

Brew

YOUR OWN TM

January 1996, Vol.2, No.1
Niche Publications Inc.

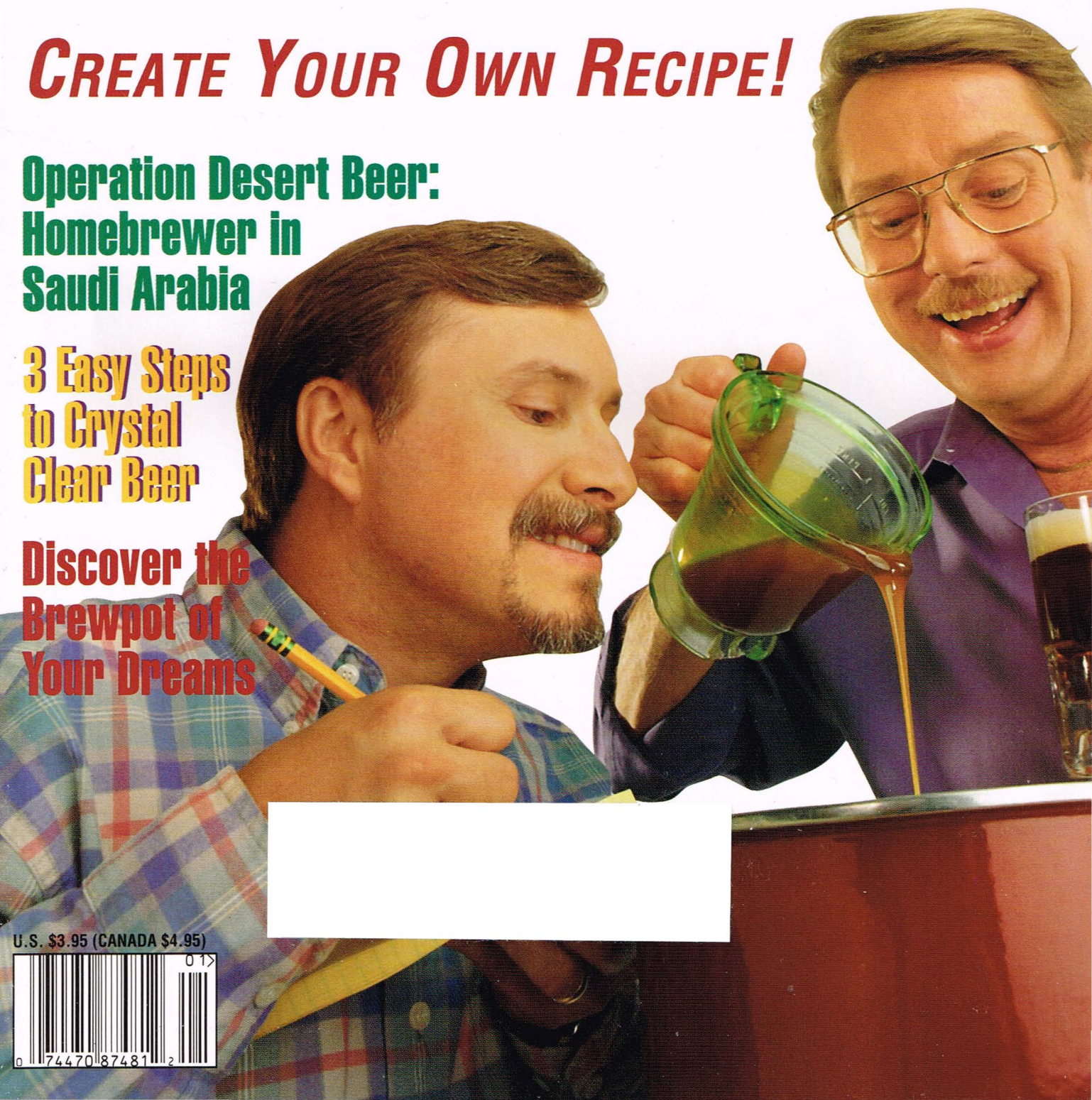
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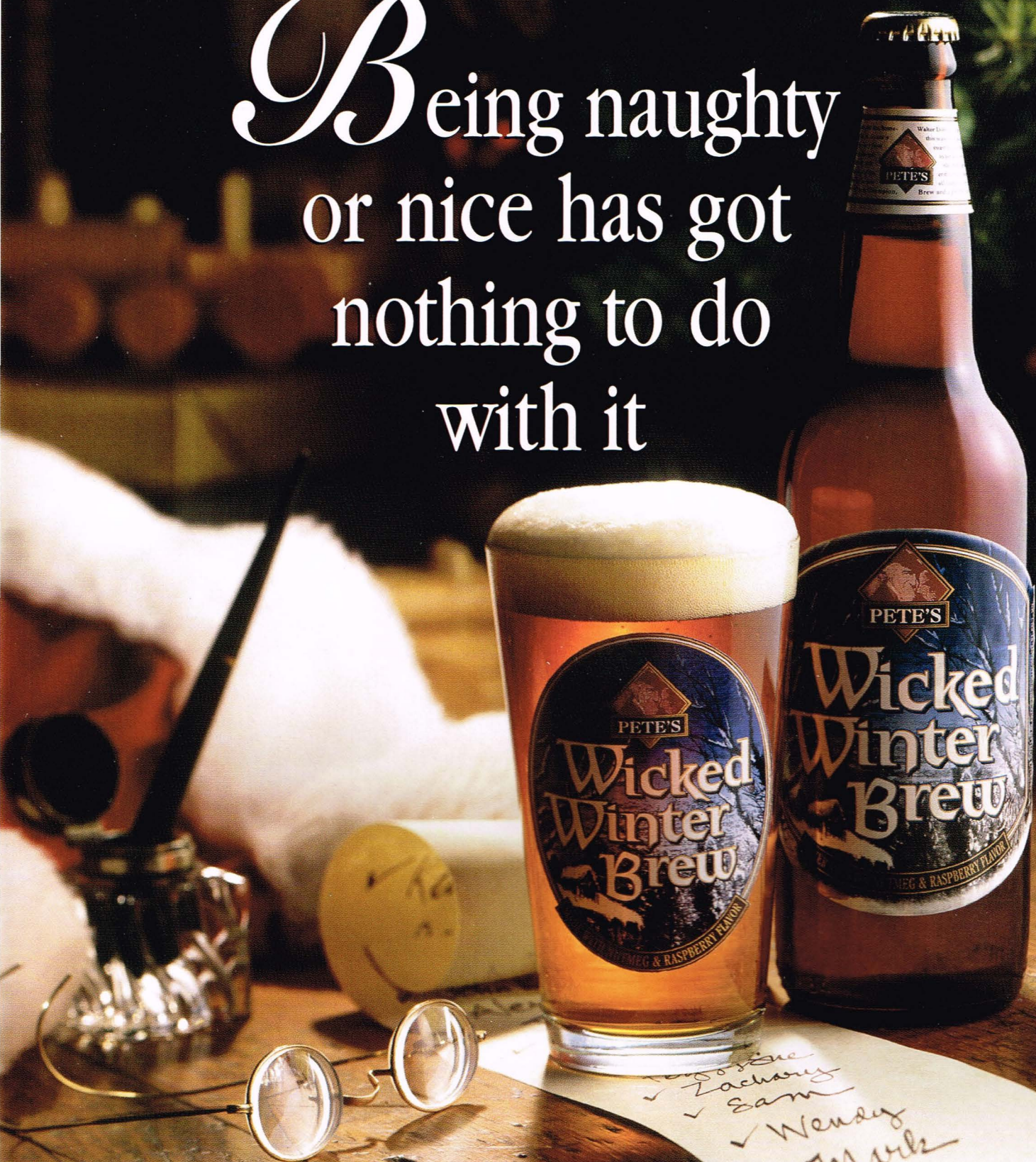
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Microbrewers should have nothing to hide from their customers.

That's why I believe all microbrewers should put a clear, easy-to-read freshness date in a prominent place on their labels. The Institute for Brewing Studies, a non-profit organization, also supports the edu-



There's an easy-to-read freshness date on every Samuel Adams.

cation of the brewing community on consumer legible freshness dating.

I hope consumers support the following microbreweries. You can help push for industry-wide freshness dating by calling your favorite microbrewery and urging them to include clear, uncoded freshness dating on each bottle. You'll be doing microbrew drinkers everywhere a favor.

Boston Beer Company, Atlanta Brewing, Broadway Brewing, Brooklyn Brewing, Bohannon Brewing, Casco Bay Brewing, Catamount Brewing, Chicago Brewing, Crested Butte Brewery, Frederick Brewing, Lowell Brewing, New Belgium Brewing, New England Brewing, Old Dominion Brewing, Old Marlboro Brewing, Otter Creek Brewing, Parichevich Brewing, Potomac River Brewing, Redhook Brewing, Spring Street Brewing, Sudwerk Privatbrauerei Hubsch, Summit Brewing, Wynkoop Brewing.

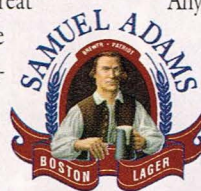
If we have forgotten any breweries that employ consumer friendly freshness labels, please send samples of the labels (so we can include them in any future lists) to: The Boston Beer Company, 30 Germania Street, Boston, MA 02130.

Our industry exists because we take such pride in the quality of our beer. We use better ingredients, and take great care to brew our beers. Don't we owe it to our customers to be honest about the freshness of our beers?

I believe all microbreweries should join the Boston Beer

Company and the other microbreweries listed here in insisting on freshness dating.

Anything less would be incomprehensible.



The Best Beer In America.™

James Koch

*Brewer/President
Boston Beer Company,
Boston, Mass.*

If you can find the freshness dates on these labels, we'll buy the next round.



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Naming of the Brew

Disaster in Detroit! Terror in Tokyo! Brouhaha in Bavaria! It finally happened. Creativity has ebbed. Insipidness has flowed. Despite the efforts of some of the best marketing minds money can buy, they've totally, wholly, and without a doubt run out of car names.

Don't believe it? Check your local newspaper. Let's see, I've never been much of an up-and-comer, so I won't be putting my money down on an Aspire. I wouldn't say I've made the big time, so an Acclaim is out. And you'll damn sure never find me driving around in a Probe. Who knows where that thing has been?

You're a fan of luxury cars and German engineering? That's good, because those cars have names only an engineer could love. Would you prefer the Mercedes E Class or BMW Series I? E or I? E? I? E? I? Oh.

What ever happened to the classic names like Mustang, Corvette, Thunderbird? Oops, they're still around. Guess when you've got a good thing going, you hold onto it for 30, 40 years. Especially when the alternatives are Neon, Geo, Dynasty, and Excel. Give me a Rambler any day.

Has anyone noticed in the capitals of car-dom? Sure. They're creating committees. Commissioning studies. Forming focus groups. They've started the ball rolling on the creative process. A five-year plan has been written. They've got it all under control.

I don't pretend this has anything to do with homebrewing. But it has everything to do with creativity, and I think that's an area in which homebrewers stand out. Who but a homebrewer would try to make a pale stout, a crabapple ale, a blue blueberry porter?

Homebrewers are famous for innovations. They've revolutionized entire beer styles (see brown ale), invented ingenious equipment ranging from the picnic cooler/mash tun to the \$3 counterpressure bottle filler. They've authored great beer names: Forever

Amber, Whistle Stop Porter, Derby Brown Ale, New Deli IPA.

