue labels is to dunk the whole label into the glue and get it a bit saturated. Wipe off excess and slap it onto the bottle.

When dry, the glue will hold your labels to the bottles as well as any big company's brew. Excess glue will appear as a white film that is easily sponged off the glass. And best of all, when you wash out the empty bottles, the labels soak right off in hot water every time!

Leftover glue will keep in the refrigerator for a couple of weeks, though it's so cheap

you might as well throw it out and make a fresh batch each time.

This label glue is based on a very old recipe used by bookbinders for at least 600 years for holding books together. The original recipe calls for six tablespoons of flour and makes a thicker glue; you can experiment to find the consistency you like best.

Thanks again!

Live well,  
Paul Clark  
Renton, Washington



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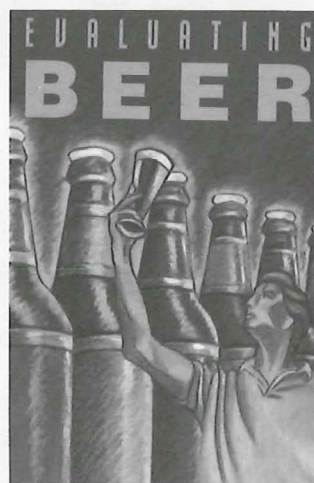


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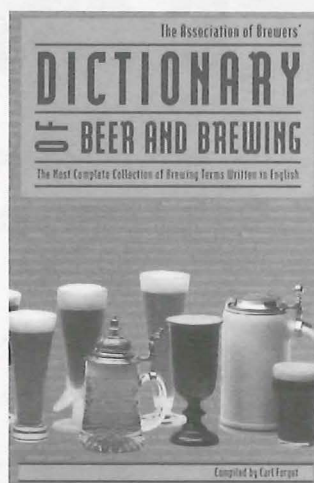
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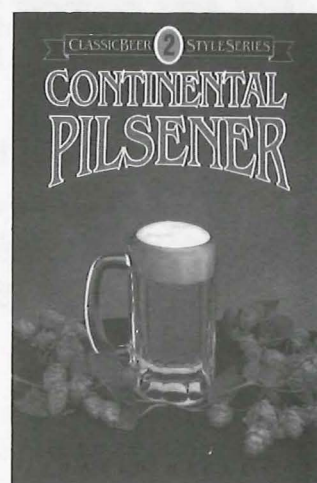
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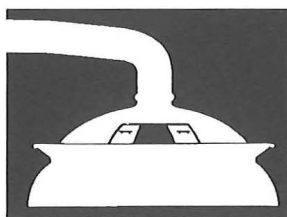
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# BREW NEWS

James Spence

## HEAD LINES

### BATF Relaxes Stance Against Labeling

After being bombarded with petitions and lawsuits, the Bureau of Alcohol, Tobacco and Firearms (BATF) has taken a step back on their policy against advertising and labeling materials with information on the health benefits of moderate drinking.

The bureau operates under the Federal Alcohol Administration (FAA) Act that stipulates the alcoholic beverage industry cannot put claims of "curative or therapeutic" attributes on container labels, even when the information is accurate. Recent research has shown that moderate drinking can decrease the risk of coronary artery disease. Wine-makers who put such information on their labels were subject to the FAA Act.

The BATF's relaxed stance on the issue vindicated Kevin Lynch, a California wine seller, who wanted to reprint Thomas Jefferson's "Good wine is a necessity of life for me" quote on bottles. Previously the BATF ruled that "necessity of life" was a claim of health benefits. Lynch appealed the ruling and won on the grounds that it was inappropriate for a government agency to censure the country's third president.

The BATF still believes that making health claims for products without similar information about the dangers of overconsumption is inherently misleading to consumers. In addition, the Food and Drug Administration has advised the BATF that health claims for alcoholic beverages may mean that these products fall under the Federal Food, Drug and Cosmetic Act. (*Beverage Alcohol Market Report*, Vol. 12, No. 17, Aug. 30, 1993.)

### Federal Funds Misused by OSAP

The General Accounting Office has ordered the Office of Substance Abuse Prevention, a division of the Department of Health and Human Services, to recover funds made as grants to organizations "which were not spent in accordance with law or grant requirements." The yearlong investigation by the GAO was made as a result of a complaint by the National Beer Wholesalers Association and at the behest of more than 110 members of Congress.

Federal law prohibits federal officials from "lobbying" or engaging in "publicity or propaganda" activities. Reportedly, the Office of Substance Abuse Prevention gave funds to organizations that ran secret seminars and sessions with antialcohol groups that instructed attendees on how to lobby against the brewing industry. Referring to the OSAP-sponsored Alcohol Policy VIII conference, the GAO decided, "Grass-roots lobbying was an inextricable part of the planning process for the conference and of the events that took place. We believe it would be strained and artificial to suggest that the prohibited activities were solely attributable to nonfederal funds." The report also said "OSAP cannot be a pure conduit (of funds and information), without attention to the content of what it publishes ...."

Additional records obtained through the Freedom of Information Act indicate that other violations of federal law may have occurred. The OSAP recently changed its name to Center of Substance Abuse Prevention. (*The Brewing Industry News*, Vol. 14, No. 11.)

### Circuit Court Supports Coors

The 10th U.S. Circuit Court of Appeals, upholding a lower court's decision, decided in favor of Coors Brewing Co. in a lawsuit over a provision in a 1930s law that forbids beer brewers from putting alcohol content on their beverage containers. The law was designed to prevent strength wars by breweries. After the BATF refused to permit Coors to print the alcohol content on their containers to dispel myths that Coors was lower in alcohol than other brands, the Colorado brewery filed suit claiming the law was an unconstitutional restraint on commercial speech in violation of the First Amendment. Coors does not plan to print alcohol content on labels until a uniform set of criteria for labeling is established in all 50 states. (*Modern Brewery Age*, Vol. 44, No. 36, Sept. 6, 1993.)

### Brain Food

Men who consumed one or two drinks a day had "slightly stronger cognitive skills than the non-drinker or heavy drinker," according to Duke University and Indiana University researcher Joe C. Christian. The study was done on 4,000 male twins ages 66 to 76. (*American Breweriana Journal*, Nov.-Dec. 1993.)

### Alcohol-Free Beer Recommended

Most people realize that overconsumption of alcohol by pregnant and breast-feeding women can result in health risks to unborn and breast-fed babies. Despite numer-



ous studies, the risks associated with light or moderate consumption of alcohol are still unclear. In fact, some doctors recommend that breast-feeding mothers consume a small quantity of beer each day because beer constituents promote the production of a hormone called prolactin that stimulates milk production. In addition, beer is high in a number of nutritional minerals, vitamins and amino acids.

Researcher Anton Piendl at Weihenstephan, Germany, has found that alcohol-free beer contains the same nutritional characteristics and similar prolactin-producing potential as alcoholic beer. For these reasons, Piendl recommends that pregnant and breast-feeding women restrict themselves to alcohol-free beer. (*Brauwelt*, 1993, 133 (7/8), p. 287-295.)

## Homebrew Recipes Inspire Professionals

Not only have several homebrewers turned professional in recent years, but professional brewers have found homebrewers to be a source of unique, cutting-edge recipes and inspiration for new brews. As a result of winning the Ninkasi Award in the American Homebrewers Association 1993 National Homebrew Competition, Walter Dobrowney of Saskatoon, Sask., worked with Pete's Brewing Co. of Palo Alto, Calif., to create a seasonal brew. About 1 million bottles of Pete's Wicked Winter Brew, an amber ale with raspberry and nutmeg flavors, were released in early November in several states.

Rogue Ales of Newport, Ore., brewed Christopher Studach's Oregon Nut Brown Ale, the AHA 1993 National Homebrewers Conference Commemorative beer, and his imperial stout. Brewmaster Bill Sherwood of the Oasis Brewery in Boulder, Colo., and Steve Klover, a local homebrewer, brewed Klover's award-winning wheat beer. American Mead Association President Susanne Price helped the Oasis brew a malt-based mead. Head brewer Terry Dennis of the Table Rock Brewpub and Grill in Boise, Idaho, has brewed Gem State Competition-winning beers. Plus, Brian Clark's and Rodney Morris' Harvest Moon Ale, winner of the 1993 Texas-Schell Open Homebrew Contest,

was brewed by August Schell Brewing Co., New Ulm, Minn. Clark and Morris live in College Station, Texas. (*Association of Brewers*, 1993.)

## Beer Boxes Measure Minivans

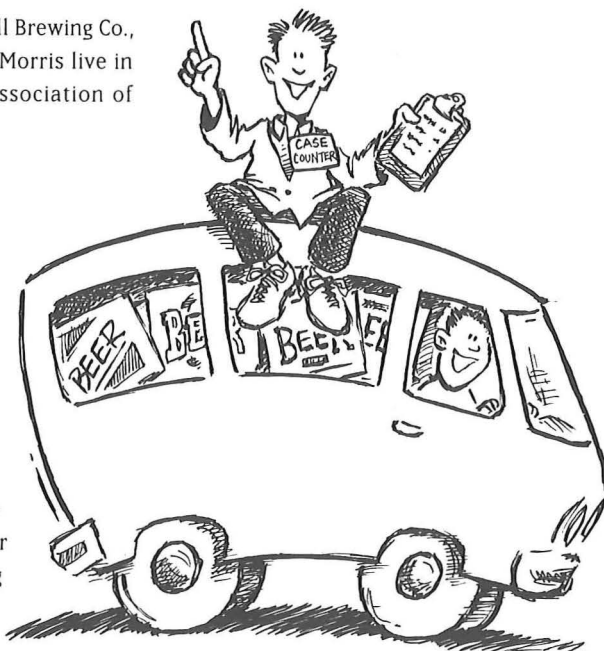
*Car and Driver* used cases of beer to compare the storage capacity of minivans. Thirteen cases fit into the Jeep Grand Cherokee, increasing to 30 with the rear seat folded down, matching the Ford Taurus. Seventy-three cases of beer fit into the Dodge Caravan. (*American Breweriana Journal*, Nov.-Dec. 1993.)

## Chinese Brewing Industry Soars

Facts and figures from the world's most populous nation indicate that China has experienced dramatic increases in beer production since economic reforms were initiated. China ranks third in the world in beer production and third in hop production. From 1978 to 1992, beer production grew from 3.4 million barrels to 85.7 million barrels. Ironically, per capita beer consumption is only 2.2 gallons a year — roughly one-tenth that of the United States while consumption of hard liquor is five times higher. Limited malted barley supplies have spurred the designation of new farming areas and the development of new barley varieties. The government predicts a minimum of a 15 percent annual increase in beer production until the year 2000. (*MBAA Communications*, Vol. 43, No. 4, p. 13.)

## For the Record

According to *Business Week*, the average American will drink 20,300 bottles of beer, 46 gallons of whiskey, 25 gallons of vodka and 11 gallons of gin during a lifetime.



Assuming a life span of 72 and 51 years of legal consumption, that's just a tad more than one drink per day. (*American Breweriana Journal*, Nov.-Dec. 1993.)

## TECHNOTES

### Lactic Acid Bacteria Sensitive to Hop Bitter Acids

The preservative effects of hop bitter acids in beer are well known. A substance in hops called trans-isohumulone essentially starves a bacteria cell by acting as an ionophore and changing the pH gradient of the cell in such a way that nutrient transport across the cell membrane is negatively affected. Ironically, although beer is best kept cool, this effect of trans-isohumulone occurs best at warmer temperatures. Strains of *Lactobacillus* bacteria, however, are almost universally resistant to hop bitter acids. Although the reasons are somewhat unclear, scientists speculate that lactic acid bacteria are able to maintain a larger pH gradient and ATP supply (adenosine triphosphate) than other beer-spoilage bacteria, resulting in higher resistance to the hop bitter acids. (*Journal of the Institute of Brewing*, Sept.-Oct., 1993, Vol. 99, p. 405-411.)



## Oxygen's Role in High-Gravity Fermentations

Oxygen is crucial to yeast metabolism. One reason is that *Saccharomyces cerevisiae* cells require preformed sterols and unsaturated fatty acids for growth. Molecular oxygen is necessary for these two compounds to be biosynthesized in wort. Yeast can incorporate free fatty acids from wort, but because of the high percentage of non-malt adjuncts in high-gravity worts, the concentration of fatty acids is low, and in such worts the yeast is more dependent on the availability of oxygen for fermentation. Without dissolved oxygen in the wort, yeast cell mitochondrial development is slowed, along with lipid biosynthesis, resulting in poor yeast performance, more off-flavors and slower fermentations. (*Journal of American Society of Brewing Chemists*, Spring 1993, Vol. 51, No. 3, p. 97-107.)

## Reactions of Gases in Beer

The exothermic reaction of gases associated with brewing is among the reasons heat and pasteurization propagate oxidation in beer. Researcher Julio Fernandez Selles believes that as oxygen dissolves into beer, the molecules of oxygen convert to ions and become hydrated, meaning that the ions are tightly surrounded by water molecules. This process, called solvation, is most efficient at lower temperatures. As beer is heated, in hot storage conditions or in pasteurizing equipment, the hydrated oxygen molecules break apart, releasing highly reactive oxygen ions into solution where they react with other molecules in the beer, producing oxidized flavors. (*Master Brewers Association of the Americas Technical Quarterly*, Vol. 29, 1992, p. 134-136.)

## Mashing Parameters Summarized

(1) For infusion and decoction methods, it is significant that no lumps are formed during mashing-in and that the action of the ag-

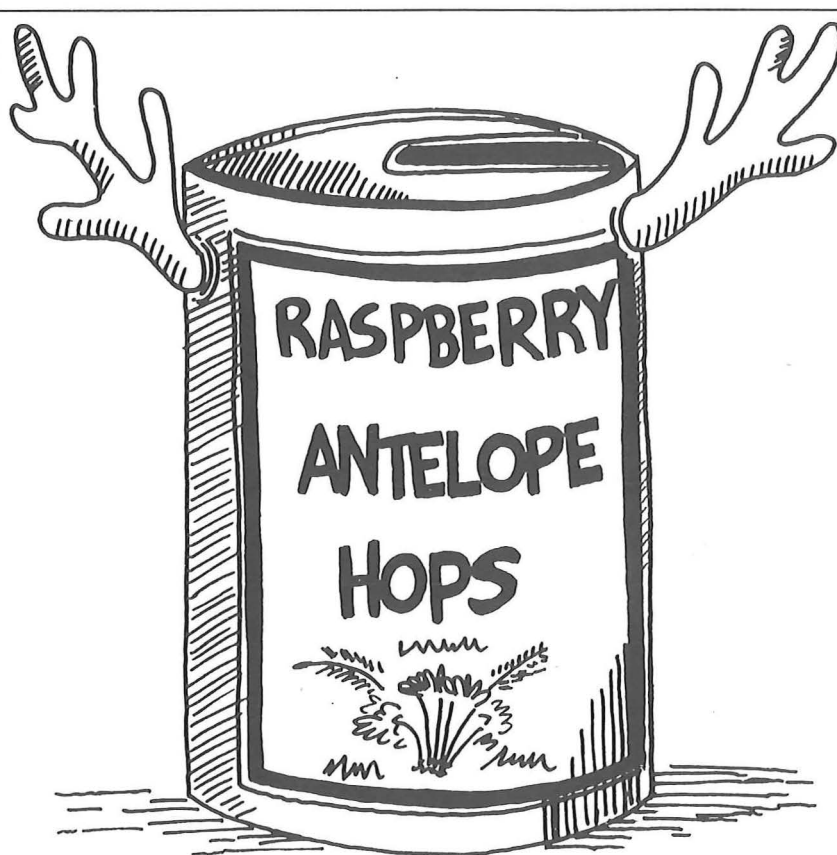
itator is optimal in order to avoid segregation on the one hand and oxidation and shear effects on the other.

(2) Depending on the size of the decoction mashes and on the temperature intervals determined by them, decoction methods bring about a stronger release of polyphenols, better splitting of the DMS precursor, formation of desirable Maillard products, but also partly their evaporation. Rapid temperature increases may decisively change breakdown processes — in conjunction with an en-

zyme activation in the decoction mash.

(3) Keeping out oxygen during mashing leads to a more complete breakdown of protein,  $\beta$ -glucans and starch. This mash parameter may have to be accounted for by varying the others.

(4) The correction of the pH during mashing (and wort boiling) positively influences the composition of wort and beer. This, together with improved fermentation has a positive effect on the foam, stability, taste and taste stability. (*Brauwelt*, 1993/III, p. 188-198.)



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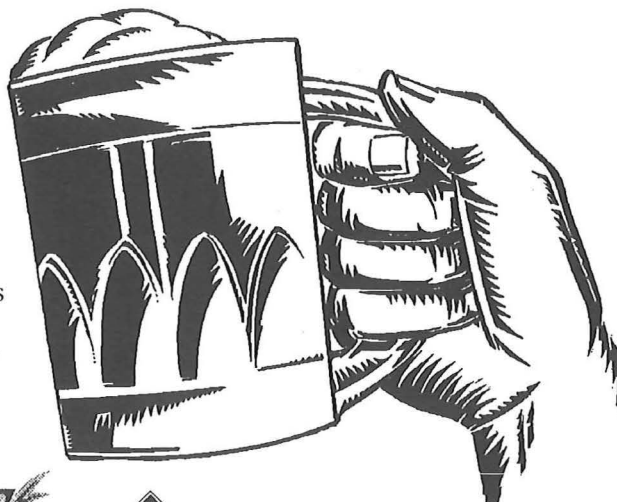
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# JACKSON ON BEER

Michael Jackson

## Egging them on in Land of the Midnight Øl

**T**he sun may have set on the days when some British pubs considered the serving of beer to be a priority and offered no accompaniment more distracting than pickled eggs, but that is no excuse for faintheartedness.

Even in those days, it was necessary to look north for pubs where huge jars of gelatinous ovoids, their whitish gray stained by brown malt vinegar, glowered from the corner of the bar, challenging any customer to be so reckless as to ask for anything to eat.

Does the northern puritan side of my character nurse a nostalgia for those times? Perhaps it does. That might explain a current preoccupation of mine.

The last sighting of the sun in Tromsø, Norway, was in late November. In December, a midday dusk is as bright as it gets. When the sun is next sighted over the horizon, on Jan. 20, the children get a day off school and a treat of strawberry jam tarts and hot chocolate.

I shall stay my hand until the end of April, when the best bars in the town will start to serve Mack Beer with seagull eggs. The season for this combination hits its stride on May 17, Constitution Day, which marks the beginning of the process that led to Norway's independence from Sweden.

The delicacy will be widely offered until June 15, at which point the seagull nests by law may no longer be disturbed. From May 21 to July 21, the sun never sinks below the horizon. There will still be seagull eggs after that from the fridge, and a few are kept for Christmas, but that is the modern world for you.

— In season, Mack Beer and seagull eggs are served for lunch on the plane to Tromsø (via Braathens Airways) and in the SAS hotel in town.

Mack Beer is broadly in the style of a south German pale lager. The man who runs Mack was trained at the famous brewing faculty at Weihenstephan near Munich. So was his father before him. The family, however, originated in Brunswick in the north of Germany. They moved farther north into Scandinavia to establish the brewery in Tromsø in 1877.

Tromsø is deep inside the Arctic Circle and Mack is the northernmost brewery in the world.

When the brewery was founded, Tromsø was a base for hunters of bear and seal, and was beginning to grow as a fishing port. It also was a trading port from which fish were exchanged for corn from Russia.

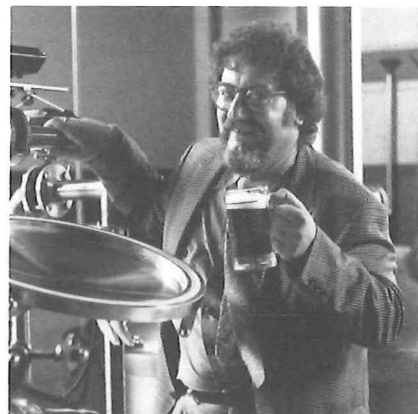
Today, Tromsø is a university town, noted for its medical faculty and its many student cafes. It makes an unlikely "Paris of the North," but is extravagantly dubbed as such.

These "Parisians" must feel very isolated in a town of 50,000 people on the edge of an island six or seven miles long and two or three wide, surrounded by hundreds of miles of snow-covered mountains and icy sea.

Mack still uses some of its original lagering cellars, and its 1889 buildings have since 1928 served as the brewery tap. Those structures are now sandwiched by shabby edifices of the 1950s and 60s.

The brewery tap is called simply Øl Hallen (the Beer Hall). It is a heartily basic place, selling only beer and no food, not even seagull eggs. Its most exotic offerings are the Blanding or the Gullbok. The Blanding sounds less odd in English: it is actually a blending of Mack's Norges Pils and the brewer's Bayerol (Bavarian Dark Lager).

The second confection is a blend of gull (meaning gold, a strong, 6.5 percent alcohol



**Michael Jackson at the Oldenberg Brewery, Fort Mitchell, Ky.**

by volume lager and nothing to do with birds) and a bock of a similar potency.

Øl Hallen was the traditional meeting place of hunters and of skippers seeking crews. Many a case of Mack Beer was taken to sea, and many a crew sustained themselves by picking seagull eggs from the nests on far-flung islands and shores.

In those days, a northern fish-buyer who had enjoyed a good season went south to the capital, more than 700 miles away, to do business. While there, he stayed at the Grand Hotel, bought himself a diamond ring and smoked large cigars. In the dining room he ordered a Mack Beer and was shocked to hear the establishment did not stock his favorite brew.

He then demanded a serving of seagull eggs and was met with a similar response. His outrage at this has become a legend. Ever since, the notion has been fostered of Mack Beer and seagull eggs as inseparable symbols of northern culture.

Some beer marketers might fear that such a context would limit the sales potential of their brand, but Mack's present director, a pugnacious shirt-sleeve brewer, entertains no such qualms. He has his own ideas about the selling of beer, as he demonstrated a few years ago when he successfully challenged a

cartel that limited each brewery to its own regional market.

All executives at Mack have on their business cards a photograph showing a glass of the beer with two eggs. The back label on Mack Beer suggests that it be served in such a combination and even the promotional T-shirts show the beer and the egg in cartoon embrace.

A song celebrating Mack Beer and seagull eggs was allowed airtime on the strictly non-commercial state radio on the grounds that it was "cultural." The song made the top ten.

When I visited Mack in June, at the height of the seagull season, I was entertained at what I can only describe as high tea at the brewery. This comprised generous servings of Mack Beer with seagull eggs. The eggs are served boiled, still in the shells, and presented in a large bowl that might otherwise have been filled with fruit.

The shells have camouflage colors of an almost military muddy green speckled with dark brown. Each egg is two or three times the size of those provided by hens. The whites are a faintly iridescent gray-white and the yolks a reddish-amber.

They are boiled for 13 to 15 minutes and served with the yolk only partly solid. I found them sweetish and nutty, with perhaps a hint of seaweed. My hosts said these must have been picked well inshore; those from closer to the sea could be fishy.

They were served with fish — three styles of salmon: smoked, pickled in salt and sugar, and marinated in dill. There also was lumpfish "caviar." Prawns and anchovies are sometimes served.

It is the beer's place of origin, rather than its style, that led to its being served with the seagull eggs, but I did feel that these elements went well together.

Mack Beer, the brewery's principal product, does seem to have a faintly grassy character that lends it to this combination. I thought the grassy character might derive from the Finnish malt used, though others attribute it to the very tall cylindroconical fermenters.

If you get to Tromsø and want to make your own tasting, make sure it is the Mack Beer that you get. This is labeled simply Mack-Øl. The word Øl, sharing a root with "ale," is simply the Norwegian word for beer. Similar words are used in other Nordic languages.

The grassy character in the Mack-Øl is perhaps masked in the brewery's progressively


hoppier Norges and Arctic Pils, the Gull, the coffeeish malty Bayerol and the dark, rich Bock.

Fortified by my sampling, I strolled around the town of wooden buildings. Even the church in the town square is wooden. That evening I visited the Cormorant Inn, in a former fish-oil plant on the harbor. As the time approached midnight, people were still sitting outside on the terrace.

The blackboard announced seagull eggs and seal, so that was what I had for supper. I enjoyed the seagull eggs for the second time in the same day, and the sliced seal meat (in

a remoulade of seaweed) was remarkably reminiscent of black pudding. What more could a northerner want?

*Reprinted with permission from What's Brewing, newspaper of the Campaign for Real Ale.*

Michael Jackson is internationally the best-known writer on beer. His articles, books and documentary films have introduced beer styles to countless drinkers and brewers outside their native lands. His use of taste descriptions, and accounts of his travels, introduced a new genre of writing on beer. 

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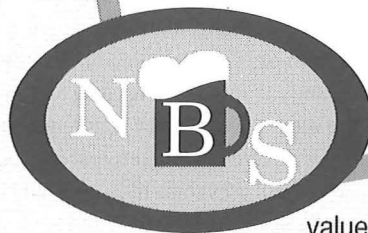
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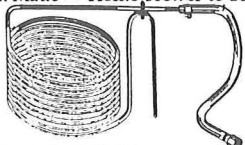


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# HOMEBREW COOKING

WITH THE BREWGAL GOURMET

Candy Schermerhorn

## Savory Spring Spread

As the last blustery days of winter come to a close and spring begins to flourish, people are filled with the desire to celebrate nature's miraculous moment by gathering with friends and neighbors.

For those of us in the brewing community, there is no finer way to do this than to orchestrate an evening of close companions, fine homebrew and, of course, *cuisine de là bière*. Food prepared with beer is the ideal fare to offer both passionate beer devotees and skeptics alike, especially when each course is served with a beer of complementing flavor.

The liaison of flavors is enlightening. Upon tasting, diners marvel at the interrelationship of food and beer. By serving a companion beer you do more than simply enhance the flavor of the fare, you permit the diner to taste anew the character embodied in the dish with each forkful, keeping the taste buds alive and the palate stimulated.

To help you design such an event, this sample menu crosses the international boundaries of beer and cuisine for a discriminating yet unpretentious repast.

Begin the evening with an aperitif of delicate refreshment, such as a flute of citrus Berliner Weisse along with crisp homemade breadsticks, and set the pace for a full evening of *cuisine de là bière*. Then serve a light soup of broth and vegetables simmered and served with a German lager. The main course is a hearty, tender roast of pork infused with India pale ale, herbs and garlic and served with a compelling bock and a good curry chutney. Pairing a Vienna-style beer with the pork and

chutney produces a striking contrast of flavors. Slivered green beans steamed in a dash of brown ale and strewn with toasted almonds makes a delectable side dish.

For dessert enthusiasts, pair peaches with the elegant essence of *pêche lambic* in a peach upside-down cake for a triumphant finale. Serve with the raspberry essence of a framboise and voilà!, you have created a brewer's "melba."



### Elegant Lagered Soup

Serves eight.

- 3 to 4 tablespoons olive oil
- 2 onions, coarsely chopped
- 1 tablespoon dried basil
- 3 cloves garlic, minced
- 1/2 cup chopped Italian parsley
- 3 carrots, thinly sliced
- 2 ribs celery, thinly sliced
- 2 cups sliced mushrooms tossed in 3 tablespoons lemon juice
- 1 1/2 cups German lager
- 10 cups clear homemade broth
- 1/3 pound dry lentils, washed
- 3 large White Rose potatoes, cut into 1/2-inch cubes

- 2 cups frozen corn
- 1/4 cup each minced scallions and chopped Italian parsley
- freshly grated Parmesan cheese

(1) In a large skillet, sauté onions and basil in olive oil until translucent. Add garlic and sauté for one minute. Add parsley, carrots, celery and continue to sauté for four minutes. Add mushrooms and sauté two minutes more.

(2) Add lager, stock, lentils and potatoes. Cover and simmer for 45 minutes. Salt and pepper to taste. Add corn and simmer an additional 20 minutes. Serve soup garnished with scallion mixture and Parmesan cheese.

### Roasted Pork

Lean, fresh hams, typically larger than roasts, are readily available and fairly inexpensive this time of year. Simply double the marinade ingredients and the marinating time if you use the larger cut. Serves eight.

- 1 6 to 8 pound pork roast
- 3 to 4 cloves garlic, finely minced
- 1 teaspoon crushed dried rosemary
- 1 1/2 teaspoons crab boil spices, finely crushed (available in the seafood section of your grocery)
- 3 1/2 cups India pale ale

(1) Combine the minced garlic, crushed rosemary and crushed crab boil spices. Pour the beer over the roast and rub with spices. Set in the refrigerator for eight to 12 hours, turning occasionally.