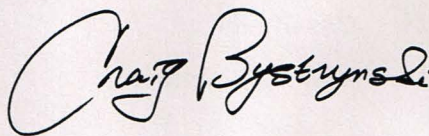
All this was done without the benefit of committee meetings or approval processes, detailed analysis or preference surveys. We're homebrewers. If it seems good, we go for it.

This month BYO celebrates creativity in two ways. Our cover feature, Create Your Own Recipe by Jeff Frane (page 36), looks beyond formulas and calculations to examine the process of creating your own unique beer. We provide a series of basic recipes, some guidelines, a little philosophy, and a few words of encouragement. You'll want to read this in the kitchen!

Also this month, we're launching the first BYO label contest. Do you spend as much time coloring labels as brewing beer? Or do you just make up funky stick-ons with cool names for your beer? We want your labels! Slick, weird, funky, funny, outrageous. Send them here! We've collected lots of great prizes, ranging from brewing equipment to ingredient kits, and we're dying to give it all away. Check out the entry form on page 11.

Finally, we have a special announcement this month. We're launching a new publication! Called *BrewPub*, it will be a monthly trade magazine for brewpub managers. We'll look at the nuts-and-bolts issues of running a brewpub: marketing strategies, finance, brewing, food, and lots more.

So thanks again for all your support of BYO. We'll continue to do our best to bring you an informative and enjoyable magazine. And if you work in a brewpub, we'll have a great new magazine for you in a few months.



Brew
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THE HOW-TO HOMEBREW BEER MAGAZINE

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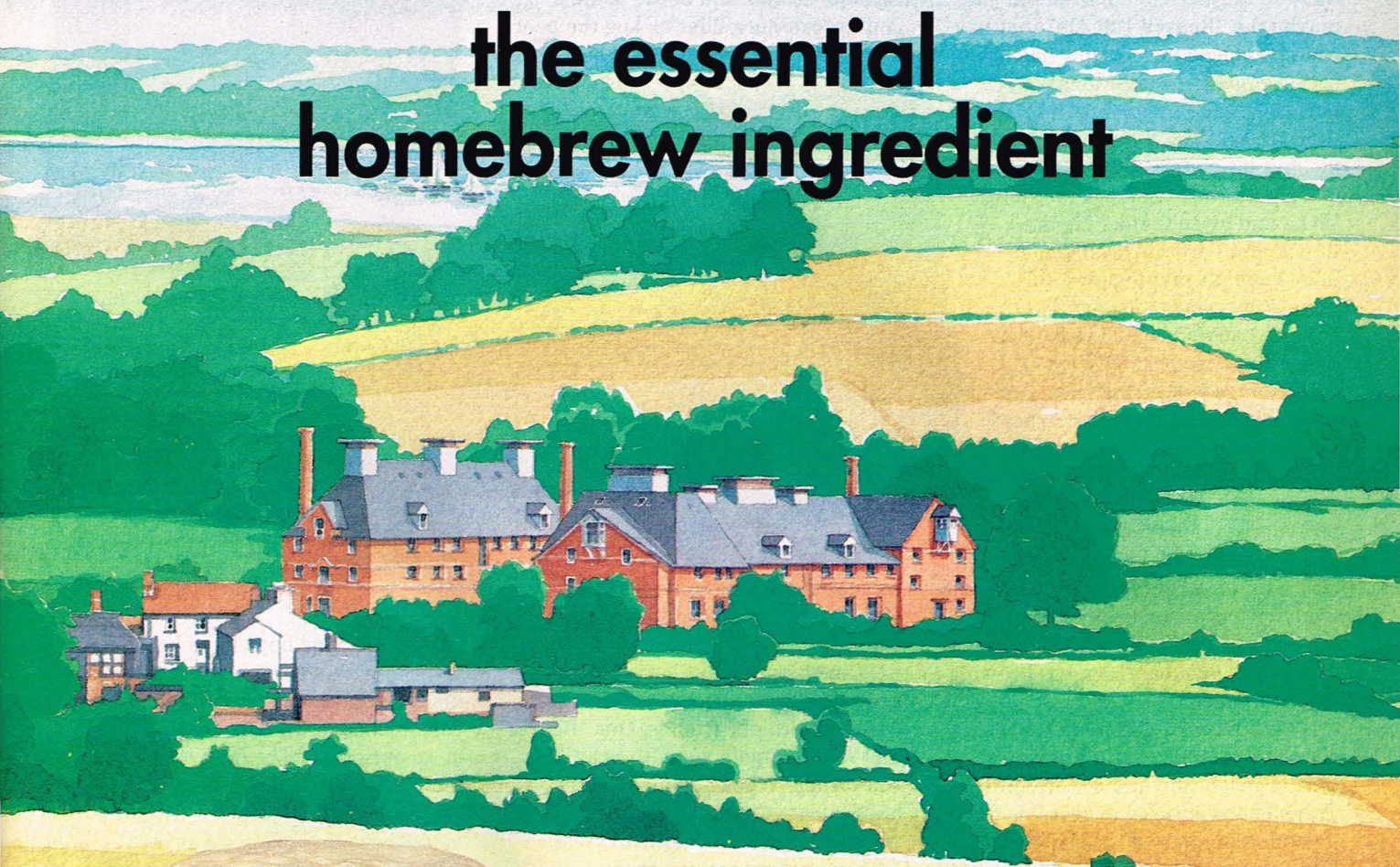
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Mike Lemire Pittsburgh, Pa.

Well, here we are in the not-so-famous "Beaver Tail Brewery" high atop the hills north of Pittsburgh. Notice the painstaking care used in decorating the brewery to give the appearance of a converted basement. Okay so maybe it is a basement, and maybe the "Beaver Tail Ale" that has been produced here in this half-barrel system for the past few years gets consumed by the brewers and their friends, not the paying public...but it's a start!

The brewery belongs to Chuck Wyke and myself, Mike Lemire. Chuck and I are musicians and have been playing together for quite a few years. Constantly being creative has lead both of us to try many new things. One of these things is brewing beer. After initial success with extract brewing, we decided to go all-grain, all the way. It has always struck us as funny that no matter where you are—even in a group that includes a nuclear physicist, a financial genius, and the person who may cure cancer—the most amazing thing to everyone there is that you make your own beer! I guess brewing is noble, indeed!

We built a 15-gallon system using stainless-steel kegs as a hot water tank, a mash tun, and a wort kettle. Transfer from vessel to vessel is done by both a pump and by gravity. We built a wort chiller by making two copper coils: one to go into the wort kettle, and one to pre-chill the cooling water

by being submerged in a kettle of ice. We built screens and supports using stainless and copper. Fermentation occurs in five-gallon glass carboys in a dedicated beer refrigerator with a digital temperature controller. Lagering and chilling are done in the same unit. We run the finished beer through a filter and bottle using a counterpressure filler or keg the beer in Cornelius kegs. We are



Watch out Boyz II Men, these guys have all the right moves, and they homebrew! Always the most fascinating guys at any party, Mike and Chuck show off their new stage act and their brewing set-up.

constantly looking to improve our system and would like to go bigger!

Chuck and I have several favorite brews that have become almost too popular with our friends. Our "Beaver Tail Ale" is a pale ale with Saaz hops. Our "Apple Wheat" is made using apples from Chuck's own trees. We flavor the "Maple Wheat" with syrup from a hunting buddy's trees.

"Beaver Tail Lager" has a reddish tint from crystal and a touch of choco-

late malts. Saaz hops have become a favorite with us ever since watching them being harvested by Czechoslovakian college women wearing bikinis in an episode of *The Beer Hunter*. They don't taste bad either.

We hope to join forces with other homebrewers and open our own microbrewery or brewpub. If nothing else, we know where we can get a house band cheap—us!

We Heard It Through the Grapevine...

Last week I had one of those classic moments. I pushed the rubber grommet through the hole as I was installing the airlock in my first batch of homebrew. Instead of working out some way of sterilizing my arm, I drove madly to my nearby homebrew outlet, dashed in (explaining my predicament to the owners as I ran through their store), and grabbed a

replacement grommet from the shelf. Being the humanitarians that they are, they told me to hurry home and don't worry about paying for the grommet. My feet never stopped once while in their store.

I raced home, installed the grommet and the airlock (with a bit more grace), and fermented a fine batch of stout. Needless to say, I shared generously with those guys when the stout came in.

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Michael Cesko Lewiston, Idaho

I have been brewing for two years and producing some beers that have won blue ribbons, which you can see behind me in the picture below.

These ribbons are a reminder of the monument we have set up in our valley. The Nezperce County Fair had not added a new category in 30 years, so Mike Busch and a few silent partners formed the Hell's



Canyon Home Brew Club with the idea that a couple of people could get together and sample some recipes.

At the first meeting 30 people showed up. At the next, 44. Then 65. Wow!

Now we hold our meetings at different taverns, which allow us the honor of bringing our own homebrew in for sampling. Also, M.J. Barleyhoppers, the micro-brewery in our area, has opened its arms in support of our club. We put out a newsletter to share recipes, tips, and experiences.

We went to the fair board and they accepted a beer-judging category. At the first fair there were 50 entries, and the next year that almost doubled. The board couldn't believe the turnout we were getting.

Mike Busch and I also grow our own hops. For years we saw strange-looking plants growing in a friend's field, with no idea what they were.



Brewers Mike Busch (above) and Michael Cesko (left). A surprise discovery in Grandpa's woods led to a bumper hop crop!

When we got into homebrewing, we realized they were hops. With some research we found out that his granddad had been a homebrewer! So I guess we come by it honestly. We haven't been able to determine what kind they are, but they taste like Cascade or Mt. Hood.

I have two 13-gallon carboys and one five-gallon. My brewing station has a simple stainless-steel sink and a bottle capper mounted for life. We always keep a good supply of homebrew around the house and collect lots of bottles. If you are a homebrewer in our neck of the woods, give us a call!

A Real Paint Job

My father-in-law, not much of a do-it-yourselfer, thought painting his house would be a good project for a newly retired guy.

So he went out and bought 10 gallons of paint in two white, five-gallon plastic buckets. At first he would get up at eight in the morning and get out there on the ladder. He was excited about painting. Every day he would go out to scrape and sand, but it was a big house. Eventually, he gave up and hired a pro to finish the job.

Anyway, he came to visit a few weeks ago and thought he'd help out by cleaning my basement. I thought I'd died and gone to heaven—it's one job I can't stand.

But then at dinner that night, he mentioned that he'd washed out my paint bucket.

"What paint bucket?" I asked. I hadn't painted since we moved in 12

years ago.

"That plastic bucket with the sludge in it that you had left soaking," he said. "What in the world did you paint that color, anyway?"

That's when it hit me. It was my latest Secret Stout, still in the primary fermenter—a five-gallon, white, plastic bucket. A bucket that looks just like the ones that contained his paint. I have to admit, I came very close to losing my cool. Okay, I did sort of lose it. I ran down to the basement, muttering under my breath.

When I got down there, I didn't discover the disaster I had expected. There was the brew, fermenting away. I was immediately embarrassed. My father-in-law and my wife were laughing loudly. She had put him up to it!

The funny thing is, I never thought the guy had a sense of humor.

Sean Duffy
Winchester, Mass.

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In Search of...

Dear Brew Your Own,

I've sent for a number of brewing supply catalogs looking for sturdy plastic crates for storing cases of beer but have been unable to locate any. I've been holding off buying a brewing kit until I get some storage crates and fill them with clean bottles. Could you recommend some sources?

Tom P. Flahive
La Palma, Calif.

The breweries of Germany and Japan use plastic crates to transport and store bottles, but in the US cardboard is the rule. It is recyclable and cheaper. Try your local liquor stores to see if they can give you boxes to store your bottles in. We weren't able to locate any sources for plastic cases, but maybe other readers can suggest some. Anyone?

Dear BYO,

Your October issue has a review of the characteristics of various yeasts (60 Great Yeast Strains). Several of us in Athens, Ga., are very interested in trying several of the Brewtek strains, particularly the Belgians. However, we could find no address or any other way to contact Brewtek in the article. Your help would be greatly appreciated!

Lari M. Cowgill
Athens, Ga.

The whole line of Brewtek yeast strains can be found at the Brewer's Resource in Camarillo, Calif. You can get a catalog or place orders by calling their Catalog Request Line at 1-800-827-3983.

Dear BYO,

Your article on how to build a counterpressure bottle filler (Tastes Great, Less Filling, November BYO) is very good. All the parts are readily available at local hardware or plumbing supply houses except for 1/4-inch and 3/8-inch thin-walled brass tubing. Can the author provide the source of this tubing? I've got all the other parts and am ready to proceed with construction.

Dave Houseman
"Groundhog Brewing Co."

Author Tom Fuller says: "Try specialty plumbing shops, the ones that the professionals use. Home-improvement chain shops don't always carry this stuff. Try hobby shops, also. If you still can't find it, you can use 'L' copper (the 'refrigerator tubing' that comes in coils). If you cut it with a tubing cutter, you will need to ream it to be able to insert the smaller size. A hack saw is best for cutting."

Breaking the Language Barrier

Dear BYO,

I enjoy your magazine. The trouble is, when I sit down to read the latest issue, I have to rush to the refrigerator to open a bottle of wheat beer. It is the only way to satisfy the ever-increasing thirst that reading BYO creates.

I have only one suggestion. Please print a glossary of brewing terms so that I will understand "brewing-ese." I have been brewing off and on since prohibition went out, but I don't understand the terms for all the processes.

Jack Huggins
Glen Dale, W. Va.

Your wish is our command! Check out the February issue for the first installment of BYO's Brewing Dictionary. That way we can all speak the same language.

Righting Old Wrongs

Dear BYO,

I have a bone of contention I would like to share. It is in reference to "Make Your American Pilsner a Classic" (October BYO).

There is a general disdain in the homebrewing industry for the American pilsner style of beer and the aforementioned article did nothing to dispel this misguided attitude. American pilsner is the style of beer that American homebrewers, particularly beginners and potential beginners, are most familiar with. Berating it turns many away from the hobby altogether.

I also thought that both the recipes he gave were rather involved for the beginning homebrewer. Here is a quick and easy recipe that will surprise and

delight beginning and advanced homebrewers alike. After all, everyone enjoys something "lite" and refreshing when it's hot and they're thirsty.

"Bless Me for I Have Seen the Lite Beer"

(recipe for five gallons)

- 3.75 lbs. Munich Lager kit
- 1 lb. corn sugar
- 1/2 oz. Hallertau Hersbrucker hops (plugs if you can get them), 4.5% alpha
- 10 to 14 grams good dry lager yeast

Add the kit and sugar to two gallons of boiling water. It is very important to remove the pot from the heat when adding the extract to reduce caramelization, which stops the beer from getting darker. Mix thoroughly and return to

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First Annual Gonzo Label Contest

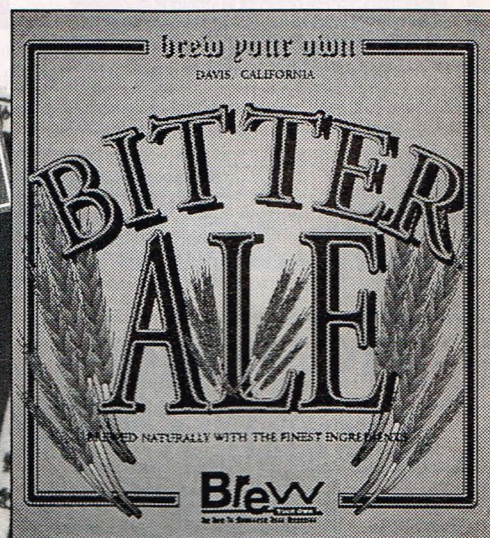
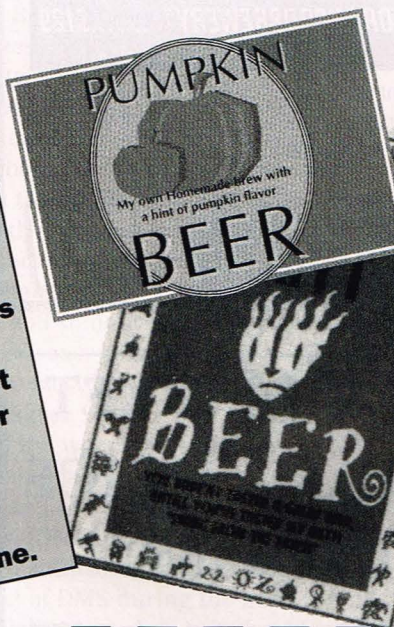
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Send us your best homebrew labels and you could win all of the prizes you see at the left. Enter as many categories as you like, but you may only win in one. Hurry, contest deadline is February 21, 1996. Winners to be announced in the May BYO issue.

WIN COOL PRIZES!



Rules: Entrants may send labels or, as they say, a reasonable facsimile thereof, or labels already stuck to bottles. All other rules are made up as we go by the editors of Brew Your Own magazine and as such may be somewhat arbitrary and flawed. Nonetheless, the spirit of the contest will be one of fair-mindedness and fun as we attempt to mirror the ethics and morality of the audience for whom the contest is designed, namely, our homebrewing friends and readers. God help us all!

Official Entry Blank

Categories (Enter one or more. No limit.)

- ☐ **Classic** (Any label that looks like it was created more than 30 years ago.)
- ☐ **Slick** (Any label that looks really cool & professional.)
- ☐ **Funky** (Everything else.)

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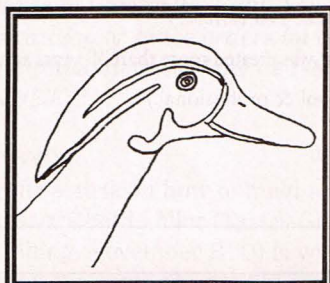
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heat. Boil for about 10 minutes and add the hops at the end of the boil. Cool and add water to make five gallons. Aerate well and pitch the yeast.

Now, here is the hard part...waiting. After you bottle the beer and charge it for about two weeks, find a dark, cool place (preferably 55° to 40° F) to store it for eight weeks.

If you can't find the recommended brand of kit, don't worry; ask the good people at your local brewshop about the kits that are the best and lightest in color.

*Michael J Pembroke
Haslett, Mich.*

Dear BYO,

Shame on your editorial staff for publishing a rough draft. The topic in the article ("Start Your Own Yeast Farm," November BYO) was well chosen, but the article itself was confused.

1. With the exception of canning sterile wort, mason jars should not be used in any facet of homebrewing. The idea of growing out yeast cultures in mason jars should be left behind with "prohibition-style-brewing-techniques-10-lbs.-of-sugar-redline-hydrometer" type of thinking. Mason jars cannot handle pressure, and exploding glass is dangerous. How about using an airlock and a No. 2 rubber stopper in a 12 oz. beer bottle?

2. On page 46, the article shows a major boo-boo. "You may want to make up two or more one-quart starters in parallel to pitch into high-gravity (especially above 1.080 Plato) recipes." Needless to say, specific gravity and Plato (brix) are two different scales. Come on guys...

Dana Jordan

Your point about mason jars exploding is well taken and your suggestion of using a 12-ounce bottle with an airlock is a good idea. An airlock can also be fitted to the mason jar so that propagation is carried out in the same sterile jar where the wort was canned. This eliminates the need to transfer sterile wort. Regarding the error on page 46, the sentence originally read "1.080 SG/19° Plato" but accidentally was cut to "1.080° Plato." This is the editor's mea culpa. Sorry if it caused any confusion.

No Apology Necessary



Mr. Wizard

I am an extract brewer (sorry) and have attempted a few "intermediate" level recipes. One step I always have questioned is the wort boil time. In the extract recipes I've read, there seems to be a large variation in the boil time—from 15 minutes for kit beers all the way up to a couple of hours. Aside from sanitation and hop-extraction considerations, what determines the boiling time in recipes? Is there a required boil time when using specialty grains or does a longer boil make a better brew? Will a shorter boil significantly change the results of an extract brew?

*Dick Pilibosian
Elbert, Colo.*

Yours is a good question that applies to all types of brewing. But before I answer the question, I want to comment on your apology for being an extract brewer: don't. There may be some all-grain brewers who feel superior to extract brewers, but they represent a very small, elitist, and arrogant minority. Many brewers up through the professional level began using extracts and hold nothing

against brewers who continue to use them. Extract brewing is a great way to start homebrewing. It allows you to focus on fermentation and packaging, arguably the most delicate processes in brewing, and it also allows you to make excellent beer without a large investment in equipment and time.

Now on to the main event. Wort boiling is important for several reasons. Boiling precipitates protein, isomerizes hop acids, concentrates wort gravity, volatilizes undesirable malt and hop aromas, increases wort flavor and color, and sterilizes the wort.

These goals are best achieved when the boil is very vigorous and sufficiently long, but over-boiling is to be avoided. Most commercial breweries boil their wort for 60 to 90 minutes. They boil some worts longer specifically to increase color and flavor pick-up, but for most beers very long boils are not needed.

If the wort boil is too short, the resulting beer is more likely to be hazy and can have a pronounced dimethyl sulfide (DMS) or cooked-corn aroma from insufficient volatilization (evaporation) of DMS during the boil. This is especially true when brewing blonde ales and lagers from very pale malts, such as lager and pilsner malt. These beers benefit from a 90- to 100-minute boil to thoroughly remove DMS. Also, short boils fail to bring much of the hop bitterness into the wort and even if you add bittering hops, the beer will lack bitterness.

Although these concerns are pertinent to all beers, many beer kits contain hopped wort that has already been boiled and then concentrated. The instructions for these products typically demand that they be diluted with water, given a 15-minute boil for sanitation purposes, and hopped with aroma hops. If these products are handled with care and diluted with pre-boiled water in a sanitized vessel, they don't actually require boiling since

malt extracts are pasteurized. But this method is prone to error, so most brewers feel more comfortable conducting a short boil for sanitation reasons.

If you are making beers with unhopped liquid malt extracts or dry malt extracts, using specialty malts for added flavor and color, and making your own hop additions, I recommend a full 60- to 90-minute boil. This will precipitate the proteins brought in from the specialty malts, isomerize (chemically convert) the hop acids, and provide bitterness. It will also drive off undesirable malt and hop aromas.

In short, if you have conducted a vigorous, 60-minute boil, you are okay when making just about any type of beer. If using extracts or making a special beer, the boil time can be shorter or longer.