(2) Place roast on a rack and pour marinade over meat. Roast at 325 degrees for about 25 minutes per pound, basting occasionally. When the internal temperature of the roast reaches at least 165 degrees F, remove from oven, cover with foil and let stand for 15 minutes before serving.

## Pêche Upside-Down Cake

The fruity sour flavor of pêche lambic beer heightens the flavor of this peach-studded, robust cake by balancing what is often a cloyingly sweet dessert. Try putting a maraschino cherry or a chunk of red spiced apple in the pit cavity before placing each peach cavity-side down in the pan for a more vibrant rendition. Serves 12.

- 8 tablespoons butter
- 3/4 cup brown sugar, firmly packed
- 12 to 15 large firm canned peach halves
- 2 to 3 tablespoons peach schnapps
- 1/3 cup toasted almonds, pecans or golden raisins (optional)
- 2 cups all-purpose flour
- 1 cup sugar
- 1/2 cup dry powdered milk
- 3 1/2 teaspoons baking powder
- 1 teaspoon salt
- 1 cup pêche lambic beer
- 1 tablespoon orange zest, finely minced
- 1 teaspoon vanilla
- 3 large eggs
- 8 tablespoons butter, room temperature


(1) Preheat oven to 350 degrees F. Heat an 11- or 12-inch cast-iron skillet over medium heat until hot. Add the butter and heat until bubbling. When hot, remove from heat and sprinkle evenly with brown sugar.

(2) Arrange the peach halves on top of the sugar. Sprinkle with schnapps and fill in any spaces with whole toasted almonds, pecans or golden raisins. Set aside.

(3) Combine the flour, sugar, dried milk, baking powder and salt in a mixing bowl,

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whisking thoroughly to combine. Combine the pêche, zest, vanilla and eggs in a separate bowl, stirring to incorporate.

(4) Add remaining 8 tablespoons butter and half the beer mixture to the dry ingredients. Beat for two minutes. Add the remaining liquid and continue to beat an additional two minutes.

(5) Pour the batter into the skillet over the peaches and bake on the lower shelf of the preheated oven for 35 to 40 minutes or until a pick inserted into the middle comes out clean.

(6) Invert the pan over a serving platter and allow the cake to drop onto it. Serve warm with a spoonful of whipped cream flavored with additional schnapps.

Candy Schermerhorn is a culinary consultant in the Phoenix, Ariz., area. She is opening Cooking Adventures, a cooking studio. Candy takes great joy in educating the public about beer and its culinary potential through her cooking classes. She is author of the *Great American Beer Cookbook* (Brewers Publications, 1993).



Home changmaking — Darma Samphel works ground yeast cake (*phap*) into a batch of cooked rice, the inoculation step in changmaking.

# Adventures in Chicha and Chang

## Indigenous Beers of the East and West

By Wendy Aaronson and Bill Ridgely



eer and wine are the oldest beverages. Nearly all cultures (with the notable exceptions of the Eskimo and the Australian aborigine) have experimented with fermentation and produced at least one indigenous alcoholic beverage.

From earliest times, these beverages were viewed as safe and nutritious dietary supplements. Perhaps more importantly, however, they were seen as effective means of bringing people closer to their gods. The desire to alter consciousness through intoxication was widely accepted as a basic part of human nature.

"If it is a disgrace to be drunk among the sober, it is disgraceful too to be sober among the drunk."

Theognis of Magara, Greek poet, 5th – 6th century B.C.

Beer brewing developed in areas where native grains grew and were eventually cultivated. The earliest evidence came from Mesopotamia and Egypt (fourth millennium B.C.), but domestication of barley may have occurred 5,000 years earlier, and the human species was probably experimenting with wild grain fermentations even earlier.

As the rituals, culture and technical aspects of brewing were being developed independently in widely separated regions of the world, great similarities also were becoming evident. We will explore these in two of the world's great mountain areas — the Himalayas and the Andes.

### Chang — The Beer of the Himalayas

The Chinese were brewing beers from millet and rice well before the second millennium B.C. However, techniques for converting starches to sugars were taking a very different path than in the West, where malting and mashing were being developed to a high art.

Asian cultures, in particular those of the Indian subcontinent and the Himalayas, succeeded through long centuries of trial and error in isolating natural substances that performed the conversion and fermentation processes simultaneously. These developments were necessary because grains such as rice lacked the embryo needed for successful germination and subsequent release of diastatic enzymes.

Chang (or chung) is one of several names given to these regional beers. The Indians call

"I'm drinking old chang and building a new house."

Tibetan popular song

the beer *pachwai* and brew it mostly from rice. In Nepal, chang is brewed from rice, millet, barley and occasionally corn. Tibetan chang is brewed almost exclusively from barley, although buckwheat and millet are occasionally used at lower elevations.

The key ingredient in chang, however, is not the grain itself but the yeast cakes known variously as *bakhar* (India), *marcha* or *murcha* (Nepal), or *phap* (Tibet). Preparation of yeast cakes is a cottage industry throughout the subcontinent, and there is considerable pride taken in the regional quality of these cakes.

Yeast cakes contain not only yeast (*hansenula* and *saccharomyces* being the primary genera) but also a variety of other fungi, including *aspergillus*, *mucor* and *rhizopus*. These various microflora work in combination to convert the starches in the grains to sugars and then ferment them. The resulting beers are fairly low in alcohol initially but have potential to become quite strong if left to ferment for an extended period.



## Yeast Cake Preparation

Yeast cake is prepared from rice or barley flour mixed with crushed and dried ginger root (and occasionally other herbs and spices), moistened, then formed into small cakes (two to four centimeters in diameter or about a dime to half-dollar size). The cakes are covered with a moist cloth and left to ferment. The fungi naturally present in the ginger root multiply and grow. When spores become evident and the smell of fermentation is strong (two to three days), the cakes are uncovered and dried in the sun.

Creating good yeast cake is a true art form because growing the "correct" microflora without concurrently producing large amounts of bacteria and other spoilage organisms is very difficult to accomplish. It requires a combination of favorable environmental conditions, quality, difficult-to-find ingredients, exacting technique and a fair amount of luck.

---

"Dogs and thunder must have voice, men and dogs must have class, tea and chang must have strength."

Tibetan chant

For homebrewers, yeast cakes are not readily available but can sometimes be purchased at Asian grocery stores under the name "Chinese yeast cakes." Unfortunately, attempts to create them from scratch can be very frustrating and usually futile. The key microflora have been isolated and identified, however, and may eventually be made available to interested brewers.

Commercial grade *koji* (steamed rice on which *Aspergillus oryzae* has been grown), combined with a healthy dose of beer yeast, can serve as a reasonable substitute for yeast cake. The authors have attempted this with some success, although the resulting chang tends to be a bit sweeter than that brewed in the traditional manner.

## Brewing Traditional Chang

As in most indigenous cultures, all brewing of chang is done by women. The raw grains (approximately one-quarter kilogram per liter or roughly two pounds per gallon of finished chang) are washed, boiled until soft, then drained and spread out on a *nanqlo* (shallow bamboo tray). The yeast cake is crushed, mixed with a little rice flour or *tsampa* (Tibetan roasted barley flour), then worked thoroughly in-

to the cooled grain. In a tradition shrouded in antiquity but performed by indigenous brewers the world over, a few bits of burning charcoal are placed in the mass (now called *lum*) to dispel evil spirits. The *lum* is then covered (traditionally with banana leaves) and left to ferment at ambient temperature.

After several days, the liquid and solid portion begin to separate, and the smell of fermentation becomes evident. This stage is called young chang, and the mass can be consumed immediately as a thick gruel with about 3 percent alcohol content by volume. For a true beverage chang, additional water is added to the mass and the infused liquid is then ladled or strained out. The *lum* can be left to ferment further and will become stronger over time, reaching a maximum strength of around 10 percent alcohol by volume. Additional water can be added and drawn off throughout the process until fermentation is complete.

## Recipe for Chang

Rice, millet, unmalted barley and wheat berries (unmalted wheat) are the best choices for home changmaking. If rice is used, an aromatic variety such as Basmati is preferred. However, any good white rice will do.

### Ingredients for 1 gallon

- 2 pounds whole unmalted hulled grain
- 1 gallon water
- 1 yeast cake
- 1/2 cup flour (rice, barley or whole wheat)

Boil grains until soft, drain and cool, then spread them out on a tray or a tabletop covered with a cut-open plastic trash bag. Crush the yeast cake (one cake will generally ferment two pounds of grain) and mix it with a little whole wheat or barley flour. Work the mixture thoroughly into the mass. Sanitation is not critical at this point (other than good hand-washing), because the microflora in the yeast cake will overcome any organisms that may be present on your hands. If using *koji* and beer yeast, use a good grade of *koji* and quality dried brewing yeast.

After mixing, place the *lum* into a clean plastic fermenter or stainless-steel pot with a tight lid. Leave no more than one inch of air-space, as fermenting chang tends to oxidize very easily. Do not create totally anaerobic

conditions, however, as the various fungi need a certain amount of oxygen to do their conversion work. Cover the vessel with a plastic bag before replacing the lid.

If the weather is cold, wrap the vessel in a blanket and place it in a warm area (60 degrees F, 15.5 degrees C, or higher). It is traditional to place a stone on top of the vessel to keep away the evil spirits.

When fermentation becomes evident, add about a cup of water to the container if you wish to make a gruel chang. (If using millet, add a bit more, as millet tends to dry out.) Then run the entire contents through a blender and refrigerate as soon as possible. The resulting chang will have a milkshakelike consistency and will keep for about a week.

Alternatively, for a beverage chang, slowly pour one gallon of water over the *lum* (being careful not to disturb it). The water will soak into and around the *lum*. Let the liquid sit for an hour, then draw it off using a ladle or siphon hose. Particulate matter can be strained out with a filter funnel, hop bag or cheesecloth. Again, refrigerate the chang immediately and consume within one week. Additional water can be added and drawn off over a period of two or three weeks. The chang will gain strength as noted before and will become quite sour. As fermentation reaches completion, the chang will again weaken but will retain its acquired sourness.

If yeast cakes are not readily available, save a portion of the grain mass to inoculate the next batch. This portion can either be dried in the sun or refrigerated (where it will remain viable for about a month).

Young chang is milky white in color and has a rather refreshing, tart, somewhat sweet and citric flavor reminiscent of hard cider. In older chang, the aroma and flavor of alcohol also are evident, along with the characteristic sourness.

## Traditions

Chang is consumed regularly in the home as well as at weddings, funerals and other ceremonial occasions. A large body of tradition (and music) has been built over the centuries to accompany the consumption of both young and old chang.

When Tibetans gather at weddings, the woman first offers a large cup of young chang to the man. She is then asked to sing a song about chang for his encouragement. When the

song ends, the man flicks a little of the chang to each of the four directions of the compass as an offering to the gods and then drinks the entire cup without spilling a drop. If a drop is spilled, he must continue to drink until the woman is satisfied that the last drop has been consumed. Following this ritual, old (strong) chang is consumed (in much smaller cups) throughout the remainder of the festivities.

Tibetans rarely drink to excess, but on ceremonial occasions hosts will consider it a compliment if guests are unable to rise from a sitting position.

## Chicha — The Beer of the Andes

Chicha has been prepared by the indigenous peoples of the Andes for centuries. It was a mainstay of Andean civilization at the time of the Incas (1438 to 1532 A.D.), and it served as a medium of exchange in the Inca economic system. As in other indigenous cultures, chicha brewing was performed by women, primarily the *mamakuna* or "chosen women" who served the Inca ruler, and it was a key part of religious observances as well as routine exchange of goods and services throughout the empire.

"Aye? Well then, Don, refill my cup. Your chicha's very fine."

Herman Melville, *Moby Dick*

With the arrival of the Spanish in 1532, the Inca economic system quickly collapsed, its demise due in large part, some believe, to the Catholic Church's ban on production and consumption of chicha. The brewing tradition continued, however, and survives today as a cottage industry. Nearly every modern town or village has at least one chicheria where the beer is brewed and served by hard-working and enterprising women.

The word "chicha" is believed to have been derived from the Spanish word *chichal*, meaning "saliva" or "to spit." Originally, chicha was made from corn (maize), quinoa, or manioc (known to us as tapioca), and the conversion of starches to sugars was brought about by mastication of these various roots and grains. Saliva contains large quantities of diastatic enzymes, and conversion was rapid and efficient. The plant materials were ground to a flour consistency, moistened and rolled into balls, then placed in the mouth until well-mixed with saliva. The resulting *muko*, or salivated flour, was then dried in the sun and stored. It made

a very high quality chicha. The salivating process was performed by women and children gathered into groups for the occasion.

The authors experimented briefly with this process. A group of adventurous women from Brewers United for Real Potables (BURP, the Washington, D.C.-area homebrew club) gathered and blue cornmeal was used as the base material. Unfortunately, the coarse grind of the meal necessitated the use of a small amount of wheat flour to stabilize the corn balls. The conversion process took place effectively, but the dried *muko* quickly turned to "chicha gravy" when it was later added to the brewpot. It is recommended that any attempts at *muko* chichamaking use corn and corn products only.

Fortunately, the majority of chicha today is no longer made from salivated corn but from germinated or malted corn called *jora*.

## Jora Preparation

Indigenous Andean corn types are not readily available in the United States, but any good seed corn can be germinated without difficulty. The easiest to find is yellow sweet corn, available in 25 or 50 pound bags from most feed stores (sold primarily as animal feed). If you wish to use a more exotic type, organically grown blue corn from the American Southwest is often available through commercial health-food outlets. Be careful to use only food-grade corn that has not been treated with a fungicide, which is often the case with seed corns. If you are uncertain, ask your supplier. Some South American grocery stores in the United States sell genuine Andean *jora*, but the price is high — up to \$3 per pound. It is much easier and more cost-effective to malt your own.

To prepare *jora*, first soak the corn for 24 hours in cold water. Then, if working with small quantities (one or two pounds), transfer the corn to a colander for sprouting. If working with larger quantities, you may wish to build a germinating tray using a plastic dishpan. Simply drill numerous one-eighth-inch holes in

the bottom of the pan to create a drain field. The pan will hold six to eight pounds of corn and form a grain bed about three inches deep.

Spray cold water on the corn twice a day and turn the entire "piece" once a day to prevent molding. Germination should occur within two days, and sprouts will grow to about two inches in length within five days. Expect no more than about 50 percent germination, as this is fairly normal using untreated organically grown corn. During the germinating process, the moist corn will develop an unusual sweet-sour aroma that is not unpleasant but has a somewhat unnerving "dirty dishrag" component. This characteristic has also been noted in salivated *muko*, however, so it appears to be normal.

After germination is complete, spread the *jora* on a plastic sheet in the sun to dry. The drying process takes most of a day. If the weather is damp, *jora* can be dried in an oven set at the lowest temperature possible (150 degrees F, 65.5 degrees C, or below). When drying is complete, transfer the *jora* to a plastic bag for storage. It can be kept indefinitely if stored in a moisture-free environment.

## Brewing Traditional Chicha

The procedure for brewing chicha changed significantly during the last 50 years. Traditionally, *jora* (or an equal amount of *muko*) was coarsely crushed, mixed with a little cornmeal and placed in a *wirki* or wide-mouthed earthen pot about 30 inches high and 34 inches in diameter and filled about one-third full. To this crushed *jora* (now called *huinapu*), hot (but not boiling) water was added until the pot was full. The water and *huinapu* were well mixed then left to cool slowly, during which time saccharification took place. When cool, the liquid layer (called *upi*) was drawn off using a gourd and placed in a second pot. A jellylike middle layer was then drawn off and boiled to make a caramel substance called *misqui kheta* (used as candy or added later to the chicha for additional sweetness). To the remaining



Indians of Cuzco drinking chicha from conical liter glasses derived from the drinking beakers of the Inca period.

ILLUSTRATION FROM MARY HIELD'S  
GLIMPSES OF SOUTH AMERICA (CASSELL & CO., 1883)



corn residue (now called *hanchi*), additional hot water was added and then drawn off to extract the remaining sugars. This liquid was added to the *upi*, which was then left to stand for a full day and night, causing a wild yeast fermentation that provided the characteristic sourness to the finished beer.

Unfortunately, time and economic constraints of late 20th century life largely eliminated the mashing step in favor of direct progression to the boil (always done late at night, usually after midnight, which allowed for proper intercession by *Mamasara*, the corn goddess). Today, the crushed *huinapu* and water are placed in a large kettle and brought slowly to a boil. Some conversion of starches takes place during the transition phase, but extra sugar is always added in the form of *chancaca* (unrefined Andean cane sugar with a taste and consistency similar to English treacle), as well as copious quantities of dark, sweet malta beer. Malta is a rich, dark, very sweet malt-based beverage with little or no alcohol content, popular in Latin America and consumed primarily by children (who frequently mix it with milk) and health-conscious adults. At one time, it was recommended as a vitamin and mineral supplement for pregnant women. Malta may or may not contain hops. Hop bitterness, where present, is very subdued. Carbonation is present but usually very light. Malta is the Latin American equivalent of German malzbier. When used in chichamaking, malta provides some color, flavor and additional fermentables to the brew.

Regardless of the method used, the boil itself generally takes three hours. At the end, spices are added (traditionally allspice, anise, cinnamon, cloves, fennel, fig leaf, mace, mint or any combination of the above), and the liquid is transferred back to the pot to cool. If the

*huinapu* has been included in the boil, it is strained from the liquid by pouring the contents of the kettle slowly through a reed basket.

After the liquid has cooled, the sediment from a previous batch of chicha is pitched, along with the traditional bit of burning charcoal to propitiate evil spirits. Fermentation is allowed to take place over a period of three to six days. The resulting chicha is drunk without priming or further conditioning, although it is believed by many that the beer, if stored underground for a long period of time, will gain strength. A little clove, cinnamon or cilantro is often sprinkled on top when it is served. In season, strawberries can be added to make *frutillada*, a beverage described by beer anthropologist Alan Eames as "the holy grail of beers."

### Traditional/Modern Chicha

For home chichamaking, a combination of traditional and modern brewing practices produces the most full-bodied, complex beer.

#### Ingredients for 1 gallon

- 4 pounds *jora* corn (see below)
- 1/4 pound *chancaca* or brown sugar
- 12 ounces malta beer
- spices (see above)
- ale yeast
- Original gravity: 1.060 (approximately)
- Final gravity: 1.010 (approximately — depends on yeast used)

The amount of *jora* required depends on the percentage of germination achieved. The amount shown in the recipe is based on a 50 percent germination rate. Your "mileage" may vary.

Crush the *jora* as fine as possible without turning it completely to flour and place in a

#### Photos top to bottom:

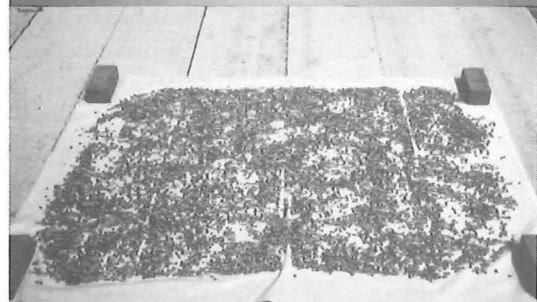
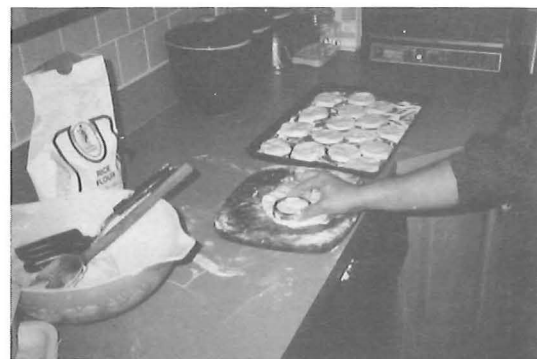
Wendy cuts yeast cakes from rice flour dough in preparation for fermenting.

Women from Washington, D.C.'s BURP homebrew club gather in a circle to masticate cornmeal balls in the ancient Andean manner.

Corn, soaked 24 hours in cold water, is placed in a tray, sprayed with cold water twice a day and turned daily to prevent molding. Sprouts grow about two inches long by the fifth day.

After the germination is completed, the *jora* (malted corn) is spread on a shower curtain in the sun to dry for a full day.

Polly Goldman and Wendy add spices to the brewpot at the end of the boil.



brewpot or other mashing vessel. Add 1 gallon of water (1 quart per pound of *jora*) at a strike temperature of about 185 degrees F (85 degrees C) to create a rather thick mash at 160 degrees F (71 degrees C). (Corn malt converts at a somewhat higher temperature than barley malt.) Stir the mash well, then let it sit for one hour. Drain the resulting *upi* and then add an equal amount of water at 170 degrees F (77 degrees C) to the *hanchi* remaining in the vessel. Drain this in turn and add to the "first run" *upi*. There should be 1 1/2 to 1 3/4 gallons of *upi* for each gallon of finished chicha.

If you wish to give your chicha some characteristic sourness, you may leave the *upi* for a full day and night per traditional practice, but it would be safer from a contamination standpoint to simply add a small amount of lactic acid following fermentation.



**Polly adds chancaca as Roger Allers checks the boil.**

Bring the *upi* to a boil and add the sugar and malta. Both can be found in Latin and South American grocery stores. If not available, however, use dark brown sugar in place of the *chancaca* and a dark, sweet beer such as McEwan's Scotch Ale, Mackeson's Stout, or (to keep the South American connection) Xingu Black Beer from Brazil in place of the malta.

Boil the *upi* for about three hours, then remove from heat and add the spices of your choice as noted above. Use small quantities — no more than one-quarter teaspoon per gallon of the stronger spices such as anise and clove.

When the *upi* has cooled (again, it can be left overnight to acquire a bit of sourness, but beware of contamination) pitch with a healthy dose of good ale yeast and ferment at 60 to 70 degrees F (15.5 to 21 degrees C). The fermented chicha may be served directly from the primary or it may be racked and bottled. (Be sure to add a little priming sugar if you decide to bottle.) The beer will keep for a week or more if refrigerated and will last indefinitely in the bottle.

To make *frutillada*, use two to three pounds of crushed strawberries per gallon of chicha. Rack the chicha onto the fruit after primary

fermentation has completed. The beer will undergo a vigorous secondary fermentation. When it subsides, strain the fruit pulp from the fermenter before serving or bottling.

Chicha is similar to chang in that it is cloudy, tart and refreshingly cidery. Its color depends on the type of corn used. Chicha throws a frothy head because fermentation is rarely complete when it is served. It also shows some complexity because of the spices and added sugars.

## Light Summer Chicha

This recipe is adapted from *The Art of South American Cooking* by Felipe Rojas-Lombardi (Harper Collins, 1991). It makes a refreshing, clear beverage the authors have come to call "lawnmower chicha."

### Ingredients for 1 gallon

- 1 pound *jora* corn
- 2 cups *chancaca* or brown sugar (about 2/3 pound)
- 8 allspice berries or cloves
- ale yeast
- Original gravity: 1.040 (approximately)
- Final gravity: 1.015 (approximately — depends on type of yeast used)

Crush *jora* rather coarsely and place in the brewpot with 8 quarts cold water. Stir and let sit one hour. Bring to a boil, add the sugar, then lower heat and simmer three hours (stirring regularly). Add spices at end of boil. Remove and let sit undisturbed for one hour. Then strain the liquid portion into a fermenter using a colander or wire basket lined with cheesecloth.

When cool, pitch yeast. Ferment at room temperature (60 to 75 degrees F, 15.5 to 24 degrees C) for five days. Rack to secondary and ferment one or two more weeks until clarified.

Bottle using 1 teaspoon corn sugar per bottle for priming. Allow two more weeks of bottle-conditioning before drinking.

## Traditions

Many of the traditions associated with chang are also kept by brewers and drinkers of chicha. The beer is consumed at ceremonial occasions and as an everyday beverage. The availability of fresh chicha is announced by the *akha llantu* or "chicha flag," a broomstick usually decorated with flowers, ribbons and corn husks. More sophisticated chicherias have ornate signs announcing the availability of the beer.

The tradition of flicking chicha to the four directions of the compass closely parallels that of other cultures. In the Andes, however, the beer is flicked toward the ground, in respect for *Pachamama*, the earth goddess, rather than toward the sky as in Buddhist culture.

Chicha is routinely sprinkled on animals for good luck, on wounds to promote healing and on graves as a final salute to the deceased during funerals.

## Universal Cultural Patterns

The role of women in the production, distribution and consumption of beer dates from the earliest known civilizations. The Sumerian goddess of beer was Ninkasi, "the lady who fills the mouth." In Egypt, the goddess Hathor was called "the lady of drunkenness, music and dance." Babylonian brewing was strictly controlled by the priestesses of the Temple of Nindaba. In Asia and South America, these traditions developed independently, but the woman's role in brewing appears to have closely mirrored her traditional role as healer and preparer of food, established since prehistory. The mysteries and magic of fermentation simply became an integral part of the female role.

The tradition of dispelling evil spirits also appears to be a universal pattern, likely a response to the fragility of the finished beverages. Souring of beer is blamed on intervention by malevolent beings. The use of burning charcoal to propitiate spirits is a common practice in widely scattered cultures.

Sacrifice of a small amount of beer to the gods appears to be a common link in nearly every indigenous culture. This speaks once again to the ancient belief that consumption of alcoholic beverages brings people closer to the gods, and the gods are pleased to be offered the drink of their worshippers. The people of the Andes finish prayers by saying "*Tomasunchis*" (in Quechua, "Let's drink together"). If the human species continues to drink with its gods, then eventually all things can be accomplished.

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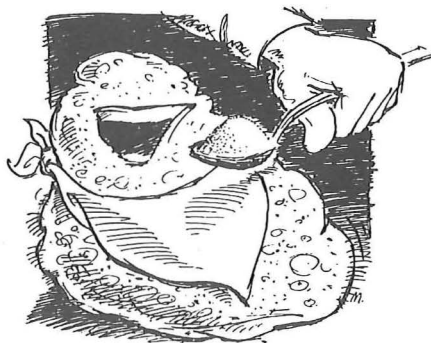
**T**ry this perspective: brewing is the art of feeding sugar to yeast. A crude analysis, but the reality is that without putting sugar into one end of the operation you cannot draw alcohol and carbon dioxide — beer (or wine or saké or cider) — out the other end. The sugars are usually those derived from malted barley, of course, but they are still sugars and in order to make good beer it is helpful to understand what sugars are and how they relate to beermaking yeast.

# How Sweet It Is — Brewing with Sugar

BY JEFF FRANE

Sugars are fairly simple organic compounds, carbohydrates, composed solely of carbon, hydrogen and oxygen molecules. The simplest of all are called monosaccharides because they are composed of a single carbon-hydrogen-oxygen ring. Two of these stuck together are disaccharides, and three can be chained into a trisaccharide. There are longer chains and in fact very long ones that are more commonly known as starches, but by the time the grain has been properly malted and mashed these should have been broken down into component parts, primarily sugars and dextrins.

Of the monosaccharides the most common is glucose. In George Fix's *Principles of Brewing Science* (Brewers Publications, 1989) you can see a diagram of glucose, along with diagrams of some of the other sugars, but for now we can muddle along without knowing what the inside of a sugar molecule looks like. All you really need to know is that, to a yeast cell, glucose looks pretty good. In fact, it looks like lunch.



Along with a steady diet of glucose, yeast cells are also fond of a bit of fructose, another monosaccharide. Fructose shows up a lot in fruits, which is how it got its name. It also shows up on the shelves of health-food stores because there are those who believe it is better utilized by the body than other sugars.

Fortunately for yeast, glucose shows up a lot in beer worts, although not usually in its base form. Glucose provides the building block from which maltose is constructed. Maltose is a disaccharide made up of two glucose molecules bonded together at the hip, as it were. Maltose, not too surprisingly, makes up a significant portion of an all-malt wort (roughly 40 percent) and is the primary source of glucose for beer yeast. Less common but also significant is maltotriose, which is much like maltose but has three glucose molecules (a trisaccharide). Maltotetraose, largely unfermentable by brewing yeast, is one molecule larger, a tetrasaccharide, and makes up an even smaller portion of wort (see Table 1).

**Table 1**

## Carbohydrate\* Constituents of Wort

Dextrin .....	22.2%
Maltotetraose.....	6.1
Maltotriose.....	14.0
Maltose .....	41.1
Sucrose.....	5.5
Glucose and fructose .....	8.9
<b>Total .....</b>	<b>97.8%</b>

**\*Carbohydrates make up about 75 to 80 percent of wort solids.**

Beer worts also contain free glucose, although not much, and free fructose. They also contain small portions of sucrose, which is a very familiar sugar indeed. Sucrose is a disaccharide composed of one molecule of glucose and one of fructose. Sucrose is the stuff that most people think of as sugar, the gleaming white crystals on the breakfast table or pouring into the cake batter. It has a terrible reputation: it's the stuff that rots your teeth, ruins your appetite, lards your waistline and defiles your beer. In spite of all that, of course, it is savored by just about everyone in one form or another and plays an important role in many fine beers.