Mr. Wizard

How can I obtain an accurate original gravity reading when using a glass carboy as a primary fermenter? By the time I add the chilled wort, top off to five gallons, and pitch the yeast, sedimentation has already begun. The sample taken off the top of the carboy for testing cannot be a representative original gravity reading. Am I just moving too slowly, or is there a solution to this puzzle?

*Tom Schooley
Williamsport, Pa.*

Hydrometers measure dissolved solids and liquids that contribute to the density of a solution. In wort, sugars make up the bulk of dissolved solids but protein and some lipids also contribute to specific gravity. However, specific gravity does not measure suspended solids. In wort, trub and yeast are the main contributors of suspended solids and have no affect on gravity readings. This makes it possible to monitor the change in

gravity over the course of a fermentation. If suspended solids affected a specific gravity reading, the gravity would continue to drop after fermentation ended since the yeast falls out of suspension after fermenting. Fortunately, this doesn't happen.

What can give you an erroneous reading is layering of liquids in your carboy. If a carboy has wort in it and then is topped off with water, there will be a density gradient in the carboy. If a sample is taken from the top of the carboy, its density is likely to be less than the wort at the bottom. To prevent this error from occurring, thoroughly mix the contents of the carboy by gently rocking it before taking a sample. However, the sedimentation that had you worried will not adversely affect your specific gravity reading.

Happy Hydrometry!

Mr. Wizard

Why do some beers continue to cause the airlock bubbler to bubble once every 30 seconds or so for days after fermentation has ended? I have an ale in the secondary right now that I racked from the primary 11 days ago.

The bubbling went from one bubble per minute to one bubble every seven minutes in four days, at which time I added an ounce of Cascade hops for dry hopping. Almost immediately, the bubbler began bubbling once every four seconds! That continued for several hours with about 1/2 inch of new foam developing.

I've monitored the beer's gravity and temperature and it has changed during this 11-day period. Is there a rational explanation for this bubbling after fermentation should have stopped?

*Gary Avery
Muncy, PA*

This may seem a little odd, but it is not uncommon. In fact it is perfectly normal.

During fermentation beer becomes super-saturated with carbon dioxide, and at the end of fermentation it is partially carbonated. When the beer sits in a carboy with an airlock, the carbon dioxide is slowly emitted, since there is more carbon dioxide in solution than allowed by atmospheric

pressure and the beer's storage temperature. That is what is meant by super-saturated.

The same thing happens when you open a soda or beer and pour it into a glass. The beverage is super-saturated with carbon dioxide. Over time it escapes from solution until the beverage is flat. But that doesn't happen immediately.

For example if you put an open soda or beer in the refrigerator, it will for a day or two hold enough carbon dioxide to make your tongue tingle. Even at room temperatures the beverage stays carbonated long enough for consumption, which is a pretty good thing!

Because your carboy has a smaller surface-to-volume ratio than a glass of beer, it takes longer for the carbon dioxide to escape from solution. That's why you are seeing bubbles days after the gravity stops dropping. When you added hops, the increase in carbon dioxide escape occurred due to the large number of bubble nucleation sites being added to the beer. The same increase in gas release happens when you add salt or sugar to a carbonated drink or pour beer into a rough glass.

Another instance that causes mysterious bubbling is when a carboy full of cold, non-bubbling beer is brought to room temperature. As the beer warms up, gas will begin to escape. This can be demonstrated by placing a bottle of water in the refrigerator overnight with the top removed. If the bottle is taken out of the refrigerator, fitted with an airlock, and placed in a hot water bath, bubbles will be seen in the airlock. This happens because more gas can be held by cold liquids than warm ones.

The next time this happens you can rest assured that if the hydrometer indicates that fermentation has ended, it really has.

Mr. Wizard

Here's a question shared by many: How can I be sure that my hydrometer is working correctly? I don't trust mine and wonder: Are they more or less accurate in different ranges?

I recently brewed a Belgian-style ale and did all the math for a target original gravity of about 1.090, but the hydrometer read closer to 1.075. I used 9.9 pounds of dry malt extract, one pound of rice extract, one pound of amber candy sugar, and 2.5 pounds of a variety of specialty grains that were ground and steeped at 155° F for one hour and then sparged. My total wort volume was five gallons.

There was no boilover or other known loss. I used the estimated extraction rates recommended by the experts. Is my hydrometer inaccurate in the upper ranges (or completely), as I suspect?

Tim McDonald

Looking at your recipe, I agree that your original gravity should have been close to 1.090. Since the bulk of the wort was derived from extract, hitting your target based upon published extract yields of the different raw materials is pretty easy.

Your hydrometer could be out of calibration. You can check it by measuring the specific gravity of water; this value should be 1.000. If the hydrometer accurately measures the specific gravity of water, then it should be accurate over the entire scale.

There are a few common mistakes people make using a hydrometer. One is using a cylinder that is too narrow for the hydrometer. If the hydrometer barely fits into the cylinder, it may be lifted up by capillary forces acting between the hydrometer and the cylinder wall. This will artificially inflate an original gravity reading. A 250 ml cylinder is recommended for a normal-size brewing hydrometer. But this would not explain your problem with the Belgian ale.

Another common mistake is to measure the gravity when the wort is too warm. Since warm liquids are less dense than cool liquids, the gravity reading will be deflated. This mistake is easy to make because not all hydrometers are calibrated at the same temperature. Most brewing hydrometers are calibrated for use at 20° C or 68° F, but some are calibrated for different temperatures. Most hydrometers come with factors used to correct for temperature. Professional-quality hydrometers have a thermo-

meter and correction scale built into the hydrometer for convenience and accuracy.

This mistake can happen even if you follow temperature-correction protocol if your thermometer is giving inaccurate results. This usually does not happen with glass thermometers, but it is quite common with metal thermometers that have calibration screws or rotating faces designed for calibration purposes. Thermometer calibration is easy. Check the low end by submerging the device into a glass full of ice that is topped off with water. The thermometer should read 32° F or 0° C. If submerged in boiling water, the thermometer should read 212° F or 100° C, provided that the barometer is reading one atmosphere.

The last mistake I can think of is taking a non-representative sample of wort. You can get a poor sample if you top off your fermenter with water, then take a wort sample. The best way to avoid this is by thoroughly mixing after adding the water.

A mistake unrelated to your hydrometer that could have affected your lower-than-calculated wort gravity would be weighing out raw materials incorrectly.

Mr. Wizard

Recently, I've experimented with using chocolate in a few of my porters. The first time I used baking chocolate (cocoa butter and all). It was good, but not much of the chocolate flavor remained. It seemed that the cocoa was not disassociating from the cocoa butter and was therefore removed with the cold trub after chilling.

More recently, I made the same beer but used cocoa powder rather than chocolate. This beer has a wonderful chocolate flavor and aroma but has a severe haze that doesn't seem to be clearing. I used low-protein malt and a protein rest as well as adjusting the pH of the boil to 5.4 to get a good break. There doesn't seem to be any sign of bacterial or wild contamination.

Could it be that the cocoa has stubbornly formed a colloidal suspension in the beer that just isn't going to clear? Do you know of any way I can keep the

chocolate flavor in my beer and not the haze?

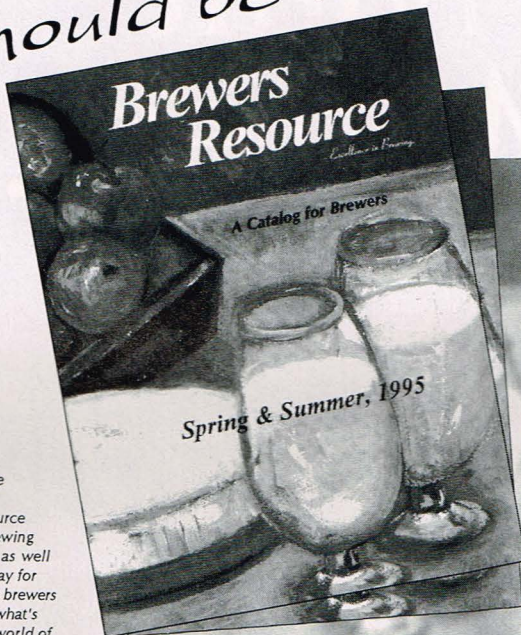
Chip Tate
Williamsburg, Va.

This is an interesting question. The answer required some digging through a couple of food science books to ensure accuracy. A short solution would be to quit using chocolate and switch to a chocolate-flavored liquor, but I don't think that is

what you have in mind.

Since the cocoa seems to be the problem, a cocoa review might be in order. All chocolates and cocoa products originate from the bean or seed of the cocoa tree (*Theobroma cacao*). After harvest the beans are separated from the pods by a short fermentation and then roasted and shelled to yield cocoa nibs. The nibs are ground to yield chocolate liquor, which is refined and pressed to yield cocoa butter and

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cocoa powder. To make chocolate, cocoa butter is added to chocolate liquor along with sugar.

Cocoa powder contains a significant portion of fat, about 15 percent by weight. It is this fat that holds the chocolate flavors. Cocoa powder is also rich in protein, between 25 and 30 percent by weight. Carbohydrate makes up the remaining 55 to 60 percent.

My theory is that the protein is chemically bound to the fat, which

explains why the fat is not separated with the cocoa butter. Since fat does not float to the surface when cocoa powder is dissolved in liquid, it makes sense that the protein and fat are associated. Essentially, the protein holds the fat in suspension. This is analogous to milk, which is a suspension of milk fat stabilized by protein.

Returning to the problem at hand, the solution is to get rid of the protein in the cocoa powder, because it sounds

like you have a vicious protein haze in your porter. Adding the cocoa to the wort *before* boiling may knock the protein out of solution along with the hot break. Adding Irish moss toward the end of the boil may facilitate this process. However, since the protein is connected to the fat, this will also remove the fat and the associated chocolate flavors.

It may help if you add the cocoa powder to the mash and hold a protein rest in hope of separating the protein from the fat. Be warned, though. This may help your haze problem but could cause the fat to come out of solution and remain in the mash or separate from the wort during fermentation.

There is another way of looking at this. It is possible that the cocoa carbohydrate is the source of the haze. Carbohydrate hazes exist in normal (cocoa-free) beers when starch conversion is incomplete during mashing. Adding the cocoa powder to the mash could convert the carbohydrates to fermentable sugars and solve your cocoa haze woes!

Another strategy is to make a darker-colored beer to mask the haze. If this does not appeal to you, my last stab at a solution is to chill the beer to near freezing temperatures and let it sit for a week. With luck, the haze may settle. Without it, the protein will remain associated with the water and will never settle.

Hopefully you can make use of these suggestions and find a solution. If your beer is still hazy after exhausting all possible solutions, I recommend that you enjoy your beer's flavor and stop worrying about aesthetic blemishes. ■

Mr. Wizard's Address

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Make Your Beer a Winner — Literally

by Gailen Jacobs

Three brewers who won medals at the recent Great American Beer Festival give the inside scoop on competing in—and winning—homebrew competitions.



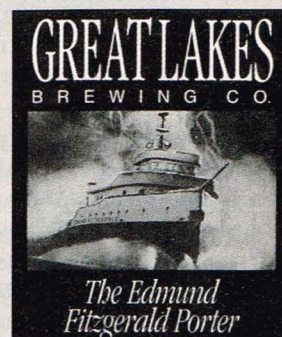
**Carolina Mill
Bakery and Brewery**
Brewer: Jason McKnight

"Entering contests is a great thing for homebrewers to do. It almost creates a support group. You are allowing your beers to be sampled by people who know what they are tasting."



**Mountain Sun Pub
and Brewery**
Brewer: Jack Harris

"A lot of the judging is based on first impressions. Some of the things judges look for right away are the clarity of the beer and the level of carbonation."



**Great Lakes
Brewing**
Brewer: Andrew Tveekrem

"It's very helpful to attend a competition judging...Every local competition is always looking for help. Even if you are just a steward or observer, you can learn a lot by watching how the judges actually judge the beer."

Brewer: Jason McKnight

Brewery: Carolina Mill Bakery and Brewery, Charlotte, N.C.

Years of experience: 4 1/2 professional, six homebrewing

Education: Siebel short courses

Silver Medal: Hornet Tail Ale (German-style brown ale/altbier)

Professionals and homebrewers have two different goals when entering contests. Homebrewers usually enter to get feedback and improve their beer. When professionals enter contests, they are trying to increase sales. Professionals want to enter a beer that is marketable and popular to the public. If you enter a beer like a lambic, even if you win a medal the general public isn't necessarily going to like that beer. It is important to enter a

beer that most people are going to enjoy. That way you will get the most benefit out of winning the competition.

At the brewery we take a little extra care when we brew the beer we're going to enter. But the laws in North Carolina specify that you can't change a beer's recipe without sending off a test sample to the FDA. Therefore, we can't make any real changes for the competition. For the Great American Beer Festival the beer has to be available on tap to the public in your restaurant. I just took three beers we had on tap, filled the kegs up, and sent them.

While I have never competed in a homebrew competition, I have judged them. As a judge, I think it's very important for homebrewers to try to match the guidelines for a style when brewing beer for competition. Any

book on homebrewing will give characteristics for beer styles. We brewed our Hornet Tail according to the guidelines for altbier. Try to create a very traditional beer. As long as you follow those guidelines, you have a very good chance at placing in a competition.

A lot of the things that knock a beer out of competition involve cleanliness. In a homebrew competition there are many different levels of homebrewers. Some people in the competition have only been brewing a month. Then there are people who have been brewing for 20 years. The judges run across all kinds of different beers, and a lot of these beers will be infected or have a biological problem. A beginning homebrewer might not even know.

Most judges will tell the brewer on the results sheet what kind of problems



Jason McKnight

there are and what the person can do to improve their beer. If the homebrewer reads the remarks and acts on them,

he should place much better at the next competition.

Entering contests is a great thing for homebrewers to do. It almost creates a support group. You are allowing your beers to be sampled by people who know what they are tasting. It allows you to learn more about brewing and your problem areas, as well as areas where you are doing well and should continue.

I recommend entering every beer you brew. There's nothing to lose. You might win a medal or a ribbon, and even if you don't you'll learn how to make better beer next time.

Brewer: Jack Harris
Brewery: Mountain Sun Pub and Brewery, Boulder, Colo.

Years of experience: Five
Education: On-the-job training

Gold Medals: Arctic Ale (herb/spice beer) and Hummingbird Ale (specialty)

The Great American Beer Festival has 28 categories. During the year we make our beers the way we want. When it's time for the festival, we taste them, pick our favorites, and try to find categories they will fit into. The two categories in which we won golds didn't have strict style requirements. They were simply for different beer.

We won in the "specialty" category, which means we fermented with something other than just barley or grain. (We used honey in the Hummingbird.) The other category was for "herb/spice beer." (We used mint and lemongrass in the Arctic.)

It's very hard to match a particular idea of a style. None of our beers were

really consistent with the festival's style categories, so our strategy was to enter in the strangest categories we could find.

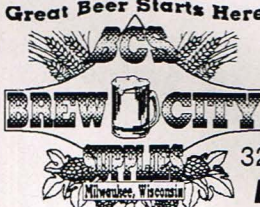
For homebrewers, you should think about what you are trying to do with your beer. If you want to emulate a certain style and think you've got it, entering a competition is a great way to tell how close you are to the mark. On the other hand I've never really liked brewing to style. I'd rather brew different types of beer that may or may not be related to historical style requirements. It depends on what the homebrewer wants to achieve.

If you are brewing to a specific style, really try to hit all the spots—from clarity to original gravity. This is particularly important if you are entering an American Homebrewers' Association competition.

When you enter a competition, there are a few ways to give your beer a head start. It may sound shallow, but one of your big concerns should be presentation. A lot of the judging is based on first impressions. Some of the things

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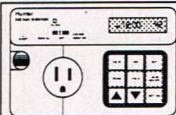
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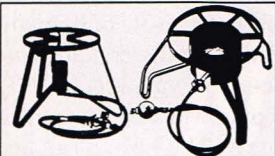


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judges look for right away are the clarity of the beer and the level of carbonation. It's very important to make sure your beer is carbonated correctly. If the judges open up your beer and find a foamer or if it's flat, that goes a long way to ruling your beer out. When you get down to things like exact bittering units, it becomes more and more a matter of the judges' personal taste.

Entering competitions in a style category is a great way to learn about your own beer. The judges' comments are great, experienced feedback. That's the only reason I would enter a competition. I think drinking the beer is a lot more fulfilling than winning awards. At the brewery we mostly enter the Great American Beer Festival for two reasons: Everyone enters it and it's only a



Jack Harris

few miles away.

I prefer to bring my beer to tastings rather than competitions. I like festival settings

where the idea is to celebrate the beer and let everyone make up their own minds. I'm almost opposed to competitions. But they may be the only way for homebrewers to expose their beer to people other than their friends.

I'm in a local homebrew club here in Boulder, and every month we do a tasting to choose the Beer of the Month. It's basically a competition, and it definitely helps me with my beer. When I bring beers from the brewery down, they don't allow them to win. But they don't mind tasting them and telling me what they think. I really appreciate that feedback.

The Tips

Jason McKnight

- Stick closely to style guidelines when brewing.
- Pay particular attention to sanitation and sterilization.
- Enter serial competitions—learn from one, improve your beer, enter it again.

Jack Harris

- If your beer doesn't match a style, enter an open or "specialty beer"

category.

- Make good first impressions with proper carbonation and clarity.
- Enter club competitions for the support group and feedback.

Andrew Tveekrem

- Look at the competition itself first for tips in choosing your beer.
- Assertive flavors stand out to judges.
- Attend a competition judging to learn how the beer is actually judged.

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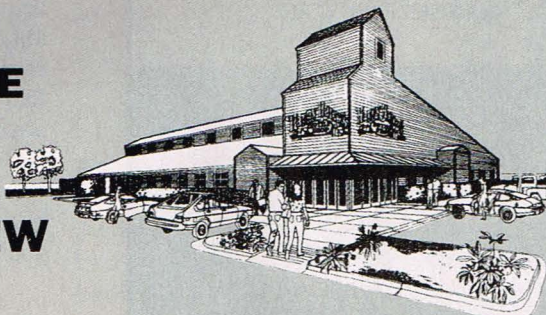
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CIRCLE 77 ON READER SERVICE CARD

Brewer: Andrew Tveekrem

Brewery: Great Lakes Brewing, Cleveland, Ohio

Years of experience: Four professional, nine homebrewing

Education: Siebel short course

Silver Medal: Peerless Pilsner (European-style pilsner)

When deciding which beers to enter into contests, brewers have to look at

the competition itself first. It helps to know what they are looking for. The Great American Beer Festival is similar to a big homebrew competition, and they are looking for certain profiles. The World Beer Championships in Chicago have different criteria. That helps determine the beer we send in, but it is not the sole factor.

A lot of the decision is based on what we think our best beers are. We brew a pretty broad range, so we have



Andrew Tveekrem

a lot to choose from. When we decide on a beer, we brew a few batches to fine tune it. I brewed the Peerless Pilsner here at the brewpub all summer

long, and I developed a few small refinements. By the time the Great American Beer Festival rolled around, we were pretty confident that it was as good as it could be.

Homebrewers tasting their beers should remember that for competition, usually the bigger beer is the better beer. More assertive flavors generally stand out in the crowd—a lot more than something that is thinner or less interesting.

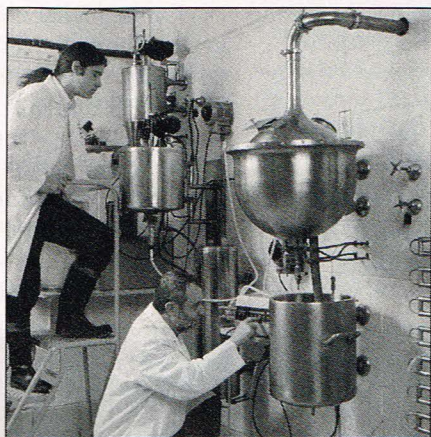
When picking your beer, make sure it is very clean beer. It should have no noticeable defects. Make sure it is carbonated properly. That can play a fairly big role. If a judge opens up a bottle and (foam) goes flying across the room, you're not going to score too well. The same is true if it's flat. In the end you'll lose points for it.

Entering competitions is fun for people who want to see how their beer stacks up against everyone else. It gives you a little feedback, too. Certainly it's a lot of fun if you win.

As a homebrew competition judge, I look first for adherence to style. The beer should match the style description as it was written for that competition.

It is very helpful to attend a competition judging. I'm sure most homebrewers who enter competitions probably haven't done this. Every local competition is always looking for help. Even if you are just a steward or observer, you can learn a lot by watching how the judges actually judge the beer. The more exposure you have to how the beer is judged, the better you're going to do down the road. ■

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CIRCLE 60 ON READER SERVICE CARD

Get Ready to Bock

by Jeff Frane

Once met someone who, trying to demonstrate his beer savvy, actually asked me: "Bock, that's the beer that they get at the bottom of the tanks, right?"

This was apparently the widespread American theory on the origin of bock beer. It's not entirely ridiculous, if one is completely ignorant about the brewing process. American beer drinkers knew that bock beer was darker, sweeter, and stronger than their usual beverage. More important-

It's not difficult to understand how it could have sustained monks through weeks of fasting.

ly, they knew that bock beer appeared only for a short time, once a year. This fostered the belief that it had to be the stuff that had been sitting all year in the bottom of the "tank," getting darker and richer, and that when the brewers had their annual cleaning, they would run this stuff out, keg it up, and offer it to their customers.

It may have helped, too, that this suspiciously dark and heavy beer appeared during those miserable, cold months at the shag-end of winter, when a little extra warmth was most welcome.

To German-Americans (both brewers and customers) bock beer was much more familiar and welcome. They knew "bock" as a warming friend throughout the winter months, rich, flavorful, and nourishing.

American-beer enthusiasts tend to associate "German" beer with Bavaria or Munich, but in the 14th century the finest beers came from the northernmost region. The best of these came from Einbeck. Einbeck beer, strong, rich, and spiced with hops (a relatively new, and by no means universal, ingredient) was shipped all over the Western World.

The Einbeck beers were highly regarded in Bavaria, and it is likely that the flattering imitations brewed there became known as "bock bier," a corruption of the city's name. There are other, more fanciful explanations, most relating to German puns on the word bock, which also means goat. Goats are frequently featured on bock labels (my favorite, which appeared briefly from a midwestern brewery, depicted the goat's eyes crossed and tongue lolled drunkenly).