## Yeast and Sugar

Yeast cells are not equipped to deal with very complex carbohydrates. Glucose and fructose are rapidly taken up by the yeast cell early in fermentation. So is sucrose, which is first "inverted," or broken into its constituent monosaccharides by the enzyme invertase, secreted by the yeast cell. During the first five hours of fermentation these are the sugars used by the yeast cell.

About 10 hours into the fermentation cycle the yeast cell begins to use maltose and maltotriose. These sugars are transported through the cell wall by the enzymes maltase and maltotriase, and then broken down into their constituent glucose units by a third enzyme,  $\alpha$ -glucosidase. Some yeast strains, notably lager yeasts (*S. uvarum*), can also completely ferment the minor wort trisaccharides melibiose and raffinose, a characteristic that provides a method of distinguishing ale and lager strains. Raffinose is one-third fermentable by ale yeast.

All of this occurs properly in an all-malt wort with healthy yeast. In worts that contain too much glucose or fructose, yeast may lose the ability to transport maltose through the cell wall, resulting in what George Fix calls "a long, disordered fermentation." When yeast strains mutate, they frequently lose the ability to ferment maltotriose entirely, resulting in incomplete fermentations and higher-than-expected terminal gravities. Wild yeasts, on the other hand, can be superattenuators, fermenting everything in sight including dextrans.

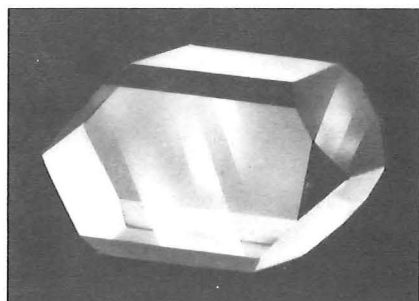
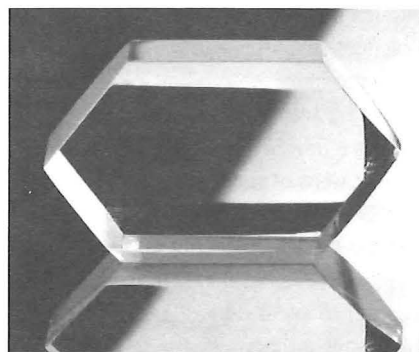
## Sugars and Beer

Just as the classic beer styles developed largely as products of the local water supply, so too the non-malt sugars used in traditional brewing methods were determined by circumstance. British ale breweries evolved along with an economic empire that included vital sugar cane-growing regions in the Caribbean and the African coast. In the lowlands of northeastern Europe, farmer-brewers derived fermentable extract from their beet crops. Immigrant brewers in America quickly made use of abundant supplies of indigenous corn.

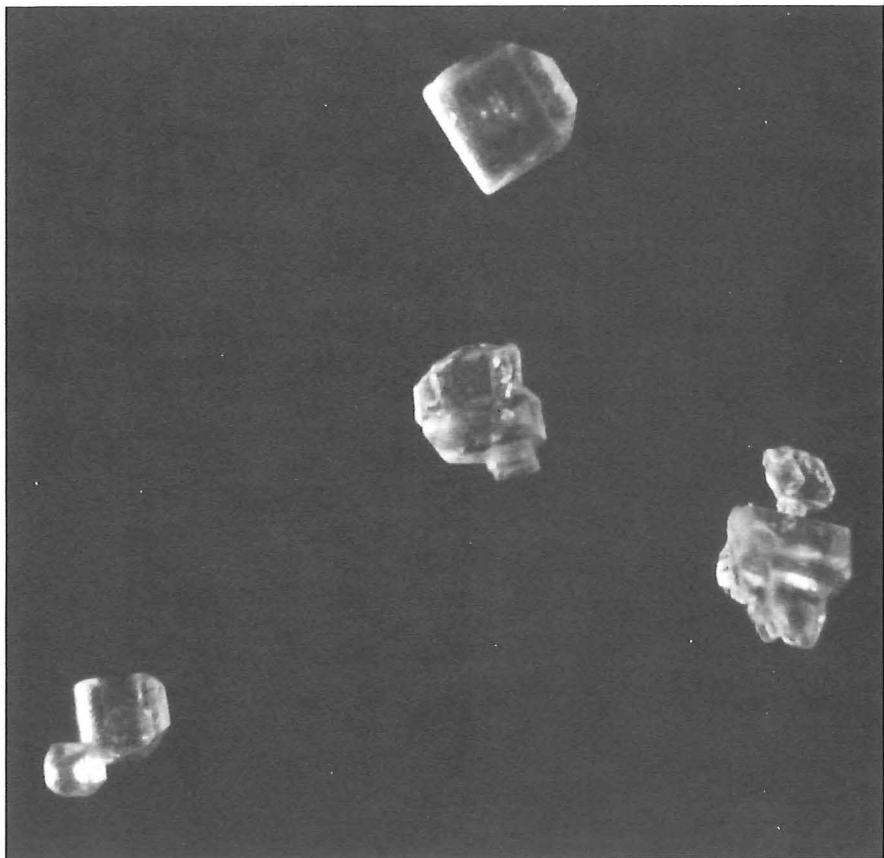
For modern brewers, particularly homebrewers, the ready availability of sugar is rarely the determining factor in its use. The

functions of non-malt sugars are many and varied. American commercial brewers used corn not only because it was abundant and cheap, but because it helped solve problems of clarity and color attendant with all-malt beers. British ale brewers may have initially been drawn to cane sugars for technical reasons but came to rely on them for the residual flavors. A number of Belgian brewers continued to use refined beet sugars in high-gravity beers because they were convinced that candi sugar enhanced head retention, added distinctive aroma and flavor, and because it allowed them to produce a less-satiating, high-alcohol brew. (And in some instances, so much alcohol is produced that the yeast is inhibited from completing fermentation, leaving a desired high level of residual sugars.)

Homebrewers experimenting with non-malt sugars can benefit from the experiences of their recent predecessors. Thanks to the pioneering efforts of such people as Fred Eckhardt, homebrewers in the 1970s and '80s threw out the old Prohibition recipes calling for vast quantities of sugar and a little malt extract, focusing on all-malt beers. The pendulum of reaction has swung far



**Above: Single sugar crystals.**  
**Below: Isolated crystals of granulated sugar photographed by incidental and transmitted light. No polarization was observed. Magnification x 15.**



enough that many of us viewed the British practices of adding kettle sugars as tantamount to heresy. More and more brewers, however, are re-examining the issue and gaining a new perspective.

Additions of sugar adjuncts ought to be held below 20 percent for beers of moderate gravity, and probably not much above 30 percent even in very high-gravity brews, in order to avoid cidery flavors or unwanted yeast disorders.

Sugars are added in the kettle or in the primings of bottle- and keg-conditioned beers, and in either case should be thoroughly boiled. Homebrewing conventions insist on using corn sugar for priming, but there is little logic behind this. In England and Belgium, commercial brewers order custom blends (usually of sucrose and invert sugar, perhaps with a portion of caramel) for priming, based on years of experience. The use of corn sugar appears to be limited to homebrewers, or commercial brewers (like those at Sierra Nevada) who began as homebrewers. It's time, I believe, to set aside the conventional wisdom and find out what really works. So, if you're interested, grit your teeth and substitute cane sugar or brown sugar for corn sugar when bottling your next ale.

## Sugars — Common and Uncommon

**Brown sugar** — Clumps of sucrose crystals surrounded by a molasses film. Supermarket brands of brown sugar have been completely refined then have had some molasses returned. Some inexpensive brands are labeled "contains sugar, molasses and invert sugar." "Raw" sugars such as turbinado (see below) also are available and probably come closer to the sort of sugars used in British ales. "Raw" sugars are always produced from cane sugar; beet sugar must be completely refined to rid it of unpleasant flavors. In cane sugars the impurities are what provide potentially desirable flavors in beer, and these impurities can vary widely depending on the cane's origin. H. Lloyd Hind, whose 1938 text, *Brewing Science and Practice*, is the bible of traditional British brewing, particularly recommended sugars from Brazil and the West Indies, and recommended against sugar from Mauritius.

Although the sugars available in British stores apparently are labeled with the point of origin, this is not generally true in the United States. In any case, brewers need to experiment with actual fermentation because "the original flavors are not always a good guide to that left after the sugar itself is removed [fermented]," according to Hind.

**Candi sugar** — sucrose. While most sugar refiners consider ultrafine crystals desirable, Belgians seem to prefer traditional methods producing giant rocks of sugar. Cotton strings with seed crystals are lowered into hot supersaturated solutions of sugar and very large crystals form on the strings. The light version is different from table sugar only in size, but the dark version has been caramelized before (or perhaps during) crystallization. Dark candi sugar is tough or impossible to find in the United States. One correspondent has reported finding a variety of rock sugars (light and several shades of dark) in a Canadian grocery stocking Middle Eastern items. Another source for light candi sugar is the Decorette Shop, 5338 S.E. Foster Rd., Portland, OR 97206, (503) 774-3760. Probable substitutes for dark candi sugar would involve a portion of caramelized sucrose and a larger portion of non-caramelized sucrose.

**Caramel** — Cooked sugar. As sugar is heated it darkens and develops a unique flavor, eventually becoming very dark with a definite burnt flavor (see recipe). It is nothing at all like the flavor of molasses or brown sugar. Commercially, caramel is used primarily for coloring beer. With experimentation, it might serve as a good substitute for Belgian dark candi sugar.

**Chinese rock sugar** — A mixture of raw and refined sugar and honey. Used by Chinese cooks for a fine glaze in braised dishes. I know of at least one homebrewer using it for creditable versions of Belgian abbey-style beers. Available in Asian specialty groceries.

**Demerara sugar** — Traditional British brown sugar and a true "raw" (partially refined) cane sugar. The Canadian version is much different, sticky and aromatic with molasses. The British version is very like American brown sugar, and is available at some homebrew stores and specialty stores appealing to British expatriates and Anglophiles.

**Glucose (dextrose)** — A monosaccharide. The essential building block of maltose

and one of the two constituents of sucrose. Commercially refined from cereal grains. For homebrewers, most familiar in the form of corn sugar. Completely fermentable.

**Invert sugar** — Created by breaking sucrose into its component parts, glucose and fructose, much the way yeast cells do during fermentation. Because fructose is one-third again sweeter than glucose or sucrose, invert sugar tastes very sweet. Invert sugar is commercially available in colors ranging from 30 to 500 EBC and in blends ranging from 91 to 95 percent fermentable. It is the non-fermentables that give character to invert sugars. Expensive, but easy to make (see recipe). Also available at specialty candy and cake-decorating stores.

**Lactose** — milk sugar. The two monosaccharides that produce lactose are glucose and galactose. Prepared by the evaporation of whey and the subsequent crystallization of the sugar. Unfermentable and therefore used to provide significant residual sugar in sweet ("milk") stouts.

**Molasses** — There are three common grades of molasses: light, medium and blackstrap. The lighter molasses contain a higher sucrose (with some fructose and glucose) content while the darker blackstrap molasses contains less sugar (about 65 percent sucrose) but more aromatics. Molasses syrups are the uncrystallized sugars and impurities that are removed during the refinement of sugars.

**Palm sugar** — Dark, sticky, highly flavored sugar derived from palm tree sap. Each palm type produces a distinctly different sugar. I have no idea how it would work in beer, but surely someone can give it a try! Available in Asian specialty groceries.

**Sucrose** — disaccharide, composed on one unit each of glucose and fructose. Commercially refined from sugar cane and sugar beets. Sugar from cane and sugar from beets, once completely refined, are indistinguishable from each other. Most sucrose is produced in very small grain sizes, ranging downward from table sugar to extremely fine sugars used in the food industry. Completely fermentable.

**Treacle** — British molasses. Available, like the U.S. version, in various colors and intensities of flavor. Lyle's is a common brand. Count on a lot of residual flavors — possibly over-



powering ones. Theakston's Old Peculier derives its unique flavor from the use of treacle.

**Turbinado sugar** — The most common form of "raw" cane sugar in the United States, and probably the best bet for duplicating British recipes. Look for it in health-food stores, and expect to pay slightly more than for supermarket brown sugars.

## Making Caramel in the Microwave

Caramelizing sugar on the stove is tricky and messy, but a microwave oven can simplify the chore remarkably. It's important to watch the sugar carefully, because it is very easy to overcook it. Even after the sugar leaves the microwave it will continue to darken, and if left too long will be reduced to a burnt, unpleasant mess. Microwave ovens vary considerably, and your times may well be different from mine; mine were certainly different from those in the microwave cookbook!

Dissolve 1 cup of sugar with 1/3 cup of water in a transparent microwave-safe bowl (make sure there's plenty of room in the bowl — cooking sugar is very active). Cover tightly with plastic wrap and microwave on high for about 5 1/2 to 6 minutes. Watch carefully and take the sugar out when it's golden brown; it will darken considerably after it comes out. Be careful! The sugar generates a lot of steam, so do not attempt to pull the plastic wrap off the bowl without cutting a vent first — watch your hands!

As the caramel cools, it will harden. The best advice for using this caramel in beer is to experiment with it, then make the actual caramel while your wort is boiling and pour the molten caramel directly into the wort. And let us know how the beer turns out!

## Making Invert Sugar

Dissolve 1 pound of cane sugar in 1/4 cup of water in a stainless-steel or enamel pot. Warm until syrupy, then add 1/8 teaspoon tartaric acid and heat a few minutes until light golden. Do not boil.

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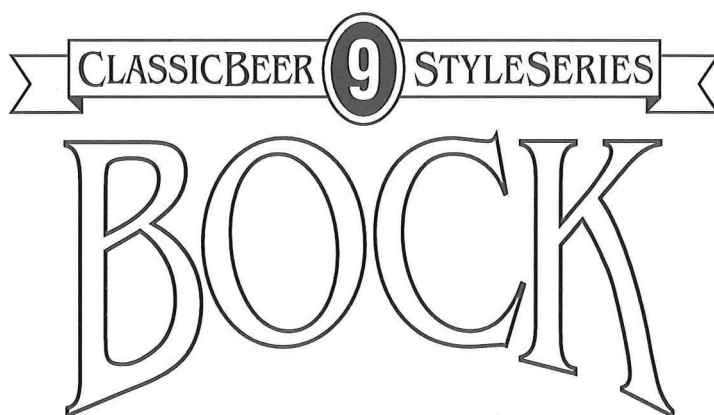
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# Heat Capacity Calculations for Mashing

By Kurt Froning

**F**or me, the magical part of brewing beer is when hot water and malted grain are mixed.

Wait long enough and a sweet liquid appears. Until the invention of the thermometer, experience was the brewer's guide. An elbow stuck in the kettle, or experimentation with boiling part of the mash separately and returning it to get the right amount of heat. Mashing is easier with a thermometer but is basically the same process of heating two ingredients, malted grain and water, to specific temperatures for specific periods of time.

Brewers typically use three different mashing techniques: infusion, where the grains and water are heated to a single temperature; step infusion, where the grain and water mixture is heated to multiple strike temperatures and held for given amounts of time; or decoction, where part or all of the grain and water is removed, boiled and returned to the mash tun.

Mechanically, homebrewers can use a large kettle on the stove to heat up the mash. Infusing boiling water into grain and water already in a bucket can work, too, and has some benefits. I apply this method to mash and sparge in the same vessel, never moving mash from a boiling kettle to a lauter-tun. This method and its advantages for reducing hot-side aeration were outlined in "Beer Stability" by Micah Millspaw and Bob Jones in *zymurgy* Winter 1992 (Vol. 15, No. 5). To use the infusion technique successfully you need to know how much hot water to add to get your strike temperatures.

This article describes how to use heat capacity equations to calculate how much heat must be added to a mash to get a given temperature. The methods can be used any time you can accurately define what is being heated and what is heating it. A single vessel method of infusion mashing based on heat capacity calculations will be described. I also will discuss some basics of heat transfer, or the science of how heat gets from one place to another, that are important to brewers.





## Heating Water and Grain

Applying heat to water or any other substance warms it up. You can keep track of how much heat you have added by watching the temperature. Different materials take different amounts of heat to raise their temperatures by the same amount. Scientists keep track of this with a number called heat capacity that measures the amount of energy it takes to raise the temperature of a given amount of material by one degree. The measure of energy in the English system is the Btu (British thermal unit). The unit of heat capacity is Btu per pound per degree F.

Water and grains have different heat capacities. The same property that makes water so useful to humans, its polar nature (water molecules act like magnets and stick together), also makes it relatively hard to heat up. By definition, it takes 1 Btu to heat one pound of water one degree F. It only takes about 0.4 Btu to heat one pound of grain one degree F.

Another fact about the world is that all energy is conserved. That means you can always account for all the energy in a closed system. If you mix a quart of cold water with a quart of hot water (in a well-insulated container) you will get two quarts at a temperature somewhere in between. You can calculate what that temperature will be.

The concepts of heat capacity and energy conservation are combined in a mathematical formula that can be used to calculate the answer to our original concern, which is how much heat do I need to add to raise my mash to the strike temperatures I want? First, let's define the variables:

CPG	=	heat capacity of grain
CPW	=	heat capacity of water = 1
LBG	=	pounds of grain
LBW	=	pounds of water
LBBW	=	pounds of boiling water
T2	=	strike temperature
T1	=	current temperature of water/grain
TB	=	boiling temperature of water

Pounds of water must be used because the heat capacity numbers are based on weight instead of volume. You can convert later by remembering that a quart of water weighs 2.08 pounds at room temperature.

Equation one, the formula to calculate how much heat it will take to raise the mash to strike temperature (T2), is:

$$① \text{ CPG} \times \text{LBG} (T2 - T1) + \text{CPW} \times \text{LBW} (T2 - T1) = \text{heat to be added.}$$

This heat can come from boiling water. The amount of heat in the boiling water that will heat what is already in the bucket is calculated with equation two:

$$② \text{ CPW} \times \text{LBBW} (TB - T2) = \text{heat provided by the boiling water.}$$

By equating the left sides of the equations and solving for pounds of boiling water we can figure how much water to boil.

One more thing that a good mash has is a desirable ratio of water to grain. The amount of boiling water plus the water already in the bucket should not add up to more than your target dilution for saccharification. I use 1 1/4 quarts per pound of grain. I've done a little

more algebra and come up with a more useful equation:

$$③ \text{ CPG} \times \text{LBG} (T2 - T1) + \text{LBW} (T2 - T1) = \text{LBBW} (TB - T1)$$

LBW is now the amount of water based on your target dilution. I also have dropped the heat capacity of water because by definition it is always one for these calculations.

As an example, suppose you want to mash seven pounds of grain with 1 1/4 quarts of water per pound of grain. The mash temperature will be 150 degrees F (65.5 degrees C). How much heat will it take to heat it from room temperature (68 degrees F or 20 degrees C)? Using the left side of equation three:

$$7 \text{ pounds grain} \times 0.41 \times (150 - 68) + 8.75 \text{ quarts} \times 2.08 \text{ pounds/quart of water} \times (150 - 68) = 1727.8 \text{ Btu.}$$

How much of the water should you bring to boiling? Using the right side of the equation:

$$1727.8 \text{ Btu} = \text{LBBW} \times (212 - 68)$$

$$\text{LBBW} = 12 \text{ pounds} \div 2.08 \text{ pounds of water per quart} = 5 \frac{3}{4} \text{ quarts.}$$

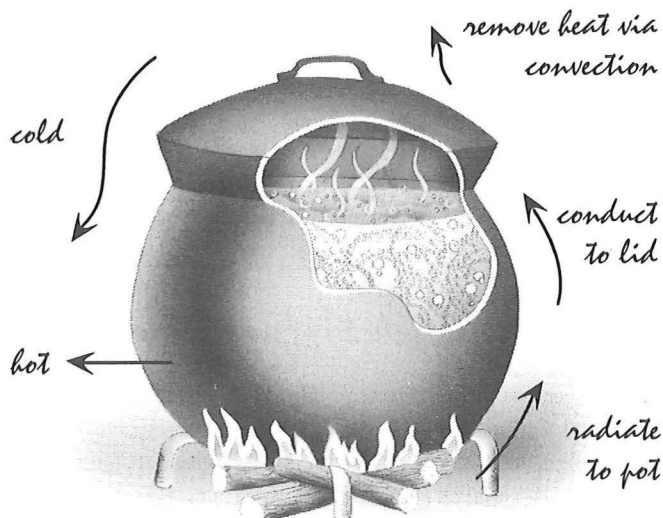
The other three quarts to make up the required mash water are added before the boiling water. This is similar to doughing-in for a decoction mash.

There are other calculations you can do, such as figuring how much more boiling water you might need to add if you missed a strike temperature. In this case, use equations one and two, putting in your strike temperature as T2, the current temperature for T1 and how much water you have in the bucket already as LBW.

Although the math might be hard, the answers look like a dream come true. If you used the numbers and did a mash you would probably be disappointed. The temperature would probably be low. Why? Because energy doesn't like to stay in one place if it can go to another. Most home mash systems suffer from heat loss.

## Heat Transfer

Heat doesn't like to stay put. Like an unruly child, you put him on the chair and he just slides off. Heat (or more generally energy) moves around by conduction, convection and radiation.



Conduction is the method by which a pan's handle gets hot when the bottom is heated. Convection is the method an immersion wort chiller uses. The cold water moving through the copper tube picks up heat from hot wort. As the water moves through the tube, it carries energy away with it. It's also how you get cold on a windy day. Radiation is the sun's method of getting heat here through space. Conduction and convection are most applicable to the homebrewer.

Heat is conducted to the sides, top and bottom of the mash vessel where it is then lost by convection to the surrounding air. That's why good insulation is so important. A less obvious source of heat loss from the mash is to the mash vessel itself. Pour hot liquid into a cold bucket and the first thing that has to be heated is the bucket. Preheating with hot water is a must for a good infusion mash done with only boiling water. Another surprising place to lose heat is through metal fittings protruding outside the insulation. Copper is an extremely efficient mover of heat. Insulate with a towel or something similar while holding a mash temperature.

If you have mashed in an open container you are probably familiar with another way to lose heat. Evaporating water carries away huge amounts of heat. In fact, one ounce of evaporating water carries away about 45 Btus of heat. Compare that with the 9 Btus it takes to heat the same ounce to boiling from room temperature. The moral is keep a lid on it! Controlling heat loss can best be done by keeping heat transfer in mind. Use insulation, a tight-fitting lid and stay out of drafts.

How else might the equations not work? If you are boiling water, check to see at what temperature it is boiling. My water boils at 212 degrees F, but mountain folks' water boils at lower temperatures. You might have to use a temperature around 200 degrees F.

One other variable is the heat capacity of grain. There can be variation between the different grains, but the biggest variable could be moisture content. You won't know the moisture content of your grain, but as the table shows, moist grain will have a higher heat capacity because you have to heat that water, too.

% Moisture	Heat Capacity in Btu/pound/degree F <sup>1</sup>
0	0.38
2	0.39
4	0.40
6	0.41

Because you are unlikely to know your grain's moisture content, you'll have to experiment. Luckily, the differences are small, so don't worry.

The size of your system can affect how well the equations work. Fortunately I have had best luck with a five-gallon system. Smaller systems present more surface area per volume, thus losing more heat per pound of mash. The following method uses all the above ideas to produce a fairly simple mash system and allows you to apply the heat calculations.

## Single Bucket Infusion Mash

Use a very well-insulated five-gallon plastic bucket with a tight-fitting lid. I insulate the sides, top and the bottom with two layers of rigid building insulation. The top pieces are glued on, but the bottom ones just sit under the bucket while mashing. Heat rises, thus a well-insulated top is important, but a bottom can lose heat through

conduction. I was amazed at how hot the counter top was (and how much the mash temperature had dropped) the first time I used a bucket without an insulated bottom. If you use a picnic cooler check the lid. My cooler lid has no insulation. It was designed to keep things cool and insulation on top is not as important. Put a big blanket on top or fill the lid with foam insulation. A drain method that does not require underletting (see glossary) is important. Underlet water must be heated, too. The extra boiling water used to do that would thin out the mash too much. I have used both a slotted copper tube and a false bottom that sits right on the bottom of the bucket. I like the false bottom better because it has no protruding metal.

Infuse hot water into the bucket either through the drain or by a down tube through the top. Be careful — handling tubes full of boiling water can be dangerous. Be sure any connections are secure and use a potholder over your hands to control tubes. Better yet, insulate the transfer tube. I use a short piece of copper tube connected to the end of the three-foot drain tube on the bucket to immerse in the kettle of boiling water when infusing into the bucket. It works well when draining wort into the boiling kettle too, reducing splashing and oxidation.

## Mashing

The night before mashing I boil my brew water to remove chlorine, then let it cool to room temperature. Using water at room temperature provides a source of water with a more stable temperature than straight tap water. If you do not boil, then draw your water several hours ahead to let it become room temperature. Stable starting temperatures are very important for the water that won't be heated to boiling. Grain should be at room temperature, too.

Decide which ratio of water to grain you will be using. Use the equations to find the amount of water you will boil and how much you will add at room temperature. The first couple of times, you might want to boil more than you calculated. After a couple of mashes, you'll be able to adjust to make up for system heat losses. Be sure to use a lid on the boiling kettle. Do not allow a lot of water to evaporate. While heating the water to a boil, fill the mash/lauter-tun with very hot water to preheat.

As the water approaches boiling, drain the mash/lauter-tun and add grain and the ambient water to the bucket. I dough-in by mixing the water and grain in another bucket, letting the water soak in. Add the boiling water slowly through the down tube or bottom drain. By manipulating the heights of the bucket and the boil kettle, I start a siphon and let the boiling water in that way. This has the added advantage of not putting the big slug of air left in the inlet tube up through the mash before liquid starts to flow. Again, be careful, you are playing with boiling water. Check the mash temperature. I find that I have to stir to even the temperature throughout the mash. Stir gently! The idea is to keep as much air out of the hot mash as possible. Put the lid on tightly. Conserving heat helps hold the strike temperature thus avoiding reheating.

What if you miss your strike temperature? You have two options — add more boiling water or drain some liquor and heat it up. If you assume that the liquor has the same heat capacity as water, you can use the equations to figure how much to heat up.



Near the end of the conversion time take another temperature reading. Calculate how much more boiling water you will need to add for mash-out using equations one and two. I add all specialty grains (caramel, chocolate, black and roasted barley) at mash-out. This reduces the pounds of grain that need to be fully mashed, reducing the total amount of water that needs to be heated to mash-out. Proceed with sparging as usual. Notice that you have skipped the hot mash transfer step. I do not recycle any wort back to the top of the bucket. I have noticed no detrimental effect on flavor or clarity. As soon as there are a couple of inches of wort in the kettle, turn the fire on. I generally achieve full boil about the same time I finish sparging.

Are there disadvantages to this system? One could be that shocking ambient malt with boiling water destroys enzymes. I think that is true, but the magnitude of the effect must be judged by results. I still like my beer, how about you? One way around this would be to do a very thick protein rest on the stove top. Transfer to the bucket then infuse with boiling water. Some may find the variability added by heat losses more troubling than those of hot-side aeration from tossing hot mash through the air. As long as you don't throw your old system out you can always go back to it.

My goal was to simplify my brewing procedure. For the mathematically inclined, and hopefully for others, this should help. If you like numbers you should be able to come up with many other uses, like calculating decoction volumes and correcting for missed temperatures. It's all in the equations.

## Glossary<sup>2</sup>

**Decoction** — The mashing process of boiling portions of the mash in a separate vessel to raise the temperature.

**Dough-in** (or mash-in) — Mixing water with ground malt before heating.

**Lautering** — The process of separating the spent grains from the sweet wort with a straining apparatus.

**Mash rest** — Maintaining the mashing temperature at a specific ideal level for certain desired enzymatic reactions.


**Strike temperature** — The initial temperature of water added to the grist.

**Underlet** — Pushing water or wort into the bottom of the mash tun.

## References

1. Briggs, D.E., Hough, R. Stevens, T.W. Young, *Malting and Brewing Science*, Vol. I, Chapman and Hall, 1982, p. 324.

2. Forget, Carl, *The Association of Brewers' Dictionary of Beer and Brewing*, Brewers Publications, 1988.

Kurt Froning, a brewer for 3 1/2 years, has a chemical engineering degree (among others) and works in manufacturing for a large medical supply distributor. The history of food and cooking methods first got him into brewing. One of Kurt's meads advanced to the second round of the AHA National Homebrew Competition in 1993. 