Munich was particularly suited for the production of bock beers because its water, rich in carbonates, naturally emphasizes deep color and malty flavors and aromas. The city developed its own variation, even richer and maltier than the original, called doppelbock (double bock). The earliest of these, which came to be called Salvator (after the Savior), was brewed by the monks of St. Francis of Paul (now Paulaner) for sustenance during the long fasts at Lent and Advent.

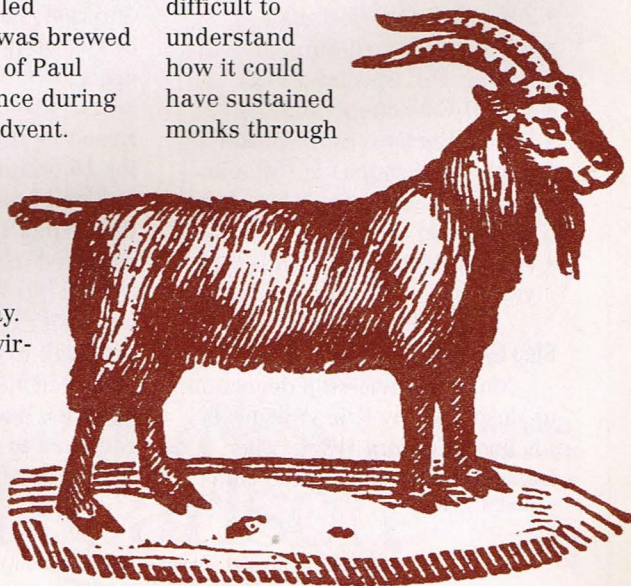
These early beers were clearly top fermented but quite likely cold conditioned after the initial fermentation, much as Dusseldorf altbiers are today. Nowadays, bock beers are virtually all brewed as lagers, with a long period of near-freezing temperatures an essential feature of their production. In Germany bocks are required to have an original gravity

(O.G.) of at least 1.065 (16° Plato). Doppelbocks must have an O.G. of at least 1.074 (18° Plato), so they are clearly not "double" bocks but decidedly stronger.

Good bocks are brewed throughout Northern Europe (my favorite originates in Norway's Aass Brewery). Outside Germany they are not always bound by law to the same definitions, but they tend to be true to the style: dark (deep brown with reddish highlights rather than black), malty, and high in alcohol.

In Germany the original version faces stiff competition from the "helles" or pale bock. These beers are not only paler but somewhat drier than the dark bocks, and they tend to have a greater emphasis on hopping. The pale versions, often called Maibocks (May bocks, named for the season of their release each year), are proving very popular among American microbreweries as well.

Doppelbocks are uniformly dark beers, very malty indeed. They are rich, sweet, and warming, and sipping a Paulaner Salvator or a doppelbock from Kloster Andechs (still a monastic brewery), it's not difficult to understand how it could have sustained monks through



weeks of fasting. It is somewhat more difficult to understand how they stayed awake through hours of meditation warmed by such a beer! In conscious tribute to the original, most doppelbocks have names that end with "ator" (Optimator, Celebrator, etc.).

All good bocks are brewed entirely from malt, and usually only the finest malts are used. Real Munich malt (German or Belgian) is imperative in even the palest of Maibocks, for only true Munich malt will provide the requisite flavor and aroma essential to a bock.

Homebrewers who are seeking the grail of a true bock will eventually be drawn to all-grain decoction mashes, a traditional method in which some of the grain is drawn off from the main mash, boiled, and returned to the whole. For helles bocks two decoctions are pulled, and for the darkest of doppelbocks, three are often taken. It's a long, involved process, but the results are gratifying.

There seem to be two common sins in the brewing of bock beers at home.

Although bocks scream "malt!" in a loud voice, the malt must be balanced with an appropriate, subtle bitterness.

The first is a tendency to focus on color rather than flavor as the signature of the style. In an attempt to produce a dark beer, brewers rely heavily on roasted malts (chocolate and black malt), as though they were brewing stout. This isn't necessary, since the beer will darken naturally through careful adjustment of the water and the use of Munich malts, some high-quality caramel malts, a decoction mash and, if necessary, a long boil.

Roasted malts should never be apparent in a bock or doppelbock.

The other mistake is to create a beer that is too sweet. Although bocks scream "malt!" in a loud voice, the malt must be balanced with an appropriate, subtle bitterness. It is this balance, in fact, that is probably the most difficult feature to achieve. The beer should never be cloying, and there should be just enough bitterness to take the edge off the sweetness. It should also provide a long, satisfying aftertaste.

An incomplete fermentation will also result in an overly sweet bock. The combination of high original gravity, cool fermentation, and high levels of alcohol can be devastating if the yeast isn't used properly. Pitching levels of a reliable performer must be very high, and you must take great care to provide the yeast with plenty of oxygen. Pitching rates should be four times that for a standard ale.

While hops play a background role in bocks, they are still essential and you should use only the finest avail-

Tom's Doppelbock for 10 gallons

Ingredients:

- 15 lbs. DeWolf-Cosyns (D-C) Munich malt
- 14 lbs. D-C pilsner malt
- 2 lbs. D-C cara-pils malt
- 1.5 lbs. D-C cara-Munich malt
- 1.5 lbs. D-C Special B malt
- 1 lb. D-C aromatic malt
- 2.5 oz. German Hersbrucker hops (4.3% alpha) for 60 min.
- 0.25 oz. Saaz hops (3.1% alpha) for 30 min.
- Wyeast 2206, Bavarian lager yeast

Step by Step:

Mash is a two-step decoction, as described by Eric Warner in his book *German Wheat Beer*. Decoction mashes are too com-

plex to go into in detail here, but essentially grain is mashed in at about 100° F, raised slowly to 122° F, then held for a short protein rest. The first decoction (about 40 percent of the mash) is drawn off and placed in a second kettle. The decoction is slowly raised to about 160° F and held for 15 minutes, then brought to a boil and boiled for about 30 minutes. Then the decoction is slowly returned to the original mash (which has been held at 122° F), where it raises the overall temperature to about 150° F. A second decoction is pulled and treated much like the first, then returned to the main mash. (Water is very soft.)

Lautering is normal, and the wort is boiled for two hours, with hop additions as noted.

O.G. - 1.080
F.G. - 1.020

Pitch the yeast. Fermentation is at 48° F for 10 days, then reduce over four days to 42° F and hold for seven days, then raise to 50° F for three days. Finally, reduce the temperature over several days to 34° F and hold for three weeks. Beer is naturally carbonated in the keg and bottles filled by counterpressure bottle filler.

*Courtesy of Tom Feller
Portland, Ore., homebrewer*

able. Traditionally, only the noble aroma hops (Hallertau, Tettnanger, Hersbrucker, or Spalt) are used, but today's market provides excellent substitutes such as Mt. Hood, Liberty, and Crystal hops from the Pacific Northwest.

I have yet to taste a convincing bock beer brewed primarily from malt extract (although it can be useful in boosting O.G.), but bock maven Darryl Richman assures me it can be done. The recipe will still need a lot of good specialty malts. Substitute a portion of the best available light extract for most of the Munich malt, and double the

weight of the caramel malt. If only 2.5 to three gallons of wort are to be boiled, the hopping rate should be effectively doubled. Richman's book, *Bock* (Brewers Publications, 1994), is a must for anyone seriously interested in brewing these fine beers.

A historic version might be brewed with a German-style, top-fermenting yeast strain (Portland's Widmer Brewery offers a seasonal version) and a six-week period of cold conditioning

after fermentation, but the more familiar modern version demands access to refrigeration (or a long period of consistent cold temperatures) for cool fermentation and lagering.

Like Vienna lagers, bock beers present a tremendous technical challenge for brewers, but what an enormous satisfaction to meet the challenge and sip one's own helles bock in the cool of the evening. And Lent isn't that far off... ■

Helles on Wheels Maibock for 5 gallons

Ingredients:

- 5 lbs. Gambrinus lager malt
- 6 lbs. DeWolf-Coysns Munich malt
- 1 lb. DeWolf-Cosysns cara-pils malt
- 1.25 oz. Northern Brewer hops (7% alpha) for 75 min.
- 0.5 oz. Mt Hood hops (3.5% alpha) for 30 min.
- 0.25 oz. Saaz hops (3.3% alpha) at end-boil
- Advanced Brewers Scientific ABS005 Czech lager yeast

Step by Step:

Mash grains at 122° F for 30 minutes, raise to 155° F, and hold until iodine test is negative (about 60 minutes). Raise to 167° F and hold for 10 minutes. Sparge with 170° F water to 6.5 gallons. (Water is very soft, hardened with four grams gypsum.)

Boil 90 minutes, adding hops as noted. Chill, aerate thoroughly, and pitch yeast. Follow fermentation and lagering schedule as noted for Tom's Doppelbock.

O.G. = 1.067
F.G. = 1.015

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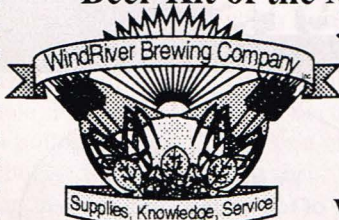
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CIRCLE 58 ON READER SERVICE CARD

Outlaw Brewer in Saudi Arabia

by Richard T. Curtin

A tale of yeast smuggling, pirated equipment, and clandestine desert tastings.

Being an avid homebrewer I was always up for a challenge to test my skills and still come up with a good batch of beer. I thought bad times meant the local supplier was out of Cascade hops or the water in my well was too hard. I soon learned I really didn't know bad brewing times until I moved to Saudi Arabia.

I entered the Kingdom of Saudi Arabia on a one-year visa working on a teaching contract for the Saudi government. During my first week there, a song lyric kept running through my head: "You don't know what you've got 'til it's gone."

Saudi Arabia is the world's religious center for Islam, followers of which are devout Muslims. There is basically no separation of church and

state when it comes to Saudi laws. One of their major no-no's (officially) is alcohol in any way, shape, or form. This holds to the extreme that even mouthwashes sold in the country must be alcohol-free. So must such seemingly innocuous products as vanilla and peppermint extract. Nutmeg is considered an illegal drug in some areas and is sold under the counter at a premium price. Punishments for the possession and/or brewing of any form of alcohol can range from a very stiff jail sentence to deportation.

Obviously, getting a six-pack of beer from the local version of a convenience store was out of the question. I decided to fall back on my homebrewing skills.

Liquid Plumber

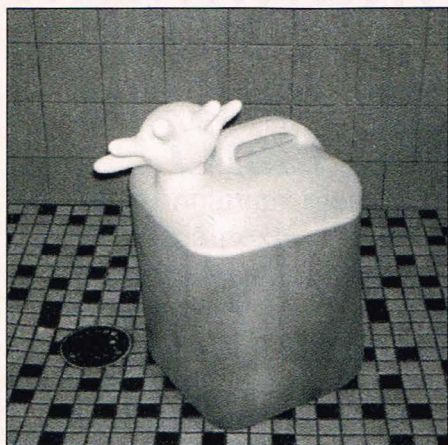
I have been a homebrewer since 1987, so I figured with a little Yankee ingenuity I could come up with the right ingredients to make a passable brew. I wasn't the first with such grand plans; many other expatriates, particularly the British, were way ahead of me. Unfortunately, they brewed a beer that in any other venue wouldn't be used as drain cleaner. They drank it though. They drank it, got sloppy drunk on it, got sick, and then had headaches from it.