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# Scroll Through Brewing Software

By Ray Daniels and Steve Hamburg



elcome to the wonderful world of homebrew software. It's new and exciting — but you won't necessarily want to run right out and spend your hard-earned money on the first program you come across.

In this article we examine six programs that can be used on Mac or PC systems to help you create or record your brewing efforts. All of these fit into two basic functional models or some combination. The first is a simple on-line recipe system or data base that lets you log and track recipes in a consistent format. The second offers some computational muscle, includes built-in calculators, formulas for computing IBUs, gravities and so on. In almost all cases, the programs also provide assistance on raw ingredients, techniques and beer styles.

We have spent many hours with the programs covered here. Each has been run, explored and at times used for actual brewing. By now we could write dozens of pages on these programs, but the realities of publishing don't allow us that luxury. Instead, we'll try to give you a feel for the strengths and weaknesses of each product through our descriptions.

When we set out to write our review we agreed to evaluate these programs as we would any other possible addition to our breweries. The chief criterion is: will it help me brew better beer? Because of various shortcomings none of these packages as yet offers a combined set of features that meets that test. As a result we cannot recommend any of the programs without reservation. At the same time almost every program offers something of merit and the promise of better things to come.



## REVIEW CRITERIA

**A**fter numerous long conversations we settled on six categories to represent the critical features of each software package. These include stability, ease of use, guidance, features, performance and flexibility. We have rated each package using a five-point scale for each of these six categories, five means excellent, one means poor. A score of three on this scale means average or acceptable.

You can review the ratings for each software program by category in the individual reviews. Here we will describe the factors considered for each category.

### Features

This assessment category strikes at the heart of the programmer's muse. Every piece of software reflects the thinking and creativity of its programmer. The activities the program offers and the way they are executed all come ultimately from the programmer's own thought process. Here we looked for the scope of brewing activities assisted by the software and the inventiveness of the execution. A score of three in this category indicates good recipe formulation calculations, a batch record storage and retrieval system and some way to record brewing and tasting notes.

### Stability

All the programs we reviewed appear to be written by homebrewers who pursue their software publishing efforts as a sidelight to some more lucrative career. None are as slick and bulletproof as well-tested commercial applications. Under the stability category we simply want to convey the risks and frustrations you are likely to experience with regard to program crashes and data loss. A three in this category indicates an occasional crash without data loss.

### Ease of Use

Both Windows and Mac applications follow some standard conventions in terms of key and mouse functions. Once accustomed, users can quickly adapt new software and easily move between applications. Compliance to these standards is one aspect of ease of use we examined.

Under this category we looked at the flow or sequence of the program to determine if it was easy to follow and easy to understand upon first use without having to read the dreaded documentation. In addition, we considered it a bonus if the program helped to minimize the amount of actual typing you might have to do.

### Guidance

Recipe formulation requires a lot of calculations and that is a big part of what brewing software can provide. But to decide where to take your brew, you usually target an established beer style. Quantitative factors like gravity, color and IBUs give you a general idea of what is required. In part, this category looks at how each package guides your adjustment of these quantitative factors.

To truly target a style you need specific information about the characteristic grains and hops that go into it. We assessed the ability of each program to provide this qualitative information as a part of its brewing guidance. A three here means good information about the quantitative effects of each addition or edit with little or no qualitative information about the style being offered.

### Performance

As Windows has become the dominant operating system found on American PCs, users have struggled to match the memory, speed and storage demands of ever-more-greedy applications. And, while a lot of people have muscle machines at the office, most are still getting by with a wimpier model at home. Herein lies the problem. To get a three in this category a program had to run reasonably well on a typical home machine such as a 386SX with two to four megabytes of RAM. Similar criteria were applied to the Mac programs.

### Flexibility

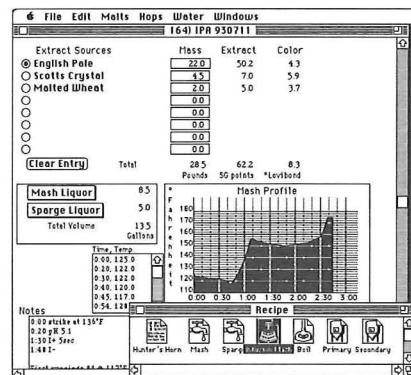
Not everyone brews the same way and we don't all use the same ingredients or follow the same set of style standards. And we certainly don't all just brew the two dozen most common styles of beer. This category looks at the range and scope of options provided for users in the selection of hops, malts and beer styles. As an added bonus it looks for the ability to add or edit these lists to conform to your own practices. A three in this area means the program offered a good list of pre-set styles and the ability to add or edit grain and hop components.

## THE SOFTWARE

### The Brewer's Planner

(Macintosh) The Crafty Fox  
(a.k.a. Darryl Richman),

15600 N.E. 8th St., Suite A3-327, Bellevue, WA 98009, (206) 641-5535, \$50.



### Features

**Comments:** Feature-rich, strong on calculations, nice bells and whistles like a beer mug hourglass that actually empties as functions execute.

### Stability

**Comments:** Only one major crash encountered, which locked the system and caused loss of all information added during session.

### Ease of Use

**Comments:** Tough to get started, tutorial is a must, but simple enough once you get the hang of it.

### Guidance

**Comments:** No style guidelines, no on-line help.

### Performance

**Comments:** Adequate on Mac IIcx.

### Flexibility

**Comments:** Malt, hops, water data all editable. Easy-to-set program defaults.

**T**his complex program provides about as much computational muscle as any product we used. With it you can design and track the entire scope of brewing activities, right down to the scores and comments from competition judges. Further, it allows easy customization of hop, malt and water data, extraction rates and measurement defaults. It also includes a built-in brewer's calculator with a powerful conversion feature.

In spite of all this power, Brewer's Planner lacks both program and brewing guidance. There is no on-line help. If you want to know how your recipe compares to an es-

tablished beer style, you'll have to pull out a book and do it manually.

Experienced Mac users won't find the Brewer's Planner overly difficult to use. Still its complexity can be a bit daunting for first-timers and its interface is not always intuitive. To get up and running as quickly as possible, run through the two tutorials and play around a bit with the six sample recipes included.

When you start from scratch the only active card is the recipe overview, yet most of the information on it must come from other cards that must be opened in separate steps. We suggest it would be a lot easier if a new recipe started out with a logical minimum subset of cards (for example, water, mash, boil, fermentation).

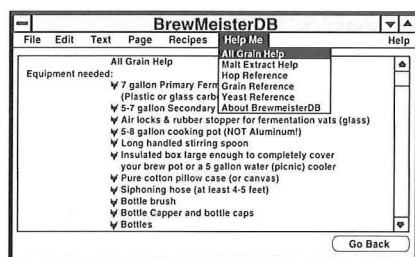
On the whole, the program performed with reasonable speed and reliability. We did force a hard crash by adding a second fermentation card once, but all other sessions — some quite long and complex — proceeded without incident.

Despite some reservations, The Brewer's Planner is our choice on the Mac. If it offered on-line style guidelines and technical assistance we would recommend it with greater enthusiasm.

## BrewMeister DB

(Windows and Macintosh)

Virtual Mountain Inc., PO Box 239,  
Fitzwilliam, NH 03447, \$39.



### Features \_\_\_\_\_ 1.5

**Comments:** Very basic recipe storage and retrieval system. Calculates alcohol by volume from gravities. Simple measurement converter. Prints simple bottle labels.

### Stability \_\_\_\_\_ 4

**Comments:** No crashes encountered.

### Ease of Use (Mac) \_\_\_\_\_ 3

**Comments:** Follows version 2.1 HyperCard standards but a bit awkward to use if not familiar with HyperCard.

### (Windows) \_\_\_\_\_ 1

**Comments:** Designer's attempt to port this Mac HyperCard to Windows falls way short. HyperCard key assignments make little sense on Windows.

### Guidance \_\_\_\_\_ 0.5

**Comments:** Has introductory help on process and ingredients. No style information at all. Has a basic glossary of brewing terms. You can edit all information and you'll want to because there are typos.

### Performance \_\_\_\_\_ 3

**Comments:** Adequate on Mac and Windows.

### Flexibility \_\_\_\_\_ 2

**Comments:** All help and glossary items can be customized. This measure is not comparable to other packages listed because of lack of calculation functions.

**B**rewMeisterDB is trumpeted as "the complete brewing database software program for the modern homebrewer." Like most advertising, this is a bit of a stretch. In fact, the program offers a simple recipe log with rudimentary calculations.

Recipes are entered on a standard form that includes separate fields for ingredients, procedures, mash details, starting and terminal gravities, fermentation times and so on. The recipes can be sorted by any field, so you can organize them by name, style or gravity if you wish. Because the program doesn't limit what you enter in these fields you'll have to develop your own methods of uniform data entry if you hope to use the search functions effectively.

Basic help is offered for extract and grain brewing procedures, hops, grains and yeast. In these help sections we would like to have been able to page down instead of always having to use the scroll bar. But complete editability allows you to change anything you don't like, even in the glossary of brewing terms.

If you are so inclined, BrewMeisterDB generates customized bottle labels and the Mac version includes an editable list of homebrew suppliers. We liked the converter table, which lets you translate between different measurements, weights and temperatures.

In operation, we were less than impressed with the program, particularly with the Windows version. The operating conventions on the Mac, while awkward for those not familiar with HyperCard, are fairly standard. Under Windows many standard interface fea-

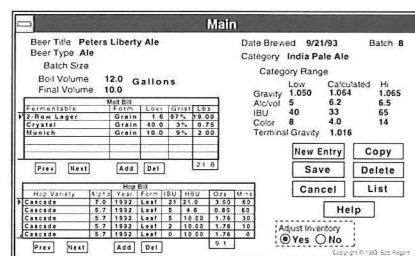
tures are dysfunctional, further exaggerating the program's awkwardness.

While the product is stable on both machines, there's a "homecooked" look about it. For instance, the help text, while basically accurate, has typos. There seems to have been no attempt by the designer to "Windowize" the system, a fact demonstrated by bullet points that turn into yen signs on the PC.

BrewMeisterDB is a very basic recipe keeper that is at its best on a Macintosh. In its current form it is not recommended under Windows.

## Brewer's Calculator

(Windows) Brewer's Calculator,  
15 Camellia Place, Oakland, CA 94602,  
(510) 482-1609, \$39 plus \$3 P&H.



### Features \_\_\_\_\_ 5

**Comments:** Addresses every aspect of the brewing process. Intelligent recipe logging and recipe search by style or name. Water calculations need additional work.

### Stability \_\_\_\_\_ 4

**Comments:** No data loss in our tests. One soft crash.

### Ease of Use \_\_\_\_\_ 3

**Comments:** Some significant inconsistencies in implementation of Windows conventions, but overall easy to follow and execute.

### Guidance \_\_\_\_\_ 5

**Comments:** 100 style guidelines including mead, cider, saké, ales and lagers. In-depth descriptions of styles, on-screen guidelines to gravity, color and IBUs.

### Performance \_\_\_\_\_ 0

**Comments:** Even with ample memory this is a slow performer on a 386SX. Avoid unless you have a 486 with four megabytes of memory.

### Flexibility \_\_\_\_\_ 4.5

**Comments:** All components of malt and hops were editable including additions and deletions. If 100 styles aren't enough for you, you can create your own using the accompanying editor. Needs water models and full water treatment calculations from tap-water base.



If the computer you use for homebrew activities has a fair amount of muscle, Brewer's Calculator holds a lot of promise. It provides a wealth of options and proved fairly stable in testing. But if you aren't equipped with at least a 486SX machine the cost of using Brewer's Calculator will be measured in lost time — namely your own.

We ran Brewer's Calculator on several different machines and found it was speedy enough on the higher end group, but essentially unusable on the more economical 386SX machines that people are likely to have at home.

This program does a great job on all the basics and beyond. It offers some very nice additional features, especially for all-grain brewing. The mash screen allows entry of up to five mash rests and calculates the needed volumes of mash and sparge water. At the boil screen, it calculates the additional water needed to make up for evaporation during the boil.

Another great feature is the conversion calculator. It translates between different units of measure (i.e., grams to ounces) in five areas of measure: gravity, weight, temperature, volume and color.

As a recipe log, Brewer's Calculator holds up well. It assigns each batch a number and then lists all your recipes in a ledger-type log. You can search your recipes using any part of a name (such as "IPA" or "berry") or by style. This search process seems to be about all you would ever really need. As for keeping a paper log, which we recommend, Brewer's Calculator printed out recipes without a problem, even over a network.

## Brewer's Workshop

(Windows) TKO Software,  
423 Greenwood Dr., Arroyo Grande,  
CA 93420, (805) 481-4900, \$49.

The screenshot shows the 'Brewer's Workshop' window. It has a menu bar with File, Ale, Lager, Grain, Extracts, Hops, Options, and Help. Below the menu is a 'Batch' section with fields for 'Batch: 41', 'Days since kegging: 493', 'Days in Primary: 38', 'Boil size - gals: 5.0', 'Days in Secondary: 11', and 'Batch size - gals: 5.0'. There's a 'Brewing and Tasting Comments' section with a text area containing a recipe for 'Sierra Nevada Celebration Ale'. Below that is an 'Ingredients' list with columns for Name, Amount, and Units. The list includes Crystal 20, Munich, Barley, Wheat, Roasted Barley, Amber Syrup, California Light, Australian Light Dry, Caramel, and Cascade. To the right of the ingredients list is a 'Style' section with fields for Style, Gravity, Color, and IBUs.

## Features \_\_\_\_\_ 2

**Comments:** Full recipe formulation calculations but no way to search existing recipes. Slightly confusing system for recipe filing.

## Stability \_\_\_\_\_ 3

**Comments:** No data loss, occasional crash.

## Ease of Use \_\_\_\_\_ 4

**Comments:** Only slight deviations from Windows conventions. Program built around a single screen that makes basic features easy to handle.

## Guidance \_\_\_\_\_ 3.5

**Comments:** This version lacks some basic styles in the guidance section such as barley wine and Kölsch. Otherwise it has great qualitative and quantitative information.

## Performance \_\_\_\_\_ 2

**Comments:** Not snappy on 386SX, but usable.

## Flexibility \_\_\_\_\_ 1

**Comments:** Current hop alpha-acid levels are only editable feature. Can't add, delete or edit hop or malt tables or styles.

We tested version 2.07 of this package which had been on sale at the AHA 1993 National Homebrewers Conference. The author promises version 3.0 with many enhancements by the time this article is published, but at this time we cannot comment on its features.

Overall, Brewer's Workshop is the simplest of the three Windows-based recipe calculators reviewed here. Based around a single main screen, it uses pull-down menus and dialog boxes to add malts, hops and other ingredients.

The program offers a limited menu of 33 style models to help guide the formulation of your recipe. A "style info" button details qualitative aspects of a style such as typical malts and hop varieties. When combined with the numerical guides for gravity, color and IBUs, this allows you to assemble a pretty good recipe with virtually no prior knowledge of a style.

Unfortunately, the style help lacks thoroughness. Some common styles were excluded and the program doesn't allow editing or additions to the style information.

We found Brewer's Workshop less than desirable as a log of your brewing efforts. The program comes with 42 past AHA winners' recipes already entered. These are a nice ref-

erence, but they coexist with your actual recipes in the log once you start using the program and we found that a bit confusing.

This program provides an adequate tool for those who just need the essentials of recipe formulation. For those who are just beginning to formulate their own recipes it provides lots of guidance for a limited number of styles. The promise of enhanced versions in the near future may make this a program that you can grow with.

## Brew Master

(Windows) Abita Software Development,  
PO Box 67402, Scotts Valley,  
CA 95067, (408) 461-0136, \$39.

The screenshot shows the 'Create Recipe' window in Brew Master. It has a 'Name' field with 'Ale Ale' and a 'Style' dropdown with 'Pale Ale'. Below this is a 'Grains' section with a list of ingredients: 6.0 lbs of 2 Row Klages and 1.0 lbs of Caramel - Extra Dark (120L). There are 'Add...', 'Delete', and 'Change...' buttons. Below the grains is a 'Mash' section with fields for 'Temperature: 155.0', 'Time (Minutes): 60.0', and 'Efficiency: 75.0'. Below the mash is a 'Hops' section with a list of ingredients: 1.0 oz of Chinook at 60.0 minutes, 0.5 oz of Cascade at 30.0 minutes, and 0.5 oz of Cascade at 5.0 minutes. There are 'Add...', 'Delete', and 'Change...' buttons. Below the hops is a 'Calculated Results' section with fields for 'Batch Size: 5.0', 'Original Gravity: 1.034', 'Color: 25.92 (Dark Amber)', and 'Bitterness: 63.0'. There is a 'Style Critique' section with a list of items: 'Too Dark', 'Too Bitter', and 'Low Gravity'. At the bottom are buttons for 'Other...', 'Print...', 'OK', 'Cancel', and 'Help'.

## Features \_\_\_\_\_ 5

**Comments:** Great calculations, good automation of some data recording chores. Unique and practical inventory system and shopping list. Creative and enjoyable.

## Stability \_\_\_\_\_ 0

**Comments:** Our version 1.0 release almost could not be run without crashing. Data loss was frequent and usually complete.

## Ease of Use \_\_\_\_\_ 2

**Comments:** Some features hard to find. You can lose the sequence of the brewing process the first time or two through. Some innovative features help to reduce the typing required.

## Guidance \_\_\_\_\_ 1

**Comments:** Only 27 style models provided. Little qualitative style information provided at the recipe formulation screen. Even quantitative indicators don't tell you how far off you are. Some serious errors in target values for some styles such as Pilsener gravity of 1.061 to 1.076 — oops!

## Performance \_\_\_\_\_ 4

**Comments:** Snappy execution even on our wimpy 386SX. See "Stability" above to understand the cost of this performance.

## Flexibility \_\_\_\_\_ 5

**Comments:** Full range of editability for malt, hops and styles. Accommodates different mash styles and multiple rests.

**A**mong the Windows programs this one got top honors — right up to the point that it crashed, losing all data related to the recipe we had been working with for several hours and a bunch of hop inventory data. This phenomenon was repeated several times.

When it did run, Brew Master showed us speedy operation, even on our slow 386SX machines. Snappy response makes recipe formulation and batch record keeping as spontaneous and easy as it should be.

In addition, Brew Master is packed with innovative and intelligent features. Brewers can indicate their preference for units of measure and methods of calculation. They can also enter starting water chemistry values in parts per million and edit or create new style guidelines.

One unique feature is the ability to formulate a recipe from the ingredients you actually have on hand. Brew Master lets you enter your current supplies and after formulation generates a shopping list of the items you don't have.

Unlike other programs, this one only shows you the gravity, color and IBU parameters for your recipe and not those for the style. To help guide recipe formulation, it provides a small box that gives you comments. Typical comments include "low gravity," "too dark" and "too bitter." Rather than looking at numbers you follow these verbal cues while putting together your recipe. Unfortunately, if you really want to see the style numbers to tell exactly where you are, you are out of luck.

In summary, we can only hope that the factors contributing to the regular General Protection Faults (read: big crashes) will be addressed in the near future. This program has a lot to offer in terms of thoroughness, flexibility, speed and convenience and we would both like to work with it, or a stable program very much like it, regularly in our own brewing.

## Beer Recipe Formulator

(MS-DOS) Chris Campanelli,  
109 N. Ardmore Ave., Villa Park, IL 60181,  
e-mail akcs.chrisc@vpnet.chi.il.us, Free.

Gallons: 5.00	Pounds: 8.25	Lovibond: 2.8	80% O.G. 1.046	IBU 0.0
GERMAN PILSENER	sm 2.5-4.0		1.044-1.050	30-40
7.50	90.9	LAGER 2-ROW	VIENNA	
		LAGER 6-ROW	CHOCOLATE	
		PILS 2-ROW	ROAST BARLEY	
		PILS 6-ROW	BLACK PATENT	
		WHEAT	FLAKED BARLEY	
0.75	9.1	DEXTRINE	RICE	
		CRYSTAL 10L	OATS	
		CRYSTAL 20L	CORN	
		CRYSTAL 40L	BROWN SUGAR	
		CRYSTAL 60L	RICE SYRUP	
		CRYSTAL 80L	DEXTRINE POWD	
		CRYSTAL 100L	HONEY	
		CRYSTAL 120L		
		PALE ALE		
		MILD ALE		
		MUNICH LIGHT		
		MUNICH DARK		
[+] [-] [←] [→] [MENU [ESC]] [WATER [F1]] [YIELD [F2]] [AHA [F3]] [HOPS [F10]]				

## Features \_\_\_\_\_ 2

**Comments:** No record storage, no comments, etc. Strictly a recipe formulator in U.S. weights and measures.

## Stability \_\_\_\_\_ 5

**Comments:** Rock solid.

## Ease of Use \_\_\_\_\_ 4

**Comments:** Some odd conventions, but easy once you get them — in about 30 seconds. Program won't recognize inverted "T" cursor keys at times.

## Guidance \_\_\_\_\_ 3

**Comments:** Full quantitative guidelines for 63 AHA styles, but no qualitative information at all.

## Performance \_\_\_\_\_ 5

**Comments:** Zippy DOS application. Would probably run great on a 286 machine, although we didn't try it.

## Flexibility \_\_\_\_\_ 5

**Comments:** Fully editable hop and malt values. Editable increments. Will formulate recipes of any size as long as you are willing to use gallons, pounds and ounces as your measures.

**W**hile this shareware program doesn't save your recipes and isn't written for Windows, it does a good job of recipe formulation. Best of all, it can be edited in all the right places and it gives intelligent print-outs of your recipes.

If you hate to type, this is the program for you. All functions operate through arrow keys, the plus and minus keys and four or five function keys. How much simpler can you get?

Example: the malt screen presents 46 types of malt. To add one, you cursor to the desired malt and press the "+" key. The weight of grain to be included in your recipe appears next to the malt listing, allowing you to view a very complex malt bill on one screen. Function keys allow you to select one of 63 style models drawn from the AHA definitions, change the size of the batch or alter the yield assumption for the mash.

We wish this program included an option for printing to a file. This would greatly enhance the utility of the program by allowing you to capture and save the information electronically in a word processor or data base.

This program is simple and easy to use, and is one of two programs that can be used in larger breweries (The Brewer's Planner is the other). All measures related to batch size, malt and hop additions can be adjusted under the "utilities" section.

Ray Daniels, National BJCP Judge, has written and commercialized his own software in the past and tinkers with recipe formulation calculations for his own homebrewing.

Steve Hamburg, National BJCP judge, is the Senior Software Quality Analyst at SPSS Inc., a major developer of statistical software for Windows, Mac, DOS and UNIX.

"The only ingredient Frozen Wort did not supply was the water."

-Stu Tallman, 1992 AHA Homebrewer of the Year

-Munich Dunkel - "StuBrew"

"Frozen Wort's Harrington 2-row malted barley is the palest, highest quality, and most versatile domestic barley we have ever used. We prefer it to Klages. It was used in any of our winning beers."

- Steve and Tina Daniel, 1992 Ninkasi Award (AHA High Point Winners)

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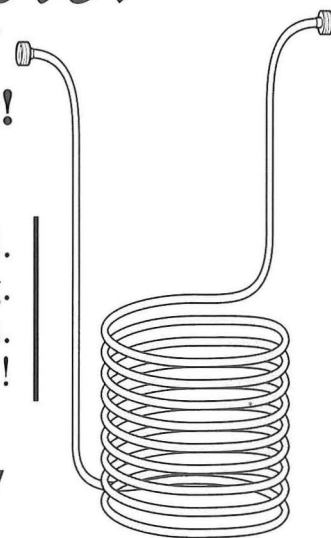
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Brewing 4/12/90	1.105	60	1.105	24.0	Days in Primary: 34 Days in Secondary: 26 Days since bottling: 1257

**Ingredients Worksheet**

Title: Breakfast of Champions Imperial Stout Framboise

Recipe File: brewer.rec Brewer: Homer Simpson

Size: Batch: 27

Boil size - gals: 5.0

Batch size - gals: 5.0

Style: Imperial Stout

Low-Predicted-Hi

Gravity	75	85	95
Color	20	39	40
IBU's	50	140	80

Extraction Efficiency: 80 %

**Ingredients**

Beverage People Dark Dry	5 lb - 0 oz
Beverage People Amber Dry	2 lb - 12 oz
Beverage People Rice Extract	0 lb - 6 oz
Perle	2.0 oz 7.6% 60 min
Northern Brewer	1.0 oz 8.1%
Nugget	1.75 oz 12.1% 30 min
Erica	0.25 oz 10.0% 30 min
Chinook	0.25 oz 12.2% 30 min
Hallertauer	2.0 oz 3.7% 0 min
Tettnanger	2.0 oz 4.5% 0 min
Saaz	0.25 oz 4.4% 0 min
Wheaties 2.0	ounces (wt)
Frozen raspberries	30.0 ounces (wt)
Irish Moss	1.0 tablespoon

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## Canadian Brewing Phenomenon *Comes to the United States*

**O**n Aug. 19, 1993, an article appeared in the *Wall Street Journal* titled "How to Get a Head of High Beer Taxes: Visit the U-brew." The subject was the proliferation of u-brew stores in Canada. Writer Larry Greenberg reported, "What laundromats are to clothes, Canada's u-brews are to the thirsty and the heavily taxed." Beer taxes in Canada are substantial and, according to Greenberg, push the price of a six-pack of domestic beer to as much as double the equivalent U.S. cost.

This was followed by another *Wall Street Journal* article on Sept. 14, 1993, "Brew Your Own Beer, Beach-side," by Tim W. Ferguson reporting on the opening of "America's first commercial venture for making your own beer," the Hamilton Gregg Brewworks in Hermosa Beach, Calif. Obviously, something significant is going on in the world of beer and brewing. Because I'm a homebrewer who lives close to Hermosa Beach, I decided to check this out for myself by paying a visit to Hamilton Gregg.

What exactly is a u-brew? According to Dean Thrasher, a partner in The Brew Store, a u-brew in the Toronto area, it is a "public brewery." Customers pay the equivalent of \$80 or \$90 (U.S.) to brew 48 liters (13 U.S. gallons) of beer at the purveyor's facility, choosing from as many as 100 recipes. Customers alter the recipe to suit their preference, or provide their own. The cost is negotiated based on the raw materials used. The brewing process, which takes about an hour, is supervised by the store's staff. The customer weighs out the ingredients, which include domestic malt extract syrup and North American-grown pelletized hops, adds the malt and hops to the boil in a steam-heated stain-

less-steel kettle and then awaits the end of the boil. At this point the staff pumps the wort through a chiller and into a fermenter. The customer then pitches the yeast and comes back two weeks later to bottle the beer in 22-ounce bottles. In the meantime, the staff has filtered and carbonated the beer so it is ready for bottling.

Thrasher says the whole idea of u-brew, or brew on premises as it is sometimes called, originated in British Columbia in 1985 and is legal in only two Canadian provinces. The Brew Store started two years ago when there were only six establishments of this kind; now there are at least 240 such facilities in Canada. The typical customer at The Brew Store is not already a homebrewer when coming in for the first time.

The Brew Store started a U.S. affiliate that opened its doors in Boulder, Colo., this January. Doug O'Claussen is the manager of this location, known as The Beer Store — You Brew It (O'Claussen says they changed "The Brew Store" to "The Beer Store" because to quite a few folks in Boulder brewing



By Bruce L. Brode



means making coffee). This is a six-kettle facility, each kettle having a capacity of 24 U.S. gallons in which patrons boil 15-gallon batches, or enough for six cases of bottled beer. There is an "economy" recipe for about \$60, but most of the other 80 to 100 recipes cost \$80 to \$85. The kettles are copper clad for an attractive appearance. Plastic lidded fermenters with a single-use disposable plastic liner are used. On the 12th day of fermentation the staff pumps the beer into a keg with "triple cold filtration" and carbonation is done in-line during the transfer process. Filtered water from the local supply, malt extract syrup, pelletized hops (seven to 10 types) and six different grain malts for minimashes are available as raw ingredients.

The Hamilton Gregg Brewworks opened officially on July 1 in Hermosa Beach as a partnership between investor John Hamilton Scudder of Scudder potato chip fame, brewing manager W. Anthony Gregg and marketing specialist Patricia S. Spiritus. There are six steam-fired stainless-steel kettles and work stations for dispensing extract malt (measured by volume rather than weight), weighing and grinding malted grains and weighing hops (both pellet and whole types). Patrons brew 8 1/2-gallon batches to produce at least four dozen 22-ounce bottles of finished beer from a choice of 35 recipes. Music plays over the sound system and a relaxed, low-key atmosphere prevails.