A major contractor near our compound produced a Saudi "moonshine" called Sid, short for *siddiq*, which means friend. A little bit of that stuff, though, and you wish your friends had told you to keep away from it. A few days prior to my leaving the country, one of the local distilleries exploded. Apparently the resident moonshiner lit a cigarette a little too close to his still. The only reason he wasn't locked up was due to his hasty med-evac from the country with third degree burns!

Winemaking was also tried by a



The author walks in the desert outside of Riyadh. He won't find any homebrew shops out there!



A surgical glove with a pin prick in a finger serves as an airlock in times of dire necessity.

few stout-hearted souls, but the results weren't much better than the local beer. I had to come up with something better or get on the next plane to civilization. Life without a good beer is not a happy one.

The Waving Carboy

My first foray into desert brewing was a complete flop. I figured the local markets would supply me with anything I needed. My first priority was to obtain the necessary equipment. A carboy was no problem as most water consumed in the country was bottled. Tap water was a real dodgy proposi-

It brewed like a beer, it bubbled like a beer, but believe me, the result was not beer. It was more like a rancid chocolate malted with a slight kick.

tion, only to be trusted if boiled. Even then you could only hope for the best. Local bottled water was produced from desalination plants and still had a pretty high sodium content. But it did the job.

Tubing and a hydrometer were

supplied by the laboratory of a medical school where I was teaching. A surgical glove made a fairly decent airlock. Some people used condoms, but I preferred my brew waving at me instead of the alternative. It was not a problem to get good bottles; most of the fruit juice imported into the country from Europe came in heavy one-liter bottles with Grolsch-type ceramic cage caps. These made excellent containers for bottling and were easy to clean and reuse.

Equipment at hand, the next step was to procure some decent ingredients. It got tricky when I tried to find malt, hops, and yeast. I discovered some type of powdered malt beverage extract that the locals drank, relied on bread yeast to do the rest, and went for it.

Unfortunately, my Arabic was extremely limited and I failed to realize that the malt also included powdered milk and eggs! It brewed like beer, it bubbled like beer, but believe me, the result was not beer. It was more like a rancid chocolate malted with a slight kick.

The NA Alternative

I was down but not out. I chalked this up to experience and forged ahead. The answer was right under my nose. Although alcohol was banned, NA (non-alcoholic) beer was very popular and came in every variety you could think of from all over the world. I really had never paid attention to it before. I likened NA beer to showering with your clothes on or kissing your sister. But I figured if they can take the alcohol out, I could put it back in and get a brew that was drinkable.

The choices were interesting and included Barbican, Swan, Foster, Kaliber, San Miguel, Moussy, and even Schlitz. My favorite was Clausthaler, a German import with a nice, hoppy taste and aroma. Things were looking up.

The next problem was obtaining some decent yeast.

Bread yeast, I found out the hard way, was good for one thing, and that was baking bread—not brewing beer or fermenting wine for that matter. I think this was one of the major reasons for the off flavors in most of the local attempts. Hygiene was another local deficiency. Many people used open fermentation, and cleaning equipment consisted of a quick rinse with hot tap water. My method of sanitizing was to use a chlorine bleach solution, which worked quite well.

Running for the Border

The yeast problem finally had to be overcome by smuggling. Extreme times call for extreme measures. It was a requirement for any homebrewer or those who benefited from the finished product to come back from leave outside the country with as much contraband yeast as they could safely get through customs.

Customs in Saudi was not a prospect to be taken lightly. Customs in the eastern province of Saudi Arabia makes Checkpoint Charlie during the



Brewers Wrae Hill and Rich Curtin enjoy their brew expatriate-style, behind closed doors, on Halloween. They called it Saudi Gaudy.

Body searches occurred occasionally but not often, so a few packets of yeast carried in your pocket didn't trip any alarms.

height of the cold war look like the welcome wagon. Saudi customs agents routinely went through all of your luggage to the point of dumping the contents on the floor and letting you put it all back. Their way of saying "howdy," I guess.

Body searches occurred occasionally but not often, so a few packets of yeast carried in your pocket didn't trip any alarms. If caught you could usually get away with claiming it as a type of spice, since many of the customs people couldn't read English. Needless to say, yeast packets were



A four-wheeling excursion into the desert provided a private spot for a clandestine picnic. On the menu was the author's latest re-alcoholized non-alcoholic commercial brew turned homebrew.

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CIRCLE 47 ON READER SERVICE CARD

"Easy Does It" Saudi Lager

This is a very palatable, easy-to-make brew for beginners. No cooking is required, and it's relatively foolproof. I can attest to that. I recommend following the directions to the letter if you're a first-time or fairly new brewer and then experimenting with future batches. The

flavor will definitely depend on what type of NA beer you choose, so sample a few and pick the one you like.

Ingredients:

- 2 cases non-alcoholic beer (24 12 oz. bottles or cans)

- 2 lbs. granulated sugar (corn sugar if you must)
- 1/4 cup water
- 1 tsp. sugar
- Any lager yeast
- 3/4 cup sugar for bottling

Step by Step:

Begin with clean equipment. Pour NA beer into a carboy slowly to allow foam to settle. Pour the sugar into the beer.

Combine 1/4 cup of water (body temperature) and one teaspoon of sugar. Pour yeast into this mixture, cover, and let stand until yeast begins to foam, approximately 15 minutes to 1/2 hour. Pitch the yeast mixture into your beer, set the carboy uncovered in a bucket or the bathtub to allow for initial runoff. This takes eight to 12 hours.

Place an airlock on the carboy. I recommend the store-bought variety where available, but in a pinch use the rubber surgical glove, secure it tightly over the neck of your container, and poke a small pinhole in one of the fingers to let the CO₂ escape.

Allow the beer to ferment eight to 10 days. To bottle your beer dissolve 3/4 cups of sugar in some warm water, then pour this into your beer. Next, place your siphon hose into the beer 1/4 to 1/2 inch from the bottom. Siphon your beer into your bottles (leave an airspace about the same size as a commercial bottle of beer) and then cap. Store the beer upright in cartons in a dark closet or cupboard above 65° F. After two days give each bottle a quick turn clockwise and counterclockwise to settle any yeast residue on the sides. In 10 to 14 days you'll have a nice, clear, drinkable beer. If allowed to age for another week or so it will be mellow and have a richer, more distinctive flavor.

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Variations on a Theme

The Middle East has a vast variety of different spices available. In abundance are cardamom, ginger, cloves, hot peppers, and different types of honey. I made batches with each of these, adding or substituting from the "Easy Does It" Lager recipe. I'll leave out the hot pepper recipe; I'm still not happy with it.

Cardamom Tea Lager

Cardamom-flavored teas and coffees are very popular in the Middle East. Cardamom has a bitter but refreshing taste and aroma. For this recipe I simmered six to 10 coarsely ground cardamom seeds in a pint of strong tea for 30 minutes. I then added this to the fermenter prior to pitching the yeast. The cardamom gives the beer a slightly bitter spiciness that goes well with an Eastern-style menu.

Donna's De-Lite Honey Lager

This was my wife's favorite brew in the desert. It's a light, effervescent beer that goes well with anything or nothing at all. I added two pounds of light clover honey instead of the sugar in the original recipe, then brewed and bottled as usual.

Gingered Amber

For this recipe you need to find a darker NA beer. I used Moussy. In a pint of strong tea I put four ounces of freshly grated ginger root and a half-dozen or so cloves. I boiled this mixture for about half an hour, then strained it into the fermenter prior to pitching the yeast. The result was a slightly heavier, fragrant, spicy beer that goes great with Chinese food. Don't get carried away with the ginger. Fresh ginger can be very potent, and too much will overpower the flavor of your beer.

worth their weight in gold, and we used them sparingly. (We tried producing our own strains in the lab, but they kept getting stolen!) One-quarter to one-half teaspoon in some warm water and a little orange juice or sugar for a starter produced a sufficient amount to pitch into a batch. Granulated sugar was used with good results in lieu of corn sugar.

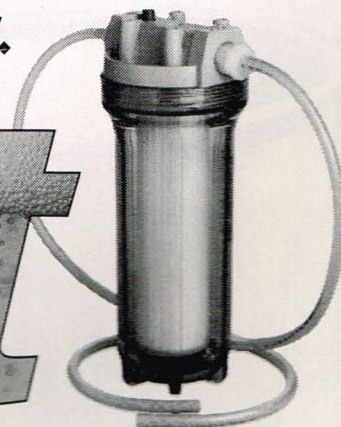
I know there are a lot of purists out there cringing, but hey, necessity is a mother and it worked. I used the products at hand and produced some very passable lagers with a decent kick and

limited ill effects the next day. I was also able to pass on the results of my trials and errors to the new kids on the block. The spirit of good homebrew lives on!

Our tasting parties in Saudi were clandestine affairs: windows covered with heavy drapes, a watch on the door. I came to realize what it must have been like to run a speakeasy. I have to say it was an experience I wouldn't have missed, but I'm thrilled to be back home where freedom can mean something as simple as openly brewing and enjoying your own beer.

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CIRCLE 24 ON READER SERVICE CARD

Crystal Clear Beer

Clarification Tips to Make Your Beer Sparkle

By
Nico Freccia

Since the mid-1800s when lagers appeared on the European brewing scene and instantly swept the world as the dominant beer style, beer lovers have been captured by the color and cool, clear sparkle of beer. At the same time lagers were introduced in Europe, the Industrial Revolution provided technical advances allowing glass producers to quickly and cheaply produce glass drinking vessels.

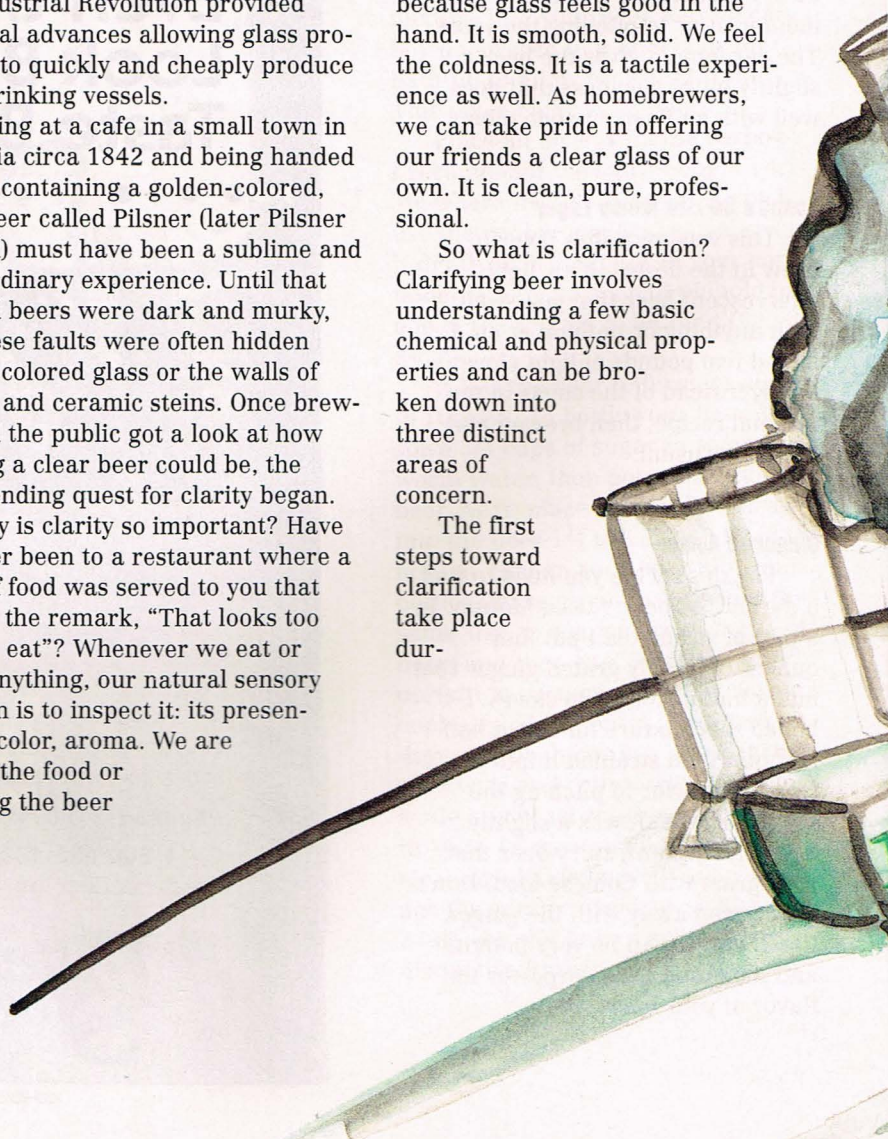
Sitting at a cafe in a small town in Bohemia circa 1842 and being handed a glass containing a golden-colored, clear beer called Pilsner (later Pilsner Urquell) must have been a sublime and extraordinary experience. Until that time all beers were dark and murky, and these faults were often hidden behind colored glass or the walls of pewter and ceramic steins. Once brewers and the public got a look at how alluring a clear beer could be, the never-ending quest for clarity began.