During the brewing process, crushed grains are steeped in a mesh bag then removed from the kettle. Extract malt is then added and later hops, according to step-by-step instructions. After the wort has been chilled by heat exchange, fermentation takes place in polyethylene fermenters for

one week at 62 degrees F (16.5 degrees C). The beer is aged for another week or more at 33 degrees F (0.5 degrees C), after which the staff triple filters and carbonates the beer into a keg and the customer comes in to operate the counterpressure bottle filler.

Unlike the Canadian stores, customers are allowed to sample their beer while they are bottling it. It costs from \$80 to \$120 to brew, plus \$30 for the bottles and carrying cases, working much like a deposit because the Brewworks will buy the empties back. A labeling machine also is available with clip art that can be used to

create custom labels (there were some very creative labels on display). The store offers a money-back guarantee if the customer is dissatisfied with the beer, although this has reportedly not yet been a problem.

Peter Sheppard, a member of the Maltose Falcons Home Brewing Society and photographer for this article, took the opportunity to brew a Pilsener-style beer at Hamilton Gregg. He found the experience to be easy and generally enjoyable. "The system is very impressive — you can brew some really fine beer on this rig," he said. "The counterpressure bottle filler is a lot of fun to use. I wish I had one at home like it! The music on the sound system provides a pleasant environment, too. It's a good place for people who have never brewed before, but I think that an accom-



**Brewing at Hamilton Gregg.**

plished homebrewer would find the experience a bit boring and would rather brew at home." Peter's finished product, though drinkable, was overhopped (too bitter, even for Pilsener) and also tasted of some cardboard-like oxidation that seemed peculiar in such a young beer.

Spiritus and Gregg offered me a taste of two of their beers. The brown ale was a bit overbittered, lacking in malty palate and a bit pale-colored for the style but tasted clean. Gregg's experimental pumpkin ale was much more interesting, with nice fruity pumpkin flavors to complement the light spiciness and creamy body.

Overall, this is a place where those who have never encountered homebrewing can learn some of the basics about the brewing process, raw ingredients and about different beer styles as well. One can brew, for at least a part of the process, without making the investment in equipment, although this comes at a bit of a premium price.

The selection of malts and particularly yeasts will need to improve, and probably will develop naturally as business grows. Brewworks uses dried yeast exclusively, mainly because of ease of handling. The proprietors seem quite sincere in wanting their customers to make the best beer possible, but are relatively new to the art of brewing themselves. They are open to the idea of allowing established customers to create their own recipes. Business, since opening, has apparently been good.

**Bruce Brode has been a homebrewer for 10 years. A former president of the Maltose Falcons in Los Angeles, he is a self-described "beer style freak" and a Certified BJCP Judge.**



**Brewing kettles at Hamilton Gregg.**

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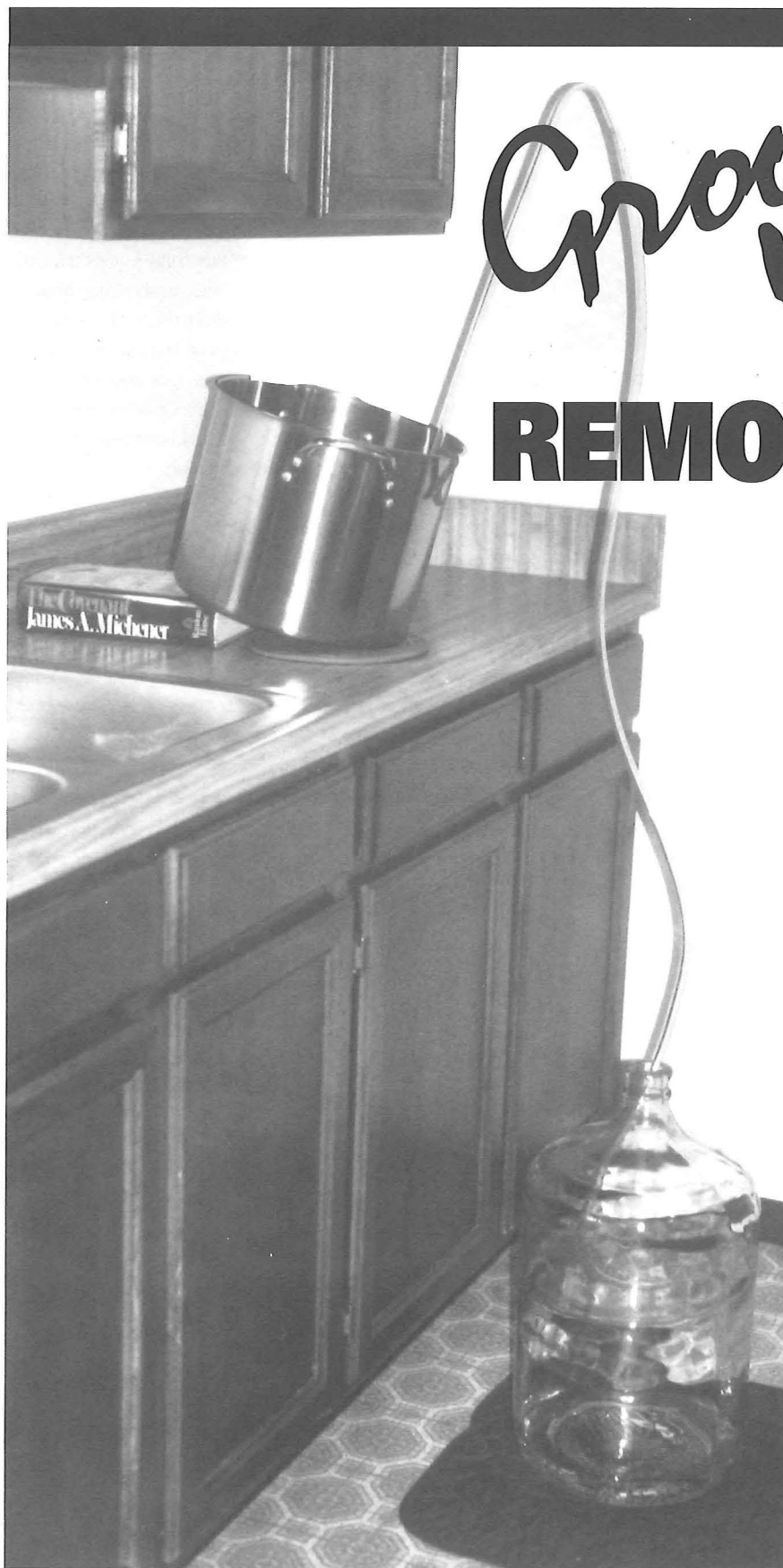
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# Crooky Ways <sup>to</sup> REMOVE TRUB

There is good news and bad news about proteins in beer. Without them, our homebrewed beers would not have a full palate. They would lack mouthfeel, and they wouldn't have that long-lasting, creamy head that laces so nicely on the side of the just-finished mug of beer. As they say in Belgium, a beer with no head has no "polish." Furthermore, the nitrogenous constituents of protein are essential factors for yeast growth during fermentation. So good beer needs an adequate supply of proteins. That is the good news.

The bad news is the above applies only to a minority of the protein fraction that makes it to the fermenter. According to *Malting and Brewing Science*, "The majority of the proteins are not assimilated during fermentation, and those which persist into the beer will slowly react with polyphenolic constituents to form non-biological haze."<sup>1</sup> This is the haze normally referred to as "chill haze" in that it does not materialize until the beer is chilled to drinking temperatures.

Whether or not chill haze bothers the homebrewer is a matter of personal preference. But excessive proteins in the finished beer also have a negative effect on its stability. Again, this may not bother the homebrewer who drinks his or her beer within a

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By Kinney Baughman

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couple of weeks of bottling. But shelf life does impact the brewer who is concerned about entering a Pilsener Urquell look-alike in the National Homebrew Competition a couple of months hence.

Brewers are always walking a fine line between having too much or not enough proteins in their beer. It is the nature of the beast and much ink has been spilled in technical brewing journals about the most effective way to control the amount of protein in the finished product. It is beyond the scope of this article to delve into such minutiae. Instead, allow me to point out that the biggest contributor to beer haze comes from the so-called "high molecular weight protein" part of the protein fraction.<sup>2</sup> The good news here is that much of the high molecular weight protein is lost on boiling. That being the case, it is essential that we cause a healthy "hot break" and leave it in the boiler when transferring the wort to the fermenter.

The first step in achieving a good hot break is to boil the wort and do so vigorously. Boiling times should last between one and 1 1/2 hours. Boils should be vigorous because vapor bubbles found in a rousing boil attract minute particles of protein to their surface. Once the bubbles burst, the proteins coalesce to form large flecks.<sup>3</sup>

Irish moss, a dried red marine algae also known as carrageen, is often added to the boil to aid the coagulation of proteins. Because there are several types of Irish moss on the market, get specific instructions from your supplier for the amount to add. The general rule of thumb is one tablespoon per five gallons. Rehydrate the Irish moss in warm water for up to six hours before adding to the boil. No negative effects on beer foam have been noted with this amount of Irish moss.

Because it is important to leave as much of the hot break as possible in the boiler when transferring wort to the fermenter, I do not think it is ever a good idea to pour wort directly into the fermenter from the boiling kettle, even if pouring through a strainer. With that in mind, I added a refinement to a technique my late brewing partner, Michael Morrissey, suggested to me when I began brewing beer about 12 years ago. It has subsequently been pointed out to me that the idea may have originated with Al Andrews. If so, I thank them both.

## Parts List

- A wound copper pot scrubber at the local grocery store. Make sure it is made of 100 percent pure copper and not copper clad. I know the Chore Boy brand is 100 percent pure copper.

- A couple of six- to eight-inch lengths of copper wire, approximately 24 gauge. An old lamp cord is a possible source.

- A racking cane.

A plastic racking cane will work if you use an immersion chiller and are racking cold wort. If you use a flow-through type chiller and are siphoning hot wort, you will need a copper racking cane.

Solder a three-quarter-inch copper cap to the bottom of the cane to prevent the sucking of the trub from the very bottom of the boiling pot (see Figure 1).

- A fine-mesh hop bag, an 11-inch square of mosquito netting or a couple of layers of cheesecloth measuring 11 inches square when folded.

To assemble, tie the pot scrubber around the bottom of the siphon cane (the end that is going into the wort). Secure it with one of the copper wire ties. Then wrap the fine-mesh hop bag or mosquito netting around and over the pot scrubber, in effect putting it in a bag. Secure it with the other wire tie.

The pot scrubber will effectively filter out any loose hop particles that are floating around near the bottom of the pick-up tube or siphon cane during the course of the siphon. A couple of years ago I added the mosquito netting and discovered that it does an excellent job of filtering out most of the coagulated protein particles that are slower to settle out of solution. Wrapping the netting around the pot scrubber increases the surface area of the filter and reduces the chances of clogging the siphon. One of my Internet brewing buddies wraps the pot scrubber around the netting to good effect. I have not tried that arrangement and cannot speak for its efficacy. You may want to try it both ways.

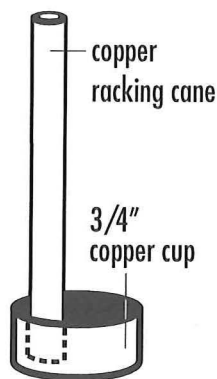


Figure 1

## Now for the Siphon

Once the boil is finished, swirl the wort around in the kettle, creating a whirlpool action. The trub and sediment will gravitate to the center of the pot creating a cone of deposit. Let it settle a few minutes.

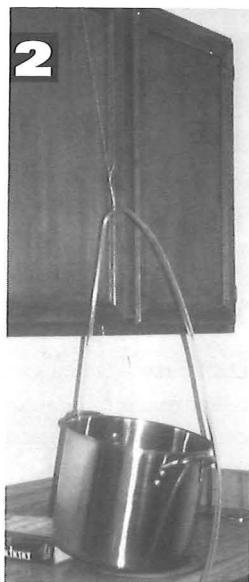
Within 10 or 15 minutes, the wort at the top of the pot will be significantly clearer than the wort nearer the bottom so I try to siphon the wort from the top down instead of plopping the pick-up tube down into the bottom of the boiler and siphoning from the bottom up. By siphoning from just below the surface you will always be siphoning off the clearest portion. As the level of the wort recedes, slowly inch the pick-up tube down, always keeping it an inch or two below the surface. This technique will give you the cleanest possible runoff into the fermenter without clogging the siphon. At the end of the siphon you will find a "moat" of wort around the cone and be able to siphon off almost all of the cleared wort.

There are a couple of ways to keep the bottom of the pick-up tube just below the surface of the wort:

**1** The easiest is to buy a racking tube clamp (one is made by Fermtech) specially made for suspending racking tubes off the bottom of a vessel. These inexpensive gizmos

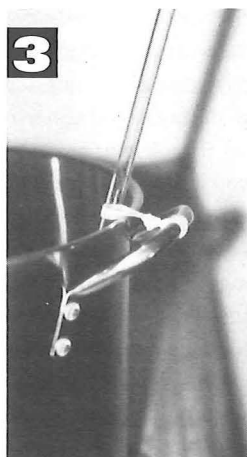
clip to the siphon cane and then attach to the rim of the brewpot. The cane can then be slid up or down in the groove in which it rests.

**2** You can try attaching a long length of string to a nail or the knob of a kitchen cabinet located a couple



feet above the top of the brewpot. Tie a long slip-knot in the string and loop it around the "handle" of the racking cane. As the level of the wort recedes, slide the slip-knot down toward the cane, lowering it into the pot.

**3** Tie an overhand knot in a rubber band so that a three-eighths-inch loop is left in one end. Loop the other end, the big loop of the rubber band, around and through itself onto the handle of the brew pot. Stick the racking cane through the small loop of the rubber band and into the kettle, adjusting it so that the pot scrubber dangles one to two inches below the surface of the wort. As the siphon proceeds, gently push the tube further through the loop.



Whichever method you use, continue lowering the racking cane until it just touches the bottom layer of trub. Tip the kettle and place a Michener-sized novel under the opposite side, forcing all the wort to one side and siphon off the last bit of liquid.

## Trouble-shooters Guide

The mesh can clog during the siphon. If it does ...

(1) Increase the vertical distance between the kettle and the fermenter to increase the siphon pressure.

(2) Remove the mesh but retain the copper pot scrubber.

## Glossary<sup>4</sup>

**Chill haze** — Haziness caused by a combination and precipitation of protein matter and tannin molecules during the secondary fermentation process.

**Hot break** — The coagulation and precipitation of protein matter during the boiling stage.

**Trub** — pronounced troob. Suspended par-

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ticles caused by the precipitation of protein, hop oils and tannins during boiling and cooling stages of wort preparation.

**Polyphenol** — A complex organic compound partly responsible for chill haze.


## References

1. Briggs, D.E., J.S. Hough, R. Stevens, T.W. Young, *Malting and Brewing Science*, Vol. 2, Chapman and Hall, 1982, p. 458.

2. Ibid., p. 460.

3. The Master Brewers Association of the Americas, *The Practical Brewer*, MBAA, 1977, p. 118.

4. Forget, Carl, *The Association of Brewers' Dictionary of Beer and Brewing*, Brewers Publications, 1988.

Kinney Baughman of Boone, N.C., is owner of BrewCo, the U.S. distributor of the Bruheat and manufacturer of the BrewCap and Brew-Chiller, head brewer at Tumbleweed Grille and Microbrewery and an adjunct professor of philosophy at Appalachian State University. 



# FOR THE BEGINNER

Fred Hardy

## Oh Those Bottles!

**B**ottles! After a couple of years of finding, cleaning, sanitizing and filling them, I have fallen in love with them. To me, working with them is an added opportunity to exercise close quality control over my brewing process.

Each brewer has to decide his or her own strategy for acquiring bottles. Seth Schneider, writing for this column in *zymurgy* Fall 1993 (Vol. 16, No. 3), suggested some sources that included creating your own empties (always fun), creating empties with friends (usually fun), raiding recycling bins (never fun) or actually purchasing clean empties from your friendly homebrew supply shop (last resort).

Regardless of the source, use only long-neck brown recappable bottles (no screw-tops)! This may sound a bit presumptuous, because commercial brewers use brown, green and even clear bottles for their product. There are, however, several good reasons for using only longneck brown recappable bottles.

Screw-top bottles will not work with crown bottle caps and the types of cappers homebrewers use. The threads on the bottle prevent a tight seal and, as the beer carbonates, the pressure forces the beer out. You will soon have a capped bottle sitting in a ring of moldy brew. A chip in the mouth of a recappable bottle will produce the same result.

Longneck bottles make it easier to watch the beer rise during filling so you can hit the head space you prefer.

Homebrewers often disagree about whether to use only refillable returnable bottles, or if non-refillable ones work as well. Non-refillable bottles are what you are most likely to find in a recycling center or in your own refrigerator (Samuel Adams, Lone

Star). Either bottle is suitable for filling with homebrew. Always discard bottles that have any signs of chips or cracks (the surface scuffing on refillable bottles may look bad but does not weaken the bottle), and you will have no cause to worry about weak bottles exploding. Extreme overcarbonation

caused by too much priming sugar or bottling before fermentation is complete could cause either type of bottle to explode.

Brown glass is the key to protecting your brew from light. Beer exposed to light will quickly become "light struck" or "skunky." To experience this taste treat first-hand, place a bottle of beer on a windowsill or table where it will get direct sunlight over a five- or six-day period (or 15 minutes if the beer is in a clear glass bottle). Chill, pour and sample light-struck beer.

The deterioration process can actually begin in less than a minute in direct sunlight, in a matter of hours in indirect sunlight or in a few days on a grocery shelf under fluorescent lighting. It is caused by the interaction of light and a bittering element extracted from the hops during the boil. This agent (isohumulone)

reacts with the light to form mercaptan, the stuff that imparts the odor to natural gas.

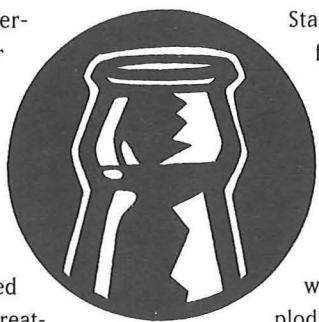
Brown glass blocks the greatest amount of the ultraviolet light that causes the damage. According to *The New Brewer*, March-April 1991 (Vol. 8, No. 2), brown glass blocks 96 percent of ultraviolet light. Green glass blocks only 20 percent and clear glass blocks a mere 10 percent. You and your beer, therefore, are happiest if you use only brown recappable bottles and store them in a dark place.

## Preparing the Bottles

First, remove all the caked-on dirt. A bottle washer will loosen some molds, but you may need a bottle brush to remove all of the visible matter from inside some bottles. Dried mold and yeast come off much easier if you let the bottles sit upright for a few minutes with about an inch of warm water in them.

Peering at the bottom of an empty bottle through its mouth will confirm that all residue has been removed.

An ammonia solution removes labels but is nasty stuff to be around, so soaking bottles in the bathtub will not endear you to other members of your household. Solve the problem with an inexpensive (less than \$10) plastic 20-gallon garbage can with a lid. Designate this as the brewing can and resist using it for anything other than floating labels off and sanitizing brewing implements (including bottles). After a 24-hour soak in an ammonia solution, paper labels will either float off or can easily be scraped away. Use



ammonia in a well-ventilated area and never mix with chlorinated cleaners. A good substitute for household ammonia is plain washing soda (one cup per five gallons water).

For 48 or so bottles, partly fill the can with 15 gallons of water to which you have added one quart of clear nonsudsing ammonia. If you must use the bathtub, use about the above ratio of ammonia or washing soda to water.

After you have removed the labels you will want to prepare the bottles for filling. Ammonia smells like a worldclass sanitizer, but its primary power is in removing grease and dirt. Sanitizing to remove potentially harmful bacteria is necessary before putting your precious brew inside.

Lightly scrub the outside of the bottles with a non-metallic scouring pad to remove any residual glue, then rinse the bottles well to remove all traces of ammonia. Now you will have bottles ready for sanitizing.

Run the clean bottles through both wash and heated drying cycles in the dishwasher to sanitize them for bottling. Put in the bottles neck down and resist the urge to use dishwashing detergent. The clear water and heated drying will kill any little beasties in and on the bottles without causing concern about residual detergent or "lemon freshness." Should you be unable to resist the impulse to add something to the dishwasher, toss in a cup of plain unscented household bleach before you start the machine. Most of it will be lost during the initial pump cycle, but enough will remain to assist the wash cycle in eliminating bacteria. You can either use the bottles directly from the dishwasher or store them for later use. Store them neck down or you'll have to put them through another sanitizing cycle in the dishwasher just before using them.

A chlorine soak for sanitizing is an adequate alternative to the dishwasher. Every book and pamphlet on brewing recommends different concentrations of chlorine to sanitize brewing implements. I have never had a problem using the guidelines from Charlie Papazian's *The New Complete Joy of Home Brewing* (Avon, 1991). He recommends a ratio of one-third to 1 1/2 teaspoons of bleach to five gallons of cold tap water. Soak the

bottles in your brewing garbage can (completely rinsed of ammonia) or bathtub for at least a half hour.

For soaking 50 bottles use about 2 1/2 fluid ounces of plain unscented bleach in 15 gallons of water. Submerge the bottles in the solution, taking care that each one is completely filled and immersed. After soaking, allow to dry on a bottle tree or a dishwasher rack. Keep them neck down until filling with beer.

## Filling

Take care to avoid splashing the beer or providing any unnecessary exposure to oxygen when filling your sanitized bottles. Oxidized beer doesn't keep well, and may

take on a distinct flavor reminiscent of wet cardboard or sherry. Bottle fillers, both plastic and metal, fill from the bottom in an effort to eliminate splashing and diminish exposure to air. The amount of airspace (head space) left in the bottle also affects the extent of the beer's exposure to oxygen, but to a much lesser degree than splashing.

Papazian recommends leaving about one inch of airspace. Do not mistake "about" for precisely. Hey, we're homebrewers, so anything from as much as 1 1/2 inches to as little as half an inch will work.

As for the effects of air on your brew, if it reduces your worry you may wish to try the new "oxygen eater" bottle caps on the market. The typical crown caps do nothing to eliminate oxygen from the airspace. An

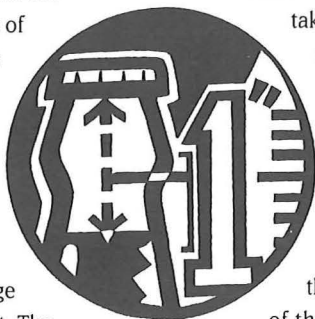
article in the September-October 1992 issue of *BarleyCorn*, an East Coast beer newspaper, describes a test in which oxygen absorbent caps reduced the oxygen in the head space of bottled beer to 2.2 percent of what it was in bottles capped with the typical crown cap.

More important than the type of caps is cleanliness in all of your brewing activities. Sanitize your plain crown caps by boiling in a covered saucepan for about five minutes (longer may destroy the plastic inner seal). After boiling, drain the water and keep the pan covered until you start filling bottles. Caution: Do not boil Pure Seal Caps®. Sanitize them with a dilute chlorine solution (one teaspoon of chlorine in a gallon of water) for 30 minutes and rinse before using with cooled, preboiled water.

Opinions vary over whether to seal the bottles immediately after filling or to set a cap on each full bottle and allow to sit for 15 minutes or so before crimping. Air may be drawn into the bottle during the rest period if the beer is cool, or expelled as CO<sub>2</sub> is generated in the bottle. I encourage you to crimp the caps as soon as you fill the bottle.

As the last processing step before drinking, bottles and bottling are the equivalent of icing on a cake. To protect your investment, treat them with the care and respect you show to all other phases of your brewing.

A 30-year computer industry veteran, Fred brewed his first beer 25 years ago using Blue Ribbon malt, table sugar and bread yeast. He brewed his second beer three years ago. He is founder of the Dulles Regional Brewing Society (Drebs), a Recognized BJCP beer judge and has won several ribbons with his all-grain beer. ☺



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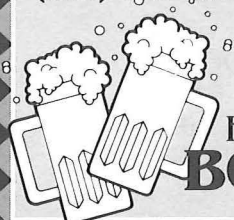
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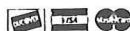
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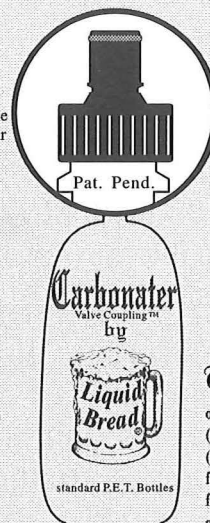
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# WINNERS

## C I R C L E

James Spence

**H**ere's another anthology of recipes from second- or third-place winners in the AHA 1993 National Homebrew Competition. Get a head start on some thirst-quenching summertime brews from award-winning homebrewers. Nothing beats the spice and zing of a well-made German light lager while you are thinking about mowing the lawn, or Dennis Kinvig's Munich Dunkel for an after-dinner taste sensation. Strom Thacker's California common beer recipe will give you a taste of a true American beer style. Spring into summer and quench some spring fever by brewing these worldclass beer styles.

These recipes are taken directly from the competition entry forms of homebrewers just like you, but they probably use different equipment and processes from yours, so your results may vary. Wouldn't it be boring if everyone brewed the same beer as everyone else?

### WHEAT BEER



**Third Place**  
**Bruce A. Brandt**  
**Casnovia, Michigan**  
**Berliner Weisse**  
**Lactic Wheaties**

#### Ingredients for 5 1/2 gallons

- 3 pounds Ireks Pils malt
  - 3 pounds Ireks wheat malt
  - 0.42 ounce German Hersbrucker hops, 3.8 percent alpha acid (60 minutes)
  - 32 ounces Yeast Lab Dusseldorf ale yeast culture
  - 10 ounces *Brettanomyces lambicus* culture (pitched with yeast)
- force-carbonated and counterpressure bottled

- Original specific gravity: 1.032
- Final specific gravity: 1.008
- Boiling time: 90 minutes
- Primary fermentation: three days at 65 degrees F (18 degrees C) in glass

- Secondary fermentation: 15 days at 75 degrees F (24 degrees C) in glass
- Tertiary fermentation: 15 days at 32 degrees F (0 degrees C) in stainless steel
- Age when judged (since bottling): two months

#### Brewer's specifics

Mash-in all grains at 105 degrees F (41 degrees C) for 10 minutes. Raise to 122 degrees F (50 degrees C) for 30 minutes. Raise to 144 degrees F (62 degrees C) for 10 minutes. Raise to 148 degrees F (64 degrees C) for 20 minutes. Raise to 160 degrees F (71 degrees C) for 60 minutes. Raise to 168 degrees F (76 degrees C) for 10 minutes. Sparge with 4 1/2 gallons of 168-degree-F (76-degree-C) water.

#### Judges' comments

- "Good conditioning, nice tartness. Could be a little more tart."
- "Could be more acidic, crisp. Balance of malt and hops good. Slight buttery aftertaste. Good try at a tough style."
- "Smooth up front with nice lactic middle and finish. Seems right on the money to me. Very nice beer. Lactic sourness is quite evident."
- "Just a little weak on the acidity. Good aroma, good cloves."

### DORTMUND/EXPORT



**Second Place**  
**Rob Brunner**  
**Windsor, Colorado**  
**Tosher Too**

#### Ingredients for 5 gallons

- 4 pounds Alexander's pale malt extract
- 3 pounds Laaglander light malt extract
- 1 pound rice extract
- 2 pounds Pils malt
- 1/2 pound Vienna malt
- 1/2 pound CaraPils malt
- 1/2 ounce Cascade hops, 4.7 percent alpha acid (60 minutes)
- 1 ounce Willamette hops, 4.0 percent alpha acid (45 minutes)
- 1/2 ounce Saaz hops, 3.2 percent alpha acid (30 minutes)

- 1/4 ounce Hallertauer hops, 3.0 percent alpha acid (10 minutes)
- 1/4 ounce Saaz hops, 3.3 percent alpha acid (dry)
- 1/4 ounce Hallertauer hops, 3.0 percent alpha acid (dry)
- Wyeast Danish liquid yeast culture
- 3/4 cup corn sugar for priming

- Original specific gravity: 1.060
- Final specific gravity: 1.024
- Boiling time: 60 minutes
- Primary fermentation: 15 days at 50 degrees F (10 degrees C) in glass
- Secondary fermentation: 14 days at 40 degrees F (4 degrees C) in glass
- Age when judged (since bottling): three months

#### Brewer's specifics

Mash all grains for 30 minutes at 100 degrees F (38 degrees C). Raise to 115 degrees F (46 degrees C) for 60 minutes. Raise to 135 degrees F (57 degrees C) for 20 minutes. Raise to 150 degrees F (66 degrees C) for 60 minutes. Raise to 170 degrees F (77 degrees C) for 10 minutes.

#### Judges' comments

"Well-balanced. Very appropriate malt-hop flavor balance and character. Very slight sulfur aroma. Would prefer more 'hard' water character."

"Good malt-hop flavor, well-balanced. Nice bitterness. Perhaps a bit heavy for a Dortmunder. Well-conditioned."

"Big smack of both malt and hops right from the start, lingering throughout. Big flavorful beer, well-balanced. Nice job."

"Harsh hop bitterness initially. Slight tartness on sides of tongue."

## AMERICAN LAGER/ AMERICAN DARK



**Second Place**  
**Steve and Tina Daniel**  
**League City, Texas**  
**League City Dark**

#### Ingredients for 5 gallons

- 4 pounds domestic six-row malt
- 3 pounds Harrington two-row malt
- 1 pound cooked rice
- 2 ounces chocolate malt
- 1 pound dark crystal malt
- 1 ounce Cascade hops, 6.7 percent alpha acid (90 minutes)
- force-carbonated

- Original specific gravity: 1.048
- Final specific gravity: 1.012
- Boiling time: 90 minutes

- Primary fermentation: 14 days at 50 degrees F (10 degrees C) in stainless steel
- Secondary fermentation: 30 days at 32 degrees F (0 degrees C) in stainless steel
- Age when judged (since bottling): not available

#### Brewers' specifics

Mash all grains for 90 minutes at 150 degrees F (66 degrees C).

#### Judges' comments

"Sweetish, malty character predominates, nicely offset by roasted grain. Smooth, well-balanced effort. Just a touch more hops might help. A little hefty for an American dark.

"Caramel flavor dominates — perhaps a bit too strong. Too rich. More rice or corn adjunct would bring this back. Lighten the crystal malt a bit."

"Rich, smooth, malty. Really a bit big for style but very tasty. I love this beer, but it is more in the style of a Munich Dunkel. Body a bit full for style."

## CLASSIC PILSENER/ GERMAN PILSENER



**Third Place**  
**Chris Moes**  
**Woodside, California**  
**ESP Extra Special Pilsener**

#### Ingredients for 5 gallons

- 7 pounds two-row Klages malt
- 2 pounds CaraPils malt
- 1 pound Briess Munich malt
- 1 pound German Vienna malt
- 2 ounces Saaz hops, 3.1 percent alpha acid (50 minutes)
- 1/2 ounce Saaz hops, 3.1 percent alpha acid (30 minutes)
- 1/2 ounce Tettnanger hops, 4.2 percent alpha acid (30 minutes)
- 1 ounce Saaz hops, 3.1 percent alpha acid (two minutes)
- 1/2 ounce Saaz hops, 3.1 percent alpha acid (added dry during secondary racking)
- 1 quart gyle to prime
- Wyeast Danish lager liquid yeast culture

- Original specific gravity: 1.051
- Final specific gravity: 1.018
- Boiling time: 50 minutes
- Primary fermentation: 15 days at 45 degrees F (7 degrees C) in glass
- Secondary fermentation: 23 days at 39 degrees F (4 degrees C) in glass
- Age when judged (since bottling): 3 1/2 months



### Brewer's specifics

Mash all grains at 125 degrees F (52 degrees C) for 30 minutes. Raise to 150 degrees F (66 degrees C) for 50 minutes. Raise to 164 degrees F (73 degrees C) for 20 minutes. Sparge with 4 3/4 gallons 170-degree-F (77-degree-C) water.

### Judges' comments

"Perhaps a little too much malt for subcategory. Overall good balance but could use more hops in flavor. A very good beer but needs either a bit more hops or a little less malt for German subcategory."

"A very nice effort! Light and refreshing. Lots of hop aroma. Very clean."

"Malt light, hop light. Not quite balanced."

"Malt-hop balance tilted toward malt. Lacks hop bitterness. Overall a very good beer."

"Enjoyable beer to savor. Good malt and hop aroma."

## CALIFORNIA COMMON BEER



**Third Place**  
**Strom C. Thacker**  
**Gainesville, Georgia**  
**Lucy's California Lager**

### Ingredients for 6 gallons

- 8 1/2 pounds American pale malt
- 1 1/2 pounds 30 °L crystal malt
- 1 1/2 ounces Northern Brewer hops, 6.5 percent alpha acid (60 minutes)
- 1/2 ounce Cascade hops, 5.4 percent alpha acid (60 minutes)
- 1/2 ounce Cascade hops, 5.4 percent alpha acid (30 minutes)
- 1/2 ounce Cascade hops, 5.4 percent alpha acid (two minutes)
- 1/2 ounce Cascade hops, 5.4 percent alpha acid (dry)
- Wyeast No. 2112 California liquid yeast culture
- 3/4 cup corn sugar to prime

- Original specific gravity: 1.049
- Final specific gravity: 1.012
- Boiling time: 60 minutes
- Primary fermentation: eight days at 65 degrees F (18 degrees C) in glass
- Secondary fermentation: 13 days at 58 to 60 degrees F (14 to 16 degrees C) in glass
- Age when judged (since bottling): 6 1/2 months

### Brewer's specifics

Mash all grains for 70 minutes at 155 degrees F (68 degrees C). Sparge with five gallons of 170-degree-F (77-degree-C) water.

### Judges' comments

"Needs more body and more bittering hops. Nice job."

"Slightly winy palate, dry. Add more malt for fuller body. Watch oxidation."

"Astringent. Mild maltiness — needs more. Bitter aftertaste. Overall flavor is on the light side."

"Strong hop bitterness, masks malt flavor. More malt would have balanced this beer out and given it more body. Too much hop bitterness."

"Increase malt and hops to produce a slightly bigger beer."

## BAVARIAN DARK/ MUNICH DUNKEL



**Third Place**  
**Dennis Kinvig**  
**Toronto, Ontario**  
**Crossways DunkelBrau**

### Ingredients for 5 gallons

- 2 1/3 pounds Bierkeller unhopped dark malt extract
- 4 pounds Muntona Continental Lager hopped malt extract
- 20 ounces dry light malt extract
- 10 ounces wheat malt
- 1 pound Munich malt
- 1/4 ounce Hallertauer hops, alpha acid not provided (30 minutes)
- 1/4 ounce Hallertauer hops, alpha acid not provided (20 minutes)
- 1/2 ounce Hallertauer hops, alpha acid not provided (tea added at bottling)
- Wyeast German lager liquid yeast culture
- 4 1/3 ounces dextrose at bottling

- Original specific gravity: 1.061
- Final specific gravity: 1.014
- Boiling time: 30 minutes
- Primary fermentation: 14 days at 55 degrees F (13 degrees C) in glass
- Age when judged (since bottling): 4 1/2 months

### Brewer's specifics

Mash all grains. Boil two cups water with the dextrose to make the priming solution. Remove pot from heat and add the 1/2 ounce of Hallertauer hops. Strain the liquid into bottling bucket.

### Judges' comments

"Lots of malt character, good amount of roasted malts. Too much bittering hops."

"A very good beer. Could be more complex. Reduce hoppiness."

"Medium to heavy hop flavor marries well with malt. Hopping may be a bit high for style."

"Could be more malty for amount of hops. Definite hop flavor. Very easy drinking beer with a trifle too much hop finish. Good job."

## WEISS IS NICE CLUB-ONLY COMPETITION WINNER



**German-Style Weizen/Weissbier**  
**Tom Hail**  
**Denver, Colorado**  
**Representing The Unfermentables**  
**Kurt and Adolf's Special Wheaten Ale**

### Ingredients for 10 1/2 gallons

- 13 pounds wheat malt
- 6 pounds two-row Klages malt
- 1 pound dextrin malt
- 1 ounce Northern Brewer hops, 8.1 percent alpha acid (60 minutes)
- 1/2 ounce Mt. Hood hops, 3.6 percent alpha acid (30 minutes)
- 1/2 ounce Mt. Hood hops, 3.6 percent alpha acid (15 minutes)
- Edelweis Weizen yeast culture
- 3/4 cup corn sugar per 5 gallons to prime

- Original specific gravity: 1.053
- Final specific gravity: 1.014
- Boiling time: 90 minutes
- Primary fermentation: four days at 66 degrees F (19 degrees C) in glass
- Secondary fermentation: three days at 60 degrees F (16 degrees C) in glass
- Age when judged (since bottling): two months

### Brewer's specifics

Single decoction mash. Pull decoction at 122 degrees F (50 degrees C).

### Judges' comments

"Just a hint of diacetyl. Wonderful balance, true to style in all respects."

"Good attempt. Very bananalike. A little buttery."

"Fruitiness comes through in flavor and aroma. A great beer!"

## BEST OF FEST CLUB-ONLY COMPETITION WINNER



**Märzen/Oktobertfest**  
**Darren T. Cousineau**  
**Fresno, California**  
**Representing the San Joaquin**  
**Worthogs**  
**Toasty Oktoberfest**

### Ingredients for 12 gallons

- 10 pounds two-row pale malt
- 6 pounds Munich malt
- 2 pounds CaraPils malt
- 1 1/2 ounce Hallertauer hops, 4.5 percent alpha acid (75 minutes)
- 1/2 ounce Hallertauer hops, 4.5 percent alpha acid (15 minutes)
- 1 ounce Tettnanger hops, 3.7 percent alpha acid (15 minutes)
- 1 ounce Tettnanger hops, 4.3 percent alpha acid (two minutes)
- Wyeast No. 2206 Bavarian liquid yeast culture
- forced-carbonated

- Original specific gravity: 1.056
- Final specific gravity: 1.012
- Boiling time: 120 minutes
- Primary fermentation: 30 days at 50 degrees F (10 degrees C) in glass
- Age when judged (since bottling): seven months

### Brewer's specifics

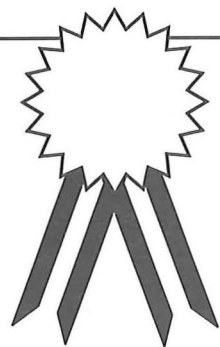
Mash all grains for two hours at 147 degrees F (64 degrees C).

### Judges' comments

"Malty. Some dark malt flavors. Some hop character. Nice drinkable beer close to style."

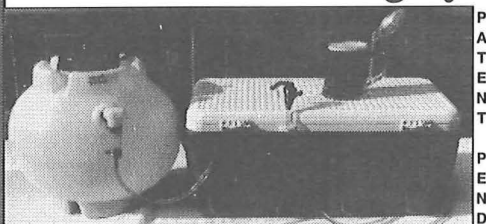
"Malty aroma. Balance very good, bump up flavor hops."

"Good malt-hop balance with some toasted malt flavor that adds complexity. For a second I imagined I was in München."



**E**very first-place recipe from the AHA 1993 National Homebrew Competition was printed in *zymurgy* Special Issue 1993 (Vol. 16, No. 4)  
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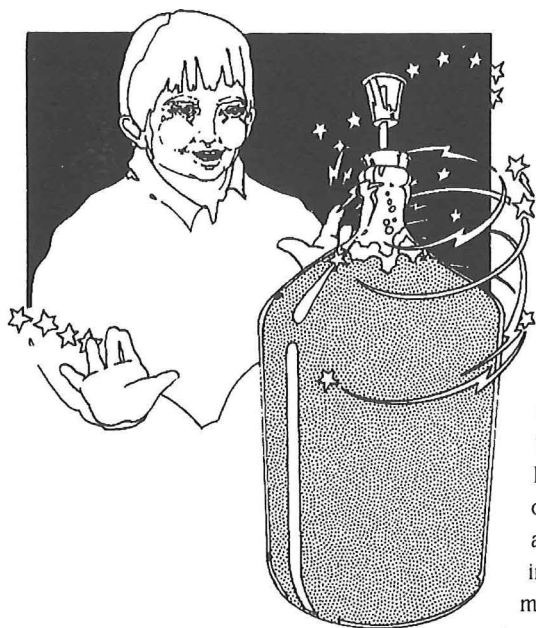
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# WORLD OF WORTS

Charlie Papazian



## Gregor's Violet Ray No Drip Stout

pounds of the stuff, assured that this low-original-gravity wort would have plenty of velvety smoothness in the finish.

One often thinks of stouts as over-ridden with hops and bitterness. Not so with Gregor's Violet Ray No Drip Stout. Beer in mind that there is a contribution of bitterness from the roasted grains, so a delicate addition of hops was blended into the boiling wort to balance roasted malt and barley bitterness with hop bitterness and malt sweetness.

Your favorite ale yeast should be used for Gregor's Violet Ray No Drip Stout, but for your information I'd recommend a rather neutral ale yeast.

As the wort was sparged Gregor offered his full attention to inadvertent drips, but the final baptism of this wonderfully smooth stout, fit for a household king or queen, occurred after the yeast was pitched. The cellar light was turned off and the Violet Ray Machine zapped the fermentation with long arcs of violet electricity. The Violet Ray Machine, a unique gadget found years ago at a flea market, was again serving the purpose of electrifying and stimulating life.

With wide eyes, we all witnessed a hope for the best stout in the world. As I gratefully evaluate my glass of Gregor's Violet Ray No Drip Stout, I know it's the best in the world because, "The best beer in the world is the one you're holding."

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

Recipe for 6 gallons (23 liters) because 5 gallons (19 liters) isn't enough.

### For the steep

- 1/2 pound (230 grams) crushed black barley malt
- 1/4 pound (114 grams) crushed roast barley malt
- 1/4 pound (114 grams) crushed chocolate malt
- 1/4 pound (114 grams) crushed Special "B" malt (Belgian origin)
- 2 1/2 pounds (1.14 kilograms) crushed 20 to 40 °L crystal malt

### Add to the grain runoff

- 4 3/4 pounds (2.16 kilograms) light dried malt extract

### And boil with hops

- 5 Homebrew Bittering Units (you may use 1 ounce 28 grams of 5 percent alpha-acid-rated English Goldings whole hops) for bittering
- 2 1/2 Homebrew Bittering Units of flavor hops (I used 1/2 ounce or 14 grams of 5 percent alpha-acid-rated English Goldings whole hops)
- 1/2 ounce (14 grams) Cascade hops for aroma

In the beginning ... there was stout and then there was light.

A small group of us had gathered to brew a simple batch of stout — clean, full-bodied, not bitter, yet with a roasted barley and malt signature that would leave little doubt that 'twad be stout. A blend of five specialty grains helped transform a utilitarian light dried malt extract into a full-flavored stout without the pungent bite of hops and roasted grains normally associated with this style.

Black barley helped deepen the color. Roast barley contributed a coffeelike roast character — but not *too* much, easy does it. Chocolate malt, a Hershey-colored grain, contributed a rich touch of cocoa character. Special "B," a Belgian malt with its intensely caramelized sugar, enriched the complexity of this lyrical stout with a hint of molasses-like character; go easy on this malt. And the prodigious amount of crystal malt, 2 1/2

7/8 cup (207 milliliters) corn sugar  
or 1 1/3 cup (315 milliliters) dried  
malt extract for bottling  
ale yeast (American Ale No. 1056  
can be recommended). Use a  
healthy, vigorous starter.

- Original gravity: 1.038 to 1.042 (9.5 to 10.5 °B)
- Final gravity: 1.010 to 1.016 (2.5 to 4 °B)

Add the crushed specialty grains to 2 gallons (7.6 liters) of water. Mix well. Raise temperature to about 150 degrees F (65.5 C) and hold for about 30 minutes. Strain dark, sweet liquor into your brewpot and sparge or rinse grains with about one-half gallon of hot water.

Discard the grains and add dried malt extract and bittering hops to make the wort. Boil for one hour. Then add flavor hops and boil for an additional 20 minutes. Turn off heat, add aroma hops, steep for a few minutes and add hot wort to a cleaned and sanitized fermenter to which about 3 gallons (11.5 liters) of cold water have been added.

Pitch ale yeast when temperature is below about 75 degrees F (24 degrees C). Ferment to completion and bottle with priming sugar or malt. Enjoy when you are good and ready.

## Homebrew Bittering Units

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



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Professor Surfeit

# DEAR

P R O F E S S O R

## No Yokes About It

Dear Professor,

I have written a history of a pre-Prohibition brewery my family owned: The Halm Brewery of Bryan, Ohio, from 1865 to 1907. It was founded by a great-great grandfather, Jacob Halm, who emigrated from the Stuttgart area in 1854. The family had been brewers and vintners for generations in their little Neckar Valley village. They included a practice in their brewing which I have found is odd to the point of being rare and I would like to know if you have ever heard of it or if it makes scientific "brew sense" to you.

During the course of my historical research I interviewed two elderly gentlemen during the mid-1970s who as teenagers worked in the brewery. One, Art Halm, was the founder's grandson and, at the turn of the century, the owner's son. The other was the son of the brewmaster. They both told me that they were prohibited from the more dangerous parts of the brewery, including the engine room and around the barley washers where exposed drive shafts were a hazard. They were allowed on the first floor which contained the laboratory, open oak primary fermenters and the brew kettle. They had one "job" in the brewery. Together they operated a gadget over the



brew kettle that separated 90 dozen egg whites from the yolks and dropped the whites into the brew! The yolks were discarded with the spent grains and sold as cattle feed additive.

When I heard this from Art Halm and his fellow "egger," Ray Wheeler, in 1977, I did not know enough to appreciate how odd a practice this was or I would have pursued it further with them. They are both dead now. I did have enough presence of mind to ask Art why this was done and his answer was that the egg whites acted as a clarifier to settle solids out of the brew and that if there was any residual protein from the whites, he figures they may have added to the heading

quality of the beer. This story was confirmed in two separate interviews with Halm and Wheeler, who had not seen each other in decades.

The question I have is if egg whites were added to the hot brew kettle, wouldn't they immediately cook, turn solid and drop? I would think they would. Herb Haydock, the collector, asked me about this and was quite curious. The history has spawned other inquiries about it from brewery historians, brew school academics and even *All About Beer* magazine. I simply don't have an answer. It is possible that the two men were confused about where they had added the egg whites ... perhaps not at the

brew kettle but at the *kuhlshiff*, pitching tanks or primary fermenters. But the brew kettle was where they said.

I would like to know if you are aware of any brewing practice along these lines or if this makes "brew chemistry" sense to you. It would help me greatly and satisfy the curiosity of others. I might even add it (properly) to my next batch of lager. I calculate the equivalent as 0.54 of an egg white per five-gallon batch. I think I can measure that!

Thanks.

Sincerely,  
Bob Smith  
Bowling Green, Ohio



Dear Bob,

*Actually the practice of adding egg whites makes some sense — but not to the brew kettle. My guess is that it was actually added to the secondary fermenters to help clarify the beer. Egg whites are protein. Protein in the form of isinglass and gelatin are commonly referred to as fining agents in the brewing process. The long-chained protein molecules serve to attract yeast and drop them out of the beer. Even wine-makers have been known to add egg whites to their fermentation to help clarify the wine.*

*In my travels around the United States and other countries I have often heard of meat and other animal products added to beer. People usually didn't know why, but no doubt it helped somewhat in clearing the beer.*

*Malt and yeast quality have improved quite dramatically from bygone days and the addition of finings is less critical to assure clear beer. But, mind you, isinglass is still used in the making of traditional cask-conditioned real ales in England.*

*Ear's egg in your beer,  
The Professor, Hb.D.*

## A Fiery Adjunct

Dear Professor,

I am writing because of an interesting bit of information revealed to me by my older brother who works for the National Park Service in Lexington Green, Mass. He is a Revolutionary War re-enactor who has done extensive research on the period among artillery companies and infantrymen. At the time it was not uncommon to use black gunpowder in the brewing of beer. Some infantrymen were known to put a pinch of powder in each mug of beer they consumed. Most of the medical personnel (in fact, all of them) whom I consulted on this subject strongly advise against this practice as it could cause severe gastrointestinal problems.

I was wondering if there could be a sane reason for the use of gunpowder in brewing (not that I am planning on it) because my brother wants to brew an authentic 18th-century stout for future encampments. I don't wish to be responsible for the poisoning of an entire militia company. Black powder consists of a mixture of potassium nitrate, char-

coal and sulfur. Any information you could give me would be greatly appreciated.

Very truly yours,  
Paul D. Messier  
Hopkinton, Massachusetts

Dear Paul,

*Sounds like a mighty explosive brew from a lot of different angles. Now, you say that black powder is charcoal, sulfur and potassium nitrate. Welllllll, potassium nitrate is also known as saltpeter and is said to suppress libido. As far as the generals were concerned, I'm sure they'd prefer that their ranks not be quite so, shall I say, horny. It is absolutely pure conjecture on my learned part, but I can imagine that stories could have been started about how great this stuff was in beer. The troops bought in and a tradition was born.*

*Personally, I'll keep my libido as long as I can. I don't recommend you put gunpowder in your beer, unless you're thinking of being celibate.*

*Not petering out,  
The Professor, Hb.D.*

## Rockin' the Wort

Dear Professor,

My friend in the wine industry uses a grape-based alcohol in a spritz bottle to sanitize apparatus as they go about their work. Is a similar type of high-alcohol barley-based sanitizing agent used in the commercial beer brewing industry? If not, do you think something along these lines could be developed, or is even needed?

I've also discovered that playing a carefully chosen compact disc adds character to the brew as well as the name, for example, Stevie Ray Vaughn Bitter Ale Brew No. 3.

Sincerely,  
Ric Henry  
Angwin, California

Dear Ric,

*Interesting you should mention alcohol as a sanitizing agent. I don't know that any commercial breweries really could use something like that because, (1) it would be expensive and (2) it is highly flammable.*

*But on the small scale at home one could use ethanol alcohol or high-proof vodka to sanitize surfaces that come into contact with beer. I use ethanol (grain alcohol) watered down to one-tenth water, nine-tenths alcohol (a doctor friend of mine told me that alcohol is a more effective killer of microorganisms if slightly diluted). I only use it to sanitize surfaces that come in contact with my wort, beer or yeast as I transfer from one vessel to another. I use a cotton swab to apply the alcohol. Recap the bottle, then flame the surfaces with a butane cigarette lighter. I believe this has helped me maintain the integrity of my beer in a basement that is resplendent with spiders and cobwebs.*

*You might be interested in reading Shelby Meyer's article, "Beer and Mysticism," in Zymurgy Winter 1993 (Vol. 6, No. 4). He says, "I've found, quite accidentally, that most strains of beer yeast respond favorably to music ... Not just any music, of course. My experience leads me to recommend such acoustic guitar standards as Leo Kottke (preferably early Kottke) or even John Fahey, with possibly a vintage side or two of Koerner, Ray and Glover just to change the pace ... and a lot of Mississippi John Hurt. For slow-starting yeasts or stuck fermentations, almost any zydeco will help; one side of Clifton Chenier is almost as good as yeast nutrient ..."*

*Everybody's rockin',  
The Professor, Hb.D.*

## Three Golf Balls?

Dear Professor,

I've been brewing beer for a little over a year now and reading books and articles about brewing, but I still have many questions that remain unanswered. Maybe you can help. Here are a few of them:

What exactly is "mouthfeel"?

How does a hop back differ from a lauter-tun?

What is the purpose of a protein rest?

Can I use the dormant microorganisms from the bottom of some real imported commercial lambic-style brew to brew my own lambic?

Are there really three golf balls on the moon?

Hmmm. I wonder ...  
Brian Quade  
Carbondale, Illinois

Dear Brian,

Well, if some people I've run into in my life ever asked me to tell them what mouthfeel meant I'd raise an eyebrow or two for sure, but coming from an esteemed homebrewer such as yourself, well ...

Mouthfeel is the physical sensation of the beer in your mouth. It is a perception of the consistency, mostly. Does it feel creamy (full bodied) or thin (light bodied)? That's it in a mouthful.

Aha. A lauter-tun is essentially a straining vessel for mashed grains. A hop back is a straining vessel for hopped wort. Hop backs are nice because they also can be used to impart hop aroma to a beer. How? Add fresh unboiled hops to the hop back and as the hot wort passes through it takes away essential hop aroma oils to the fermenters. Some small breweries do this and you can taste it in their brews.

The purpose of a protein rest is to produce the types of proteins that are helpful as yeast nutrients and for foam stability. A protein rest is used during the mashing process of undermodified malts. The process is not essential, but can be helpful.

Yes, you could use the dormant microorganisms from the bottles of lambic but there are not guarantees whatsoever as to the results. You'd be better off getting some lambic yeasts from sources available to homebrewers.

There are not only three golf balls on the moon but there is a hole in one of them.

Wonderless,  
The Professor, Hb.D.

## Correction

Dear Readers,

The equation for calculating the freezing point of beer (Beer Slush and New Math) was correct in **zymurgy** Winter 1993 (Vol. 16, No. 5), but the solution should have been 28 degrees F rather than -19.3 degrees F. I was just making sure someone was reading my column.

Mathematically speaking,  
The Professor, Hb.D.

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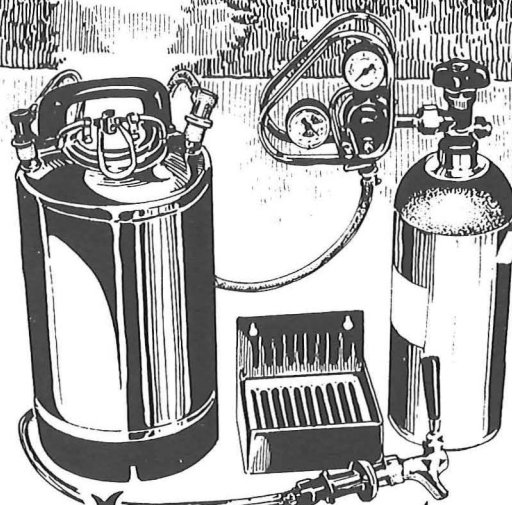
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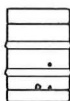
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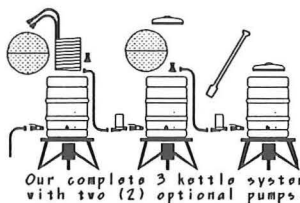
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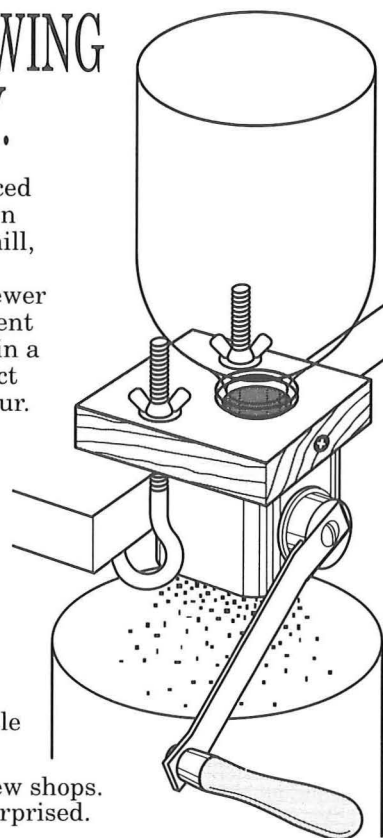
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## Inline Temperature Adjuster

Chinook Manufacturing offers the Temp-Tee, a temperature monitoring and adjusting device. When fitted to the three-eighths-inch or one-half-inch hose between the counter-flow or ice bath wort chiller and the fermenter, it allows the brewer to see and make adjustments to the yeast pitching temperature of wort before it is in the fermenter.

The Temp-Tee is a barbed hose T with a leakproof sliding thermometer holder that runs through the straight part of the T. Cooled wort flows around the thermometer probe as it rounds the corner of the T and enters the fermenter. By adjusting the thermometer holder's position, flow can be reduced or increased. A reduced flow will keep the wort in the chiller longer, cooling it more. This device allows the brewer to maintain consistent pitching temperatures that are essential to the brewing process.

The Temp-Tee is made of food-grade plastic and includes a 0 to 220 degree F removable stainless-steel thermometer. Manufacturer's suggested retail price is \$15.95. For more information contact Chinook Manufacturing, 143 E. 7570 S., Midvale, UT 84047; (801) 562-1836.

## Hop Oil Emulsions

Alpha Hop Products offers Kent Goldings and Saaz hop emulsions to the homebrewer. Hop emulsions are extracted with liquid CO<sub>2</sub> then emulsified in water. They differ from the more common hop oils by not being as concentrated.