Why is clarity so important? Have you ever been to a restaurant where a plate of food was served to you that elicited the remark, "That looks too good to eat"? Whenever we eat or drink anything, our natural sensory reaction is to inspect it: its presentation, color, aroma. We are tasting the food or drinking the beer

with our eyes, and that plays a great role in our appreciation of it. A green, murky beer may taste wonderful, but we wouldn't be particularly inclined to try it. Glass is important to our drinking pleasure not only because it lets us anticipate our appreciation, but also because glass feels good in the hand. It is smooth, solid. We feel the coldness. It is a tactile experience as well. As homebrewers, we can take pride in offering our friends a clear glass of our own. It is clean, pure, professional.

So what is clarification? Clarifying beer involves understanding a few basic chemical and physical properties and can be broken down into three distinct areas of concern.

The first steps toward clarification take place during





ing and immediately following the kettle boil. These include coagulation (joining or clumping together) and precipitation (settling out of solution) of proteins and spent hop material. They take place during the hot and cold breaks (discussed below) and whirlpooling.

The second steps occur in the physical control of fermentation and conditioning of the beer and involve the removal of yeast.

The final measures occur during finishing and packaging of the beer and include final yeast removal and sedimentation and chill-haze proofing.

Apart from your manipulation of the brewing process, clarifying aids are available as ingredients that can be added to your brew. These aids are collectively called finings and often work on the principles of attraction of positive and negative electrical charges.

1. THE KETTLE BOIL

Proteins and the Hot Break.

The coagulation and precipitation of proteins in boiling wort is a natural process affected by heat, time, and agitation. As a homebrewer you will have control over all of these factors and therefore control over the initial stages of clarification.

Proteins are chains of amino acids that positively affect yeast nutrition and performance, beer color and flavor, and foam stability. But excess protein and polyphenol (tannin) will contribute haze and harsh, husky flavors to beer. Protein function depends on molecular structure. Once a protein loses its structure (called denaturation), it loses its function. As the complexly twisted or folded chain of amino acids loses its structure, it essentially unfolds. This unfolding exposes new segments of the chain for interactions such as joining together (coagulating) with other proteins to form haze particles.

After just a few minutes of rapid boiling, you should begin to see a film forming on the top of the wort. This is called the hot break and consists of the proteins that have become clumped together because their structure was

destroyed by heat and agitation. Because of this physical action of denaturing, there are two primary factors to bear in mind when boiling wort for clarity: length of the boil and vigorousness of the boil.

Because of the proteins present in all-grain worts, a 90-minute boil is recommended to maximize coagulation. For some beers containing high percentages of high-protein malts, particularly wheat beers, a longer boil will precipitate more protein matter, aiding clarification. Also, you should allow the wort to boil for 15 to 30 minutes before making any hop additions so maximum coagulation can occur.

Heat alone is not enough to properly denature proteins and cause clumping. A rapid, rolling boil should be maintained so that the proteins physically bump into each other and break down. If a rolling boil is not possible for your system, you should stir vigorously and often.

Irish Moss. Irish moss (a seaweed) is a kettle fining. Proteins in boiling wort have a positive electrical charge.

Irish Moss is negatively charged. Added in the last 10 minutes of the boil, a small amount (about 1/2 teaspoon for a five-gallon batch) of Irish Moss will attract clumps of protein. The weight of the new clumps causes them to sink, or "settle out" of solution.



Whirlpooling. In most commercial breweries wort is pumped tangentially into a second tank at the end of the boil, creating a whirlpool, or it is recirculated for a few minutes in the kettle to achieve the same effect. After whirlpooling, the wort is allowed to sit for 20 to 40 minutes, during which time all the hot break material (trub) will settle and form a cone in the middle of the kettle. Clear wort is then drawn from the side. Homebrewers can simply create a whirlpool by rapidly stirring the wort in a clockwise motion and allowing it to settle.

Cold Break. Some of the protein compounds created during boiling will remain soluble at high temperatures and only precipitate when cooled. An additional "break," or forming and settling of haze particles, will therefore occur during cooling. Cooling should be completed as quickly as possible to maximize the cold break.

2. FERMENTATION AND CONDITIONING

After careful boiling and cooling, most of the unwanted proteins will have been removed from the wort. The main concern following primary fermentation is rapid settling and removal of yeast. Yeast cells will multiply and become suspended throughout the wort in the initial stages of fermentation. As they use up available sugars, the cells begin to flocculate, or clump together, and settle out to form a sediment at the bottom of the fermentation vessel.

The homebrewer generally does not need to worry about this initial yeast activity, though temperature will have a great effect on both yeast activity and flocculation tendencies. After primary fermentation is complete (usually three to five days) or when fermentation has slowed considerably, the beer should be racked (transferred) to a secondary vessel where conditioning can commence. Conditioning in commercial breweries generally involves gradually decreasing temper-

After just a few minutes of rapid boiling, you should begin to see a film forming on the top of the wort. This is called the hot break.

"Can it really be any good?" a young woman whispered. "Heavens no," Thomas exclaimed. "He's never brewed a drop in his life."



They Laughed When I Told Them I Was Serving My Own Home Brewed Beer, But When They Tasted My Pale Ale! —

Thomas brought a gift of his latest micro-brew discovery that he wanted everyone to try. I decided that this would be a dramatic moment for me to make my debut. To the amazement of all of my friends, I strode confidently over to my Alephenalia Micro Brewery-Home Brew Kit and began to pull out the professional looking bottles that I had placed there.

"Chuck is up to his old tricks," somebody chuckled. The crowd laughed. They were all certain that I couldn't brew any more than I could make potatoes au gratin.

"Can he really brew?" I heard Thomas' partner whisper. "Heavens, no!" Thomas exclaimed. "He's never brewed a drop in his life. But just you watch him. This is going to be good."

I decided to make the most of the situation. Holding up the wing capper, I explained that I had bottled it just for this occasion. With mock dignity, I drew out a bottle and cradled it in my arms like a great wine. "Is this another of those disappearing ink trips," called a voice from the rear. The crowd rocked with laughter.

Then I began to pour.

Instantly a tense silence fell on the guests. The laughter died on their lips as if by magic. I poured a glass for everyone, even those who exclaimed "I don't like beer." I heard a gasp of amazement. My friends sat breathless, spell-bound.

I sampled it myself and for a brief moment I forgot the people around me. I forgot the hour, the place, my fellow imbibers. The little world I lived in

seemed to fade—seemed to grow dim—unreal. Only the ale was real. Only the ale and the visions it brought me. Visions as beautiful and as changing as an autumn sunset, with its amber hues, just like my homebrew.

A real Triumph!

As everyone finished tasting, the room resounded with accolades. I found myself surrounded by excited faces. How my friends carried on! Men shook my hand—wildly congratulating me—pounding me on the back in their enthusiasm! Everybody was exclaiming with delight, plying me with rapid questions. Chuck! Why didn't you tell us you could brew like that? Where did you learn? How long have you been brewing?

"I simply followed the complete instructions included with the Alephenalia Homebrew kit," I replied. "And just a short while ago, I didn't know hops from malt."

"Quit your kidding," laughed Thomas, a real beer enthusiast. "You've been brewing for years. I can tell."

"Only since Rosie gave me an Alephenalia Microbrewery for my birthday, less than three weeks ago. I decided to keep it a secret so that I could surprise all you folks." Then I told them the whole story. "Ever heard of Liberty Malt Supply Company?" A few of my friends nodded. "That's a home brew shop and mail order catalog!" One of the oldest in the entire country!

"Exactly," I replied. "They have a great program for learning how to brew beers like a professional, the Liberty Way."



How I learned to brew without a teacher.

And then I explained how for years I had longed to brew my own beer. I shared that dream with Rosie and when she saw the Alephenalia Microbrewery in the Liberty catalog, she knew it was the perfect gift for me.

A Complete Catalog!

Pointing to the colorful Alephenalia Micro-brewery carton, I explained, "It contains brewing equipment that can be used over and over to brew beers like the professionals." I told them how pleased I was with Brewer's Companion, a real home brewers bible. The Liberty Pack included with the microbrewery contained enough pre-measured, concisely labeled ingredients to brew five gallons of the Pale Ale. I explained that each of the Liberty packs used the highest quality ingredients, exclusive to Liberty Malt and that packs for each of the classic brewing styles are available.

I proudly told them that I have already begun brewing Weekend Weiss, a Bavarian style wheat beer and Liberator Doppelbock, both promptly received by simply dialing Liberty Malt's own toll free number, 1-800-990-MALT (6258).

Favorite brewing styles

"Let's order Liberty's Pals Pils Pack!" Thomas pleaded after seeing the Liberty catalog. He took another sip and said, "Which weekend is that Weiss going to be ready?"

To order or for a free catalog:

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atures to complete the settling of yeast and, if very cold temperatures are used, to continue the cold break.

To maximize settling and clearing of the secondary fermentation, it's best to initially "warm condition" ales at or close to primary-fermentation temperature until there is no sign of carbon dioxide activity in the airlock. If possible, decreasing the temperature to 50°F for a few days and again to 40°F

for a few more should produce a brilliantly clear final beer at packaging time. Otherwise, several days at ambient temperature should clear the beer sufficiently for most homebrewers. Lagers will be fermented colder and should be stored at the coldest possible temperatures.

Obviously, different yeast strains will display different flocculation tendencies. Many commercial breweries that bottle-condition their beers use highly flocculent yeast strains so the bottled product will be clear with a very firm, thin layer of sediment on the bottom of the bottle. Each yeast strain will vary, and you may find that two different beers conditioned in the same way exhibit different qualities of clarity.

3. FINISHING AND PACKAGING

When we prime and bottle our beer we are, in