The recommended dosage is 15 milliliters per five gallons, or about one-half ounce for a five-gallon batch. The amount added is a matter of taste. One four-ounce bottle will hop about 40 gallons of beer. To use, dilute the emulsion in five times (by volume) the amount of distilled water, stir well and mix with the beer before kegging or bottling.

The manufacturer's suggested retail price is \$6.50 for four ounces. For more information contact Alpha Hop Products, 11700 S.E. 78th Place, Renton, WA 98056; (206) 227-6073.

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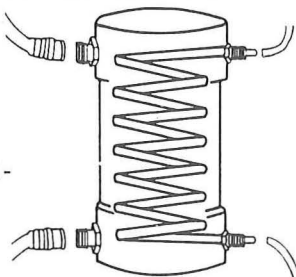
The tray is made of PVC plastic and comes with a ball or pin-type connector and spigot. The splash guard height allows for most pint glasses. Holding more than eight ounces in spills, an easy-to-clean sponge absorbs drips. Clearance of one inch above the keg is needed in the refrigerator.

The manufacturer's suggested retail price for the Keg Tapper Tray is \$36.95. Personalized tap handles are \$11.95 each. For more information contact Jack Whybark, Whybark Manufacturing Inc., 12742 1/2 Los Nietos Rd., Santa Fe Springs, CA 90670; (310) 946-5212.

*Compiled by Dede Schum*

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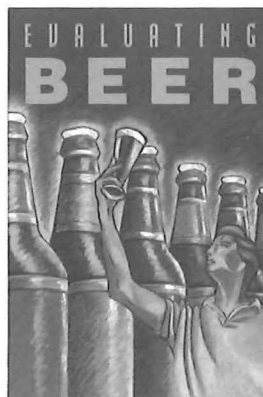
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# THE BEST FROM KITS

John Carlson Jr. and Caroline Duncker

**D**riving through the Wind River Range of snow-capped peaks and sage-filled valleys our stomachs growled and our palates craved a filling meal complemented by some fine brew. Throughout our four-week venture to Wyoming, Montana, Utah and Colorado, we made vital stops at what we consider some of the West's finest microbreweries and brewpubs.

While most of the commercial establishments we visited use a mashing process to produce an excellent product with a great deal of control, a fine beer can still be made at home using a malt extract kit. Using extract kits takes considerably less time than using a mash, yet kits can capture the elements we prefer: hoppy nose, full body and a smooth, rich flavor. Brewing a batch from a kit provides the perfect way for a beginning brewer to learn the basics.

As we drove and pondered the beers we had been tasting, we dreamed of future travel destinations and the beers we would like to make in the next few months. Our minds drifted from the western United States to the continent down under — Australia and its native brew were calling our names. Instead of booking plane reservations to Sidney, we decided to try making some beer. We had made traditional Australian lagers before and thought we would attempt something different. We choose two products from Cooper's, an Australian Real Ale kit and an amber unhopped malt extract. We brewed the Real Ale kit according to the instructions and decided to experiment in creating an Oktoberfest-style lager with the amber extract.

Although we have ventured into creating our own recipes using bulk extract, fresh

whole hops and specialty grains it is good to know that we can depend on kits like Cooper's to provide a relatively quick, easy-to-make, fine-tasting batch.

## Cooper's Australian Real Ale Kit

The Cooper's Brewery produces some very fine beer that we enjoy from time to time. The Australian Real Ale kit proved to be a worthy counterpart of the South Australian operation. This kit is perfect for the homebrewer who wishes to make a batch of Australian ale in his or her own kitchen.

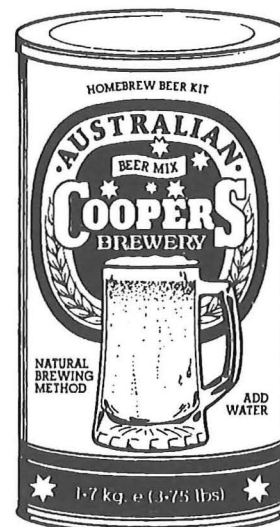
### For five gallons:

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- dry ale yeast (included with kit)

- Original specific gravity: 1.054 (estimated)
- Final specific gravity: 1.010

The directions that came with the kit were very interesting to read. They were broken down into six parts: requirements, brewing method, fermentation, bottling, hints for the homebrewer and common faults. In addition to these comprehensive words of wisdom the manufacturer provided a homebrewer's brewing record that allows the brewer to record date, volume and amount of sugar plus a telephone number (Australian) to call or address to write should further advice be required.

We deviated from the kit directions only twice. First, instead of adding white sugar we



used an additional can of extract. Second, we boiled the malt with 1 1/2 gallons of water for about 10 minutes to sanitize the wort and evenly dissolve the extract rather than adding 4 liters of boiling water. By using two cans of the Real Ale malt, we figured the beer would have more body and an intense hop character. After the short boil, we force-chilled the wort, funneled it into a glass carboy with enough water to make five gallons and pitched the dried ale yeast. Initial fermentation was visible within several hours. The beer was racked into another carboy for secondary fermentation after three days when most of the visible activity had ceased. A week or so later the beer was batch primed and bottled.

We sampled a bottle after two weeks of conditioning and were very pleased with the overall quality of this ale. The hop character was predominant in the nose and taste while the color was a beautiful amber. The color of our batch was deeper than the mug of beer pictured on the Cooper's extract can, but we

attribute this to the addition of the second can of extract instead of white sugar called for in the instructions. We would highly recommend this kit because it is easy to make even with our modifications, requires little time and produces a wonderfully flavorful ale.

## Cooper's Australian Amber Malt Extract "Australian" Oktoberfest

The second beer we brewed used Cooper's amber malt extract. This extract can is not a "kit" so it is unhopped and does not include yeast or instructions, giving us the opportunity to create our own recipe. We decided to produce a unique "Australian" Oktoberfest-style beer. In addition to the two cans of Cooper's amber malt extract, we supplemented the recipe with some specialty grains (crystal, chocolate and Munich), liquid yeast and whole hops.


### For five gallons

- 2 cans (3.75 pounds each) Cooper's amber malt extract
  - 1/2 pound 40 °L crystal malt
  - 1/8 pound chocolate malt
  - 1/2 pound Munich malt
  - 3/4 cup corn sugar (for priming)
  - Wyeast No. 2206 liquid Bavarian yeast
  - 3 ounces Tettnanger hops, 5.5 percent alpha acid (60 minutes)
  - 1/2 ounce Tettnanger hops, 5.5 percent alpha acid (two minutes)
- Original specific gravity: 1.052 (estimated)
  - Final specific gravity 1.012

First, we toasted the Munich malt at 350 degrees F (176.5 degrees C) for about 10 minutes. Then we cracked the crystal, chocolate and Munich malts by putting them in a ziploc® bag and crushing them with a beer bottle, added them to 1 1/2 gallons of water in the brewpot and brought the mixture to a boil. When the mixture started to boil we removed the grains and added the malt extract followed by the

boiling hops and boiled for 60 minutes with occasional stirring. The wort was force cooled and added to the fermenter with enough water to make five gallons. We pitched the yeast, put on the fermentation lock and waited for the action to begin. The beer fermented for eight days at about 74 degrees F (23 degrees C) and then was racked into another carboy for secondary fermentation. After another week or so we siphoned the beer and to a bottling pail, batch primed with corn sugar, bottled and set the beer aside to condition.

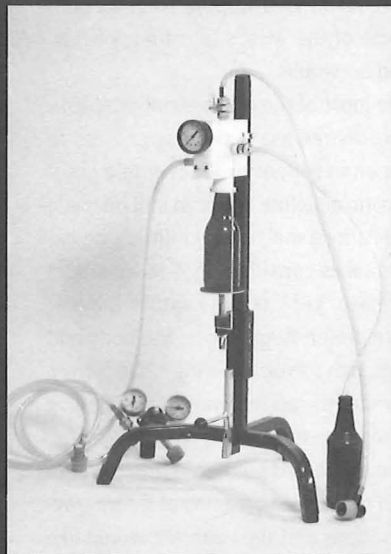
The finished beer has an exceptional dark amber color. It balances a malty sweetness with low bitterness and low hop flavor and aroma. Cooper's Australian amber malt extract is a terrific baseboard from which to develop your own creative beer recipe.

John Carlson is a second year law student at the University of Denver who spends part of his free time as a homebrewer. Caroline Duncker does public relations for Colorado Ski Country USA. In addition to her love for the outdoors, she enjoys the indoor art of brewing. 

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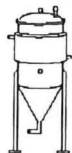
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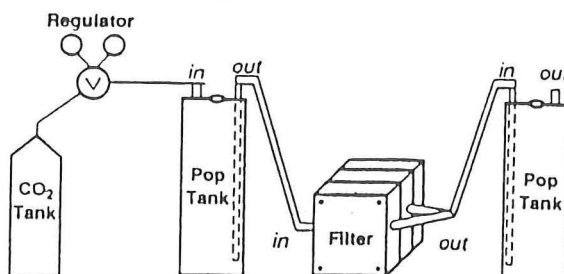
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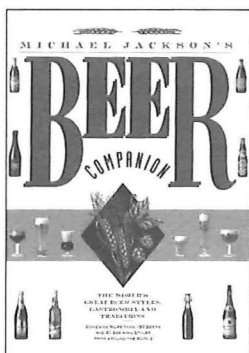
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# REVIEWS

## Beer Companion



This 280-page book by Michael Jackson covers a brief introduction to brewing ingredients, a broad spectrum of brewing styles and examples, a variety of anecdotes about the

history of beer and a section on beer and food, including recipes. *Beer Companion* is a true delight and hard to put down, though there were several wonderful summaries, maps and topics in Jackson's earlier book, *The New World Guide to Beer* (Running Press, 1988), that would have made the new book more complete.

For the well-traveled and style-experienced beer drinker or for the wannabe, this book is a fantastic collection of history and sensory insights into 41 brewing styles and gives specific examples of beers within the styles from around the world. The pictures add a great deal in demonstrating the background of the styles and the actual colors.

I was truly immersed in this book. Jackson has an uncanny ability to put sensory experiences into words. Sights, sounds, smells and tastes were mentally triggered as I read. His narrative was enough for me to imagine I was there tasting the beer he was describing.

Each section on beer styles gives the history and characteristics that make each style unique. The information is fascinating and gives the reader insights into how the styles originated. What is lacking, for those who are not intimately familiar with all of the styles,

is a summary of the styles and their attributes as a quick reference guide.

Having carried Michael Jackson's *Pocket Guide to Beer* (Simon and Schuster, 1992) around the world with me and used it as a source for specific breweries and beers, this book goes into a lot more detail and prepares the beer enthusiast to look for more history and locations while searching out specific beers. My travels would have been even more enjoyable if I had the information contained in this book.

While reading, I was a little concerned about how this book was supposed to relate to Jackson's 1988 book, *The New World Guide to Beer*. There was no mention of it in *Beer Companion* other than the title being mentioned on the inside back cover.

Looking at the books side by side, the most obvious differences are that *The New World Guide to Beer* spent more time on the background of beermaking and looked at the variety of beers country by country, rather than style by style as in the *Beer Companion*. Additionally, *Beer Companion* looks at beer and food, which *The New World Guide to Beer* does not.

Personally, as much as I like the descriptions in *Beer Companion*, *The New World Guide to Beer* has a lot of information that would have made the new book a more comprehensive study. For example, *The New World Guide to Beer* has terrific maps of brewery locations, country by country. Summary sections on style descriptions, how to taste and judge beer, descriptions and pictures of hops and barley would have made *Beer Companion* a little more complete.

Given the existence of two books by the same author on very similar topics, which book should one purchase? As a beer-history junkie, each provides me with a lot of useful information. Unfortunately, I do not have the space

to carry both of these books when I travel.

The only obvious error was on page 93. My dog Millie was on our beer label, but that label passed on to doggy heaven in 1989.

Overall, I loved *Beer Companion*, but I wish that its relationship to *The New World Guide to Beer* were better defined and the best of both books integrated.

*Beer Companion* by Michael Jackson, Running Press, 1993, publisher's suggested retail price: \$39.95.

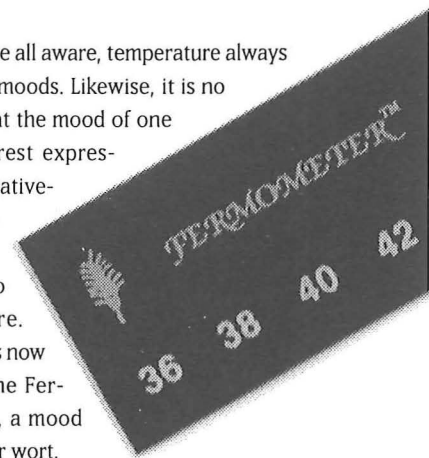
Reviewed by Pete Slosberg, founder of Pete's Brewing Co. and a Recognized BJCP judge.

## Fermometer™

As we are all aware, temperature always affects our moods. Likewise, it is no surprise that the mood of one of our dearest expressions of creativity, homebrew, is linked to temperature. Alas, there is now available the Fermometer™, a mood ring for your wort.

The Fermometer™ is an economical alternative to the traditional immersion thermometer during the fermentation stage. It is a flexible liquid crystal thermometer designed to stick to the outside of the fermentation vessel with a self-adhesive backing.

The Fermometer™ provides continual monitoring to signal the time for pitching and is a tireless sentry of temperature during fermentation. This eliminates the sanitation blues and threat of contamination associated with



the more traditional immersion thermometer. It also eliminates the nagging question, "Is it time to pitch yeast yet?" and sends packing the faith brewers who must do a laying of hands on the wort.

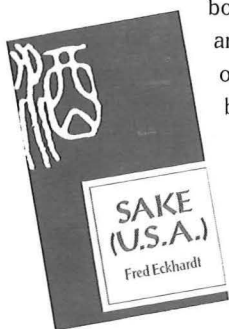
The temperature range of 36 to 78 degrees F is in two-degree increments. Color changes ingeniously designed into the liquid crystal allow actual one-degree-increment readings. It also displays range bars for suggested fermentation temperatures of lagers and ales.

The manufacturer's suggested retail price is \$3.50 (plus \$1 S&H). This makes the Fermometer™ an economical and fun way to prevent off-flavors and reduce the risk of contamination — a definite mood enhancer. The Fermometer™ is available at homebrw supply shops. For more information write Tkach Enterprises, PO Box 344, Castle Rock, CO 80104, or call (303) 660-2297. Reviewed by Ross Libenson, a brewophile.

## Sake (U.S.A.)

You will always get your money's worth in a book by Fred Eckhardt. *Sake (U.S.A.)* offers a preface, a foreword and an introduction, plus no less than seven appendices that include a glossary, a bibliography and an index. The main text itself is actually three

books: one on the history and lore of saké, another on the history of U.S. saké breweries and a third on how to make your own saké at home. If you are at all interested in saké, your library could begin and end right here.



Saké, Eckhardt tells us, is the most complex alcoholic beverage on earth and has the highest alcohol content (up to 21 percent) of any naturally fermented beverage. Neither a beer nor a wine, saké is the product of a unique fermentation that begins with the making of *koji*, from rice incubated with a mold. When the *koji* is ready, it is combined with steamed rice, water and saké yeast for the first of a series of ferments that can last as long as four weeks. The next stages of filtering, settling, more filtering and aging can take six months to a year.

Eckhardt describes the commercial and the streamlined home version of this process

in careful detail, and illustrates throughout with clear black-and-white photographs.

If you are leery of beverages that do not feature a hoppy aroma, you may at least find the history of saké brewing in the United States to be interesting. Thirty-six saké breweries have operated in the United States, the first opening in Berkeley (where else?) in 1902, with new plants opening recently in California, Colorado and Oregon.

To pour it into a small cup, *Sake (U.S.A.)* is all you need to begin a lifelong appreciation of saké, written by the best man for the job.

*Sake (U.S.A.): The Complete Guide to American Sake, Sake Breweries and Homebrewed Sake*, by Fred Eckhardt, Fred Eckhardt Communications, 1992, publisher's suggested retail price: \$14.95.

Reviewed by Kihm Winship, a free-lance writer since 1973 and a beer and book lover.

## The Minnow — Mini Homebrew System

I have always appreciated fine beers, but have been completely ignorant of the process and care that go into creating such a beer. To educate and enlighten others like me, along comes the "Minnow," a mini homebrewing system that outlines the homebrewing process and makes it understandable for first timers. The "Minnow" homebrewing system includes a 1 1/2-gallon white food-grade plastic primary fermenting bucket, a snap-on lid and three-piece airlock with rubber grommet, an amber glass secondary fermenter with S-type-triple-ripple airlock, a special vented funnel, three packs of crushed specialty malt grains and a multirecipe ingredients pack. This pack includes a 1.4 pound can of pale malt extract syrup, hop pellets, ale yeast, priming sugar and chlorine bleach in powder form for sanitizing. The kit brews four liters, or a 12-pack of beer.

A copy of *The New Brewer's Handbook* by Patrick Baker is included to introduce brewing terminology. The user is instructed to read the handbook cover to cover (about 36 pages) to provide some familiarity prior to brewing.

The kit also comes with a full set of instructions that will guide the user through primary and secondary fermentation, the prim-

ing process and bottling. My first recipe describes the process of brewing a continental light or Pilsener-style beer that includes Tettnanger hop pellets. Preparing the wort for primary fermentation lasts two hours. Primary fermentation takes about four days. I allowed secondary fermentation to proceed for seven days as opposed to the recommended three or four days to ensure that secondary fermentation was complete. One week was required for the beer to carbonate and condition and I allowed an additional three weeks for it to settle out and clear. The result of my labor was a very drinkable Pilsener with a good head and flavor.

To move to the intermediate brewing level, the user can take the specialty malt grains included in the kit and extract the essence of the malt grains by using a household coffee maker. A final section in the instructions guides the user to the advanced brewing level by using all-grain brewing techniques. I look forward to taking these next two steps.

The "Minnow" appears to satisfy two types of consumers. The first-time homebrewer, who wishes to join in the fun of brewing her or his own beer, and the advanced homebrewer who wishes to experiment with specialty recipes without the commitment of brewing a five-gallon batch.

The "Minnow" can be converted into a "whale" by adding a separate priming bucket and two additional secondary fermenters to produce four liters or a 12-pack of homebrew every other day. Whether you are an advanced homebrewer looking for a system to try out your newest "secret recipe" or a first timer looking to discover how beer is brewed and why microbrews are so flavorful, the "Minnow" is the kit for you.

Manufacturer's suggested retail price: \$19.95 (plus \$5 S&H). For more information on the "Minnow" write The New Bootleggers of America, PO Box 2772, Canoga Park, CA 91306, or call (818) 701-0557.

Reviewed by J. Matthew McMullen, a Boulder, Colo., architect and aspiring homebrewer.

## Evaluating Beer

*Evaluating Beer* is a 238-page compilation of 15 articles by 13 contributing authors all on beer evaluation. Aimed at a wide range of peo-

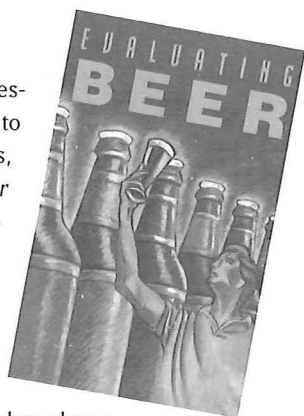


ple from professional brewers to homebrewers, *Evaluating Beer* shows the importance of each to the other, and especially takes advantage of the homebrewing movement to further beer appreciation and analysis. As Charlie Papazian says, "Never before has there been such a large group of brewers having an interest in the characteristics of different beer styles ..." The point of the book is that if brewers are "able to evaluate a beer's flavor, aroma, appearance, mouthfeel and aftertaste — and then identify the source of these characters, (brewers) can control, adjust and improve the quality of their brew."

Remember school? In what grade did they teach you how to properly smell and taste and what the components of those aromas and flavors might be? I thought so; I wasn't taught either. Since we were not systematically taught smells and tastes in school, *Evaluating Beer* attempts to make up for our lack of education.

Some of the information in this book directly involves the work we do in the Beer Judge Certification Program. The effects of environmental factors and even the effect people have on one another during judging are discussed in great detail. The American Homebrewers Association and Home Wine and Beer Trade Association scoring sheets are dissected, and theory is applied to explain each part of the score sheets. Even the differences in techniques between tasting beer and wine are noted and thoroughly covered.

This is not a book for the beginner, nor for someone who has no experience in the brewing process. Unless you realize that the many articles discuss each different author's personal experiences of how to evaluate beer and not one universally applied system, this book can be confusing and even contradictory. For example, Ron Siebel of the Siebel Institute in Chicago discusses using a hedonic scale, yet Dr. Palamand of Summit Products in a later article specifically says, "Avoid hedonics." Later, the importance of hedonics is used again in discussing the work done by



large brewers with consumer preference groups. So which system should the reader use? It's important to realize that you may encounter different systems in the brewing industry. This book is an introduction to many of those systems.

For the novice, I'd recommend taking one of the tasting seminars held each year at the AHA's annual Homebrewers Conference. Otherwise, an introduction to tasting using doctored beer samples is an excellent project for homebrew clubs. *Evaluating Beer* contains complete instructions on how to make such doctored samples. After such an introduction to tastings, you will have a sound basis for appreciating this book.

For the novice or even for an advanced taster, the advice given on how to taste and the tasting procedure is valuable, as is the advice on how to communicate with an entrant if you are a judge. What seems to be out of place are the articles on color evaluation. While this is an important part of laboratory technique, color evaluation is not easily done in a competitive setting.

The latter part of the book deals with larger brewers and how consumer testing and

evaluation help determine what changes might be necessary to their brands. This is not something that a homebrewer would do, but for anyone with dreams of breaking into the world of microbreweries and brewpubs, it contains valuable insights into commercial brewing.

I had read several of these articles before in different journals, but as a beer judge, and one interested in furthering the avocation of brewing, I was glad to see so many articles dealing with beer evaluation together in one book. For anybody seriously interested in being a beer judge, this is a valuable reference tool. It contains helpful advice to homebrewers, commercial brewers, homebrew clubs and beer judges. In the not too distant future, I expect to see this book on the required reading list for advanced judges and competition organizers.

*Evaluating Beer*, a collection of articles edited and published by Brewers Publications, 1993, publisher's suggested retail price: \$25.95. Reviewed by Ed Busch, a National BJCP judge.

This article is available on Library 13-AHA/*zymurgy*/Clubs on CompuServe's Beer and Wine Forum as REVIEW.S94.

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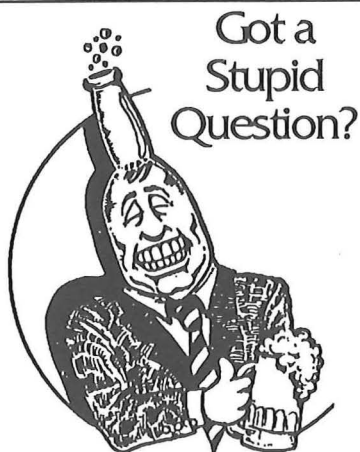


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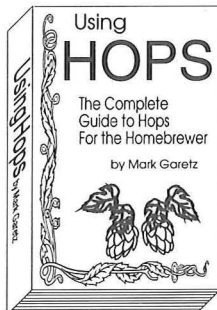
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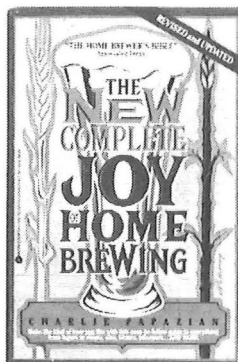
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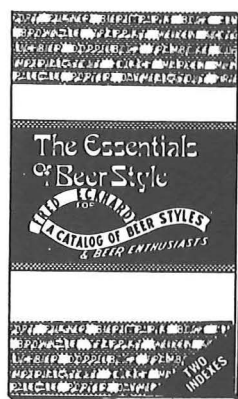
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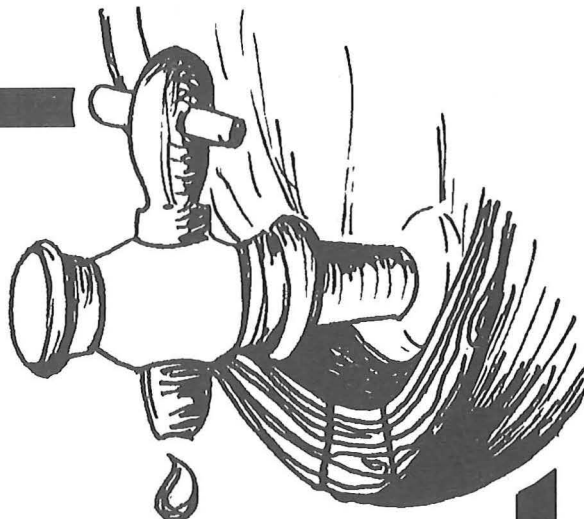
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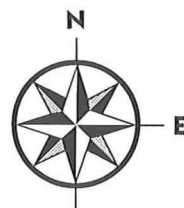
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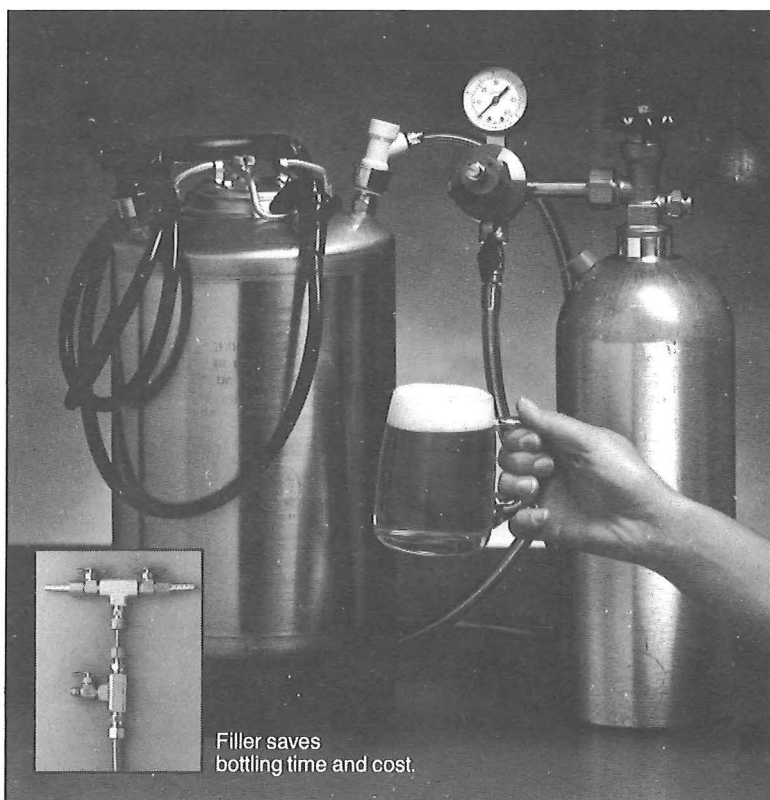
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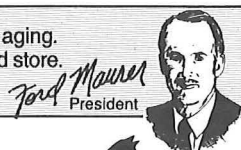
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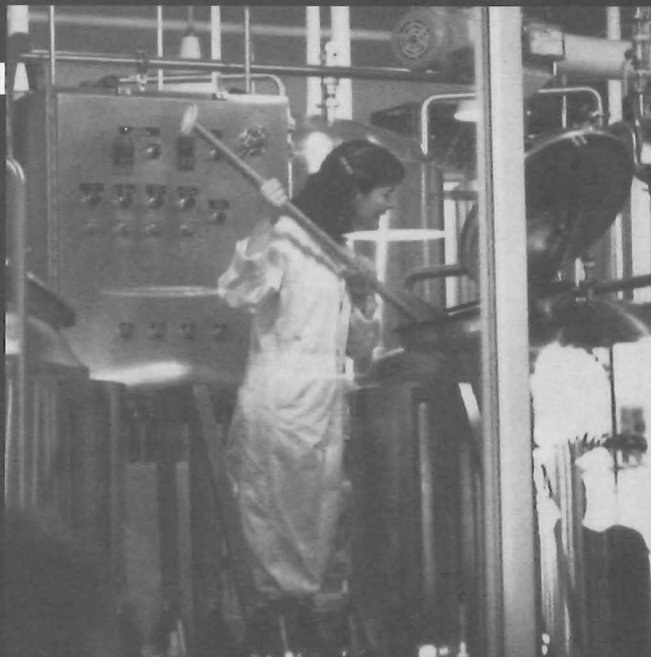
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# *The New Brewer*

THE MAGAZINE FOR MICRO- AND PUB-BREWERS

American Homebrewers Association

## Stout Bout Club-Only Competition

Here's your chance to show 'em who's Champ!

Send your club's best Stout to this year's "Stout Bout" club-only competition and see who's left standing after the bell. Entries are due May 31, 1994. Three bottles per entry, one entry per club. Please use AHA Sanctioned Competition entry forms and include the \$5 entry fee. All clubs registered with AHA are eligible and encouraged to participate.

Send all entries to:

Stout Bout

Gold Country Brewers Assn.

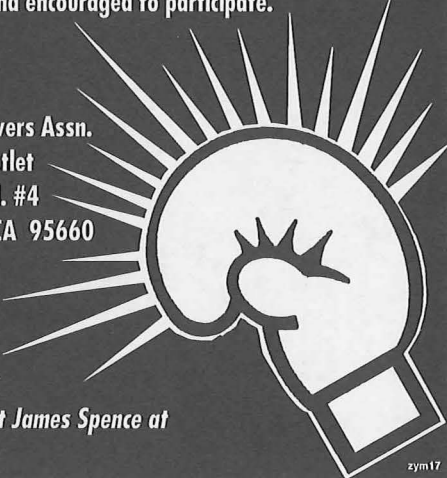
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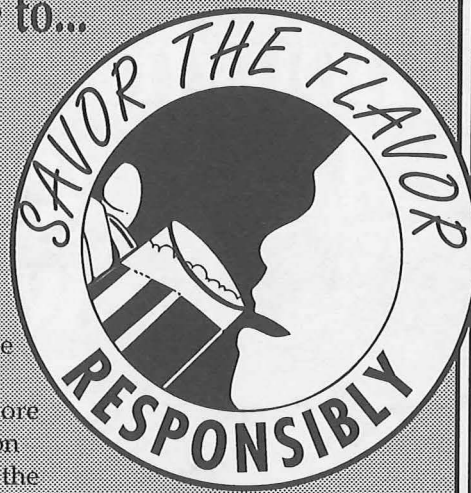


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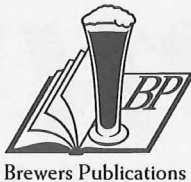
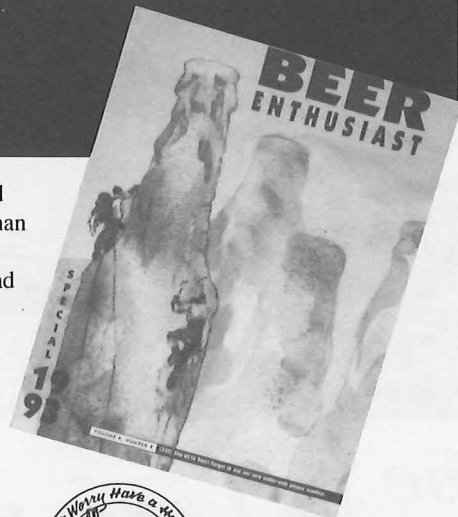
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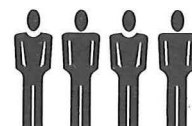
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# HOMEBREW CLUBS



James Spence

## Compete Nationally in AHA Club-Only Competitions

Each year the AHA sponsors six homebrew competitions exclusively for AHA Registered Homebrew Clubs. Because each club is allowed only one entry and each competition focuses on one beer style, the Club-Only Competitions are an excellent avenue for clubs to organize tastings and competitions to choose their representative beer to compete against other clubs nationwide. Four of the competitions (Hail to Ale, Bock is Best, Weiss is Nice and Best of Fest) focus on the same style each year. Two competitions change in style each year. In 1993, Scottish ale and porter were the styles of the fifth and sixth competitions. In 1994, stout and specialty beer are the two new beer categories featured in Club-Only Competitions.

For a few years, all of the competitions were judged at AHA headquarters in Boulder,

Colo. In 1993, however, the club-only competitions began rotating to different judging sites, allowing clubs to organize the receiving and judging of the entries with the support and sponsorship of the AHA. California's Maltose Falcons, Michigan's Ann Arbor Brewers Guild, Washington's Seattle Brews Brothers, Pennsylvania's TRASH, Florida's Hogtown Brewers and the AHA all hosted a competition in 1993. In some cases, the opportunity to organize a Club-Only Competition gave members their first experience with organizing and judging a homebrew competition. First-place winners receive trophies and the honor of having their recipe published in *zymurgy* (see "Winners Circle" in this issue).

Homebrew clubs also earn points toward the Homebrew Club of the Year trophy when a member wins first, second or third in a Club-

Only Competition. This trophy has been awarded since 1985 to the homebrew club garnering the most points in the National Homebrew Competition and the Club-Only Competitions.

A complete schedule of the remaining 1994 Club-Only Competitions, with category and subcategories, follows. Information and entry forms for upcoming competitions are sent to club liaisons after each competition. If you have any questions or comments about the Club-Only Competitions, please contact the AHA.

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### BOCK IS BEST

Organized by Maine's Maine Ale & Lager Tasters (MALT). Entry deadline is March 21.

#### 12. BOCK

##### (a) Traditional German Bock

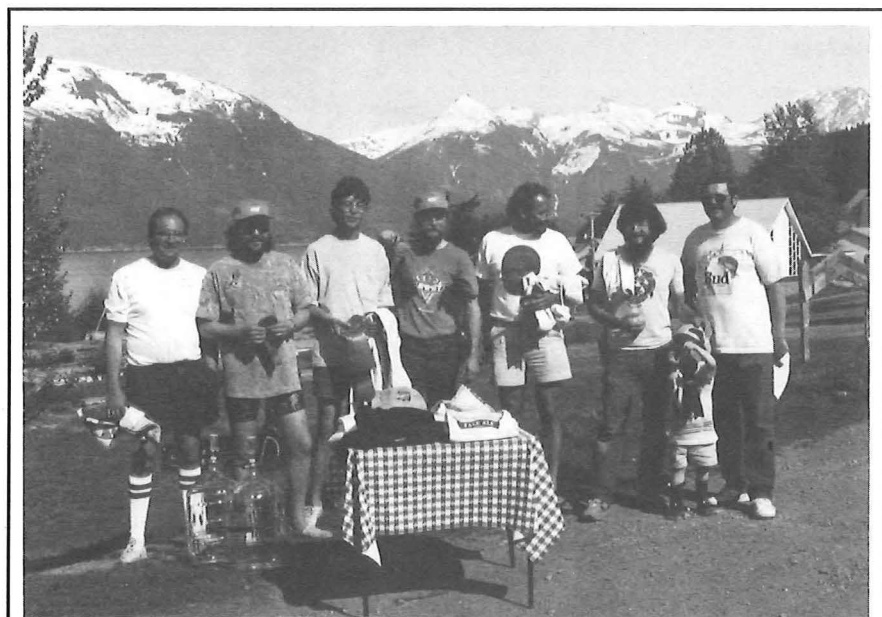
O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.066-1.074 (16.5-18.5)	6-7.5%	20-30	20-30

Copper to dark brown. Full body. Malty sweet character predominates in aroma and flavor with some toasted chocolate malt character. Low bitterness. Low hop flavor, "noble-type" OK. No hop aroma. No fruitiness or esters. Low to medium diacetyl OK.

##### (b) Helles (light) Bock

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.066-1.068 (16.5-17)	6-7.5%	20-35	4.5-6

Pale to amber. Medium body. Malty sweet character predominates in aroma and flavor. No toasted chocolate malt character. Low bitterness. Low hop flavor, "noble-type" OK. No hop aroma. No fruitiness or esters. Low to medium diacetyl OK.



Homebrewing in the Great White North, Juneau Homebrew Club, Alaska.



### (c) Doppelbock

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.074-1.080 (18.5-20)	6.5-8%	17-27	12-30

Light to very dark; amber to dark brown. Very full body. Malty sweetness evident in aroma and flavor can be intense. High alcoholic flavor. Slight fruitiness and esters OK, but not very desirable. Low bitterness. Low hop flavor, "noble-type" OK. No hop aroma. Low diacetyl OK.

### (d) Eisbock

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.092-1.116 (23-29)	8.6-14.4%	26-33	18-50

A stronger version of Doppelbock. Deep copper to black. Very alcoholic. Typically brewed by freezing a doppelbock and removing resulting ice to increase alcohol content.

## STOUT BOUT

Organized by California's Gold Country Brewers. Entry deadline is May 31.

### 11. STOUT

#### (a) Classic Dry Stout

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.038-1.048 (9.5-12)	3.8-5%	30-40	40+

Black opaque. Light to full medium body. Medium to high hop bitterness. Absence of or low levels of roasted barley (coffee-like) character OK. Sweet maltiness and caramel malt evident. No hop flavor or aroma. Slight acidity/sourness OK. Low to medium alcohol. Diacetyl low to medium.

#### (b) Foreign Style

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.052-1.072 (13-18)	6-7.5%	30-60	40+

Stronger version of Classic Dry Stout.

#### (c) Sweet Stout

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.045-1.056 (11-14)	3-6%	15-25	40+

Overall character sweet. Black opaque. Medium to full body. Hop bitterness low. Roasted barley (coffee-like) character mild. No hop flavor or aroma. Sweet malty and caramel evident. Low to medium alcohol. Low diacetyl OK.

### (d) Imperial Stout

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.075-1.095 (19-23.5)	7-9%	50-80	20+

Dark copper to black. Hop bitterness, flavor and aroma medium to high. Alcohol strength evident. Rich maltiness. Fruitiness/esters OK. Full bodied. Low diacetyl OK.

## WEISS IS NICE

Organized by New York's Upstate New York Homebrewers Association. Entry deadline is Aug. 8.

### 24. WHEAT BEER

#### (a) Berliner Weisse

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.028-1.032 (7-8)	2.8-3.4%	3-6	2-4

Pale. Light body. Dry. Sharp lactic sourness. Fruity/estery. Between 60 and 70 percent malted wheat. Very low bitterness. No hop flavor or aroma. Effervescent. No diacetyl.



## AHA SANCTIONED COMPETITION

*Kudos*

May 1, 1993,  
**MALTOSE FALCONS'**  
**1993 MAYFAIRE,**  
Woodland Hills, Calif., 238 entries.  
Norman Dickenson of Santa Rosa, Calif.,  
won best of show.

May 22, 1993,  
**NEW MOON MADNESS,**  
Douglassville, Pa., 85 entries.  
Kevin McCarty of Sicklersville, N.J.,  
won best of show.

June 19, 1993,  
**MAZER CUP MEAD**  
**COMPETITION,**  
Ann Arbor, Mich., 80 entries.  
Phil Fleming of Broomfield, Colo.,  
won best of show.

June 19, 1993,  
**MT. CLEMENS 175TH**  
**ANNIVERSARY,**  
Mt. Clemens, Mich., 67 entries.  
D. J. Downs of Bloomfield Hills, Mich.,  
won best of show.

July 3, 1993,  
**BIG SKY HOMEBREW**  
**COMPETITION,**  
Missoula, Mont., 28 entries.  
Paul Tartarka of Dillon, Mont.,  
won best of show.

July 24, 1993,  
**SANTA CLARA COUNTY FAIR,**  
San Jose, Calif., 72 entries.  
Caesar Snee of Los Gatos, Calif.,  
won best of show.

Aug. 7, 1993,  
**SECOND ANNUAL**  
**CENTRAL ILLINOIS**  
**HOMEBREWING COMPETITION,**  
Normal, Ill., 87 entries.  
Tim Hilton of Normal  
won best of show.

Aug. 14, 1993,  
**BREWFEEST 1993,**  
Columbus, Ohio, 63 entries.  
Chris Estelle of Columbus  
won best of show.

Aug. 14, 1993,  
**NORTH TEXAS STATE FAIR,**  
Denton, Texas, 156 entries.  
Patrick Carroll of Dallas won best of show.

Aug. 21, 1993,  
**GERMAN AMERICAN FESTIVAL**  
**BEST BREWER,**  
Oregon, Ohio.  
Jeffrey J. Gralak of Toledo, Ohio,  
won best of show.

Aug. 21, 1993,  
**GILROY ANTIQUE AND BREWFEEST**  
**HOMEBREW COMPETITION,**  
Gilroy, Calif., 48 entries.  
Kregg Dickerson of Folsom, Calif.,  
won best of show.

Aug. 28, 1993,  
**NEW MEXICO STATE FAIR PROAM,**  
Albuquerque, N.M., 151 entries.  
Laure Pomianowski of Pecos, N.M.,  
won best of show.

Sept. 11, 1993,  
**SANTA CRUZ COUNTRY FAIR**  
**HOMEBREW COMPETITION,**  
Watsonville, Calif., 43 entries.  
Michael Byers of Santa Cruz  
won best of show.

Sept. 11, 1993,  
**SONOMA COUNTY HARVEST FAIR**  
**HOMEBREW COMPETITION,**  
Santa Rosa, Calif., 185 entries.  
Rick Larson of Sebastopol and Paddy  
Giffen of Cotati won best of show.

Sept. 26, 1993,  
**MINNESOTA BREWFEEST '93,**  
Minnetonka, Minn., 285 entries.  
Rick Larson of Minnetonka  
won best of show.

Sept. 28, 1993,  
**MID-SOUTH FAIR**  
**HOMEBREW COMPETITION,**  
Memphis, Tenn., 139 entries.  
William Schwartz of Memphis  
won best of show.

Oct. 2, 1993,  
**DOMINION CUP/**  
**STATE FAIR OF VIRGINIA,**  
Richmond, Va., 35 entries.  
Tim Artz of Lorton, Va.,  
won best of show.

Oct. 3, 1993,  
**EVANSTON FIRST**  
**HOMEBREW CHALLENGE,**  
Evanston, Ill., 44 entries.  
Gary Sults of Chicago  
won best of show.

You can receive an  
AHA Sanctioned Competition  
application for your homebrew  
competition by contacting the  
AHA. For results to appear in this  
column for 1994 Fall *zymurgy*,  
organizers' reports must  
be received by April 28.

### (b) German-style Weizen/Weissbier

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.048-1.056 (12-14)	4.8-5.4%	10-15	3-9

Pale to golden. Light to medium body. About 50 percent wheat malt. Clove and slight banana character. Fruity/estery. Clove, vanilla, nutmeg, smoke and cinnamonlike phenolics permissible. Mild sourness OK. Highly effervescent. Cloudiness OK. Low bitterness. Low hop flavor and aroma OK. No diacetyl.

### (c) German-style Dunkelweizen

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.048-1.056 (12-14)	4.8-5.4%	10-15	17-22

Deep copper to brown. Dark version of Weizen. Chocolatelike maltiness evident. Banana, cloves and other phenolics may still be evident, but to a lesser degree. Stronger than Weizen. Medium body. Low diacetyl OK. Low hop flavor and aroma OK.

### (d) German-style Weizenbock

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.066-1.080 (16.5-20)	6.5-7.5%	10-20	7-30

Usually deep copper to dark brown, but light versions can be amber to copper. Medium to full body. Alcoholic strength evident. Maltiness high. Low bitterness. Hop flavor and aroma absent. Banana and clove character apparent. Low diacetyl OK.

## BEST OF FEST

Organized by Indiana's Bull and Stump Brew Club and Foam Blowers of Indiana. Entry deadline is Oct. 3.

### 17. VIENNA/OKTOBERFEST/MÄRZEN

#### (a) Vienna

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.048-1.055 (12-13.5)	4.4-6%	22-28	8-12

Amber to deep copper or light brown. Toasted malt aroma and flavor. Low malt sweetness. Light to medium body. Hop bitterness low to medium. Low hop flavor and aroma, "noble-type" OK. No fruitiness, esters. Low diacetyl OK.

### (b) Oktoberfest/Märzen

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.052-1.064 (13-16)	4.8-6.5%	22-28	7-14

Amber to deep copper/orange. Malty sweetness, toasted malt aroma and flavor dominant. Medium body. Low to medium bitterness. Low hop flavor and aroma, "noble-type" OK. No fruitiness, esters or diacetyl.

## SPECIALTY QUEST

Organized by the American Homebrewers Association. Entry deadline is Dec. 5.

### 21. SPECIALTY BEER

Any ale or lager brewed using unusual techniques and/or fermentable ingredients other than (or in addition to) malted barley as a unique contribution to the overall character of the beer. Examples include (but are not limited to) the use of honey and maple sap or syrup or heating the wort with white-hot stones. Examples do not include fruit or herbs, although they can be used to add to the character of other uniquely fermentable ingredients.

## NEW AHA REGISTERED HOMEBREW CLUBS

**Y**ou can receive a complete list, updated quarterly, of Registered Homebrew Clubs by ordering item #939 from the *Beer Enthusiast* catalog. The complete list will be published in *zymurgy* Summer 1994 (Vol. 17, No. 2).

To register your homebrew club with the AHA, send a brief letter about your club. Include the same kind of contact information you see for the new clubs listed here to AHA Club Coordinator, PO Box 1679, Boulder, CO 80306-1679. You can FAX your letter to (303) 447-2825, send it to CompuServe at ID #70740, 1107, or Prodigy address BREW99A.

We need to receive your new club information by April 28 for your club to appear in *zymurgy* Fall 1994.

## NEW CLUBS

### CALIFORNIA

**South San Diego Brewers and Vintners Club**, c/o Jarrod Bell, 661 Gretchen Rd., Chula Vista, CA 91910, (619) 427-2474.

**Brewers of the Central Coast (B.O.C.C.)**, c/o Sean Portwood, 470 Price St. #A2, Pismo Beach, CA 93449.

### COLORADO

**Bierewolves of Loveland**, c/o Bob Green, PO Box 411, Loveland, CO 80537, FAX (303) 663-1557.

**One Brew Over the Cuckoo's Nest (O.B.O.C.N.)**, c/o Dave Lipitz, 1614 E. Orman, Pueblo, CO 81004, (719) 564-1611.

### CONNECTICUT

**Hop River Brewers**, c/o Richard Rosen, 265 Route 6, Andover, CT 06232, (203) 742-5465.

### ILLINOIS

**Weinkeller Beer Enthusiasts**, c/o Bob Ward, 9114 W. 140th St. Suite 3NE, Orland Park, IL 60462, (708) 403-6666.

### MASSACHUSETTS

**Colonial Brewers**, c/o Bill Lytle, Box 229, Brookfield, MA 01506.

### MICHIGAN

**Fermental Order of Renaissance Draughtsman**, c/o Rich Byrnes, 30972 Cousino, Warren, MI 48092, (313) 558-9844.

### NEW HAMPSHIRE

**Postal Brewers Club (PBC)**, c/o Robert W. Zeigler, 934 Lake Shore Rd., Manchester, NH 03109-5709.

### NEW MEXICO

**The Desert Quenchers**, c/o Anne L. Stout, 427 Vassar Ct. #A, Las Cruces, NM 88005, (505) 523-6820.

### NEW YORK

**Brewbonic Plague**, c/o Eric Hahn, 65 Clarendon Place, Buffalo, NY 14209, (716) 884-8099.

### NORTH DAKOTA

**Buffalo Brewers**, c/o Curt Saylor, 1206 3rd Ave. N.E., Jamestown, ND 58401, (701) 252-4358.

### OREGON

**Saccharomyces First!**, c/o David L. Murray, 73 Pine St. #5, Klamath Falls, OR 97601, (503) 883-3070.

### TENNESSEE

**Chattanooga Brew Club**, c/o Doug Smith, 514 Hurricane Creek Rd., Chattanooga, TN 37421, (615) 894-4631.

### TEXAS

**Lagerhythms**, c/o James Moniger, 3925 Fredricksburg Rd., San Antonio, TX 78201, (210) 737-6604.

### VERMONT

**Black River Brewers**, c/o Tom Coleman, PO Box 404, Ludlow, VT 05149, (802) 228-4178.

### (a) Specialty Beer

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.030-1.110 (7.5-27.5)	2.5-12%	0-100	0-100

Any non-classic style fitting the above description.

### (b) Classic-style Specialty Beer

O.G. (Plato)	Alc./Vol.	IBUs	SRM
(refer to individual styles)			

Any classic ale or lager to which special ingredients or a special process has been used, e.g., honey Pilsener, maple porter, sorghum stout, pumpkin pale ale. Brewer to specify style.

## HAIL TO ALE 1995

Organized by Florida's Central Florida Homebrewers. Entry deadline is Jan. 23, 1995.

### 5. ENGLISH-STYLE PALE ALE

#### (a) Classic English Pale Ale

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.044-1.056 (11-14)	4.5-5.5%	20-40	4-11

Pale to deep amber/copper. Low to medium maltiness. High hop bitterness. Medium hop flavor and aroma. Use of English hops such as Goldings, Fuggles. Fruity/estery. Low diacetyl OK. Medium body.

#### (b) India Pale Ale

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.050-1.065 (12.5-15)	5-6.5%	40-65	8-14

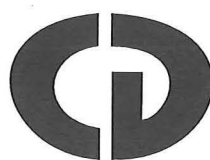
Pale to deep amber/copper. Medium body. Medium maltiness. High hop bitterness. Hop flavor and aroma medium to high. Fruity/estery. Alcoholic strength evident. Low diacetyl OK.

### 6. AMERICAN-STYLE ALE

#### (a) American Pale Ale

O.G. (Plato)	Alc./Vol.	IBUs	SRM
1.044-1.056 (11-14)	4.5-5.5%	20-40	4-11

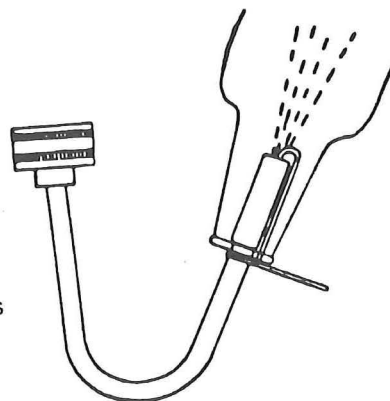
Pale to deep amber/red/copper. Low to medium maltiness. High hop bitterness. Medium hop flavor and aroma. Use of American hops such as Cascade, Willamette, Centennial (CFJ-90). Fruity/estery. Low diacetyl OK. Medium body.



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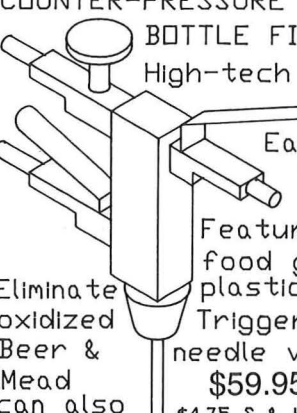
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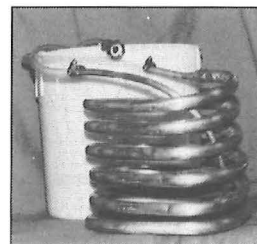
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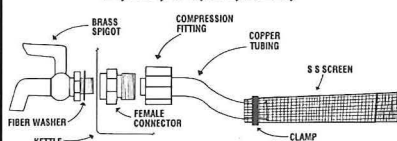


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# LAST DROP



I was judging the specialty class in the California State Homebrew Competition put on by the San Andreas Malts. This is always a very well-run competition, and this year was no exception with the legendary Russ Wigglesworth at the helm. There was a calibration beer, scored like the rest of the flight, that for most panels was in the style being judged. For us, it was a Witbier.

Veteran left-coast clubs prefer a 20-point scale, and the other three judges on the panel scored it in the high teens while I gave it a 10. I didn't think it was a bad beer, but I did think it was a lousy Witbier. I made one a few months back that was just as bad. In the spirited discussion that followed, the others shaved a few points off the score, but I still thought the total was too high.

When the judging was done, Russ came over to our table and asked, "What did you think of that calibration beer?" When I launched into a recital of its sins, Russ laughed and said, "That was your beer!" Oof! I'd forgotten I gave him some.

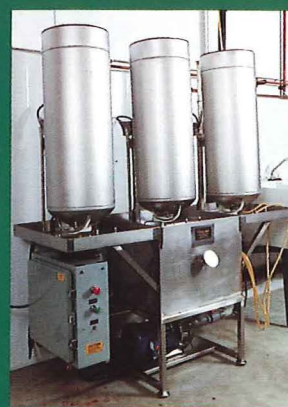
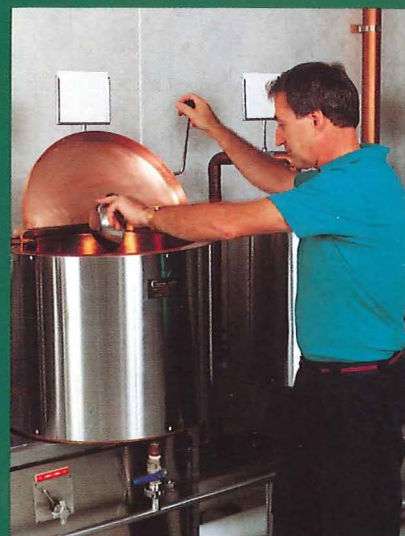
Oh well, at least I knocked it for the same reasons, whether I knew it was mine or not.

By Martin Lodahl, a brewer for the last seven years, and judge for five of those. Martin is a Certified BJCP judge and twice a first-round organizer of the AHA National Homebrew Competition, his specialty both in brewing and judging has been the Belgian styles, though his present research projects are in the areas of pre-Prohibition American styles and steam beers.



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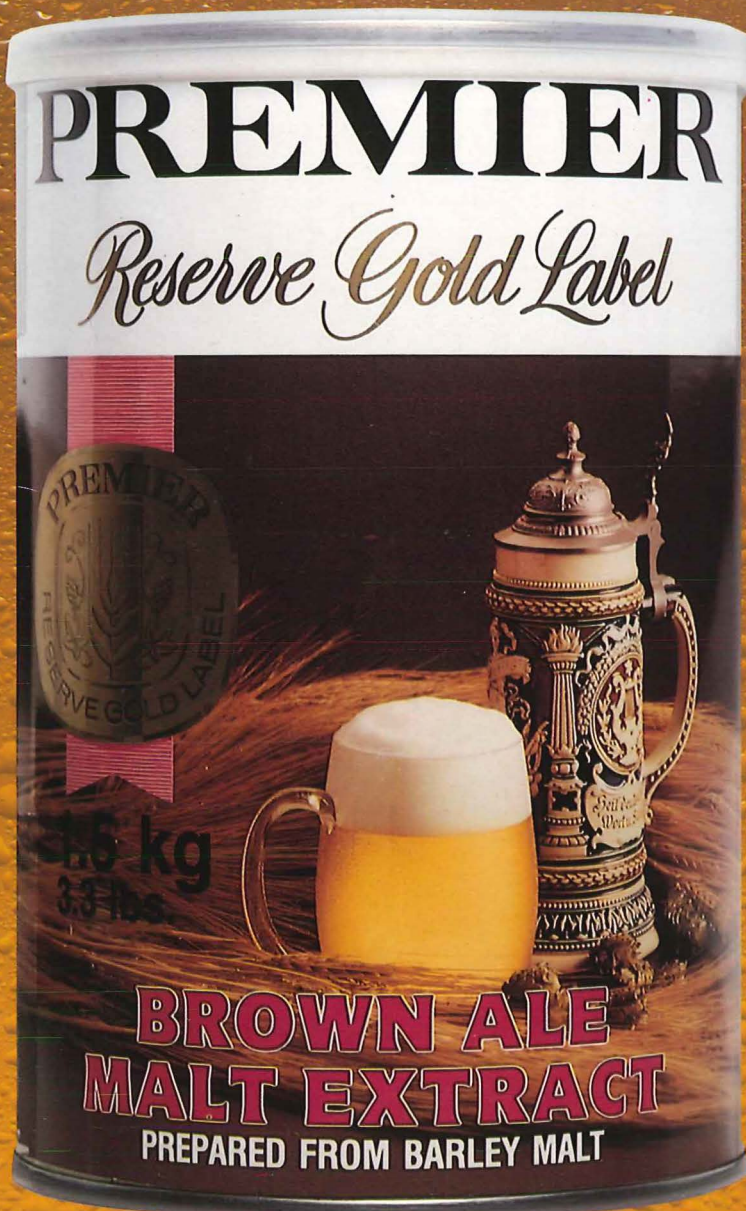
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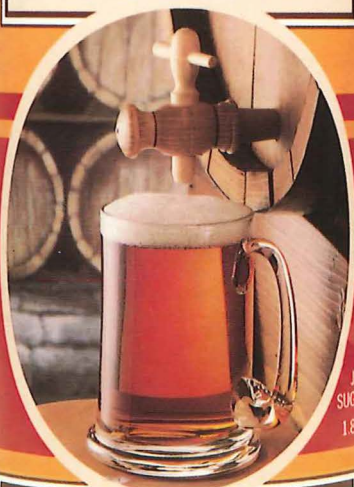


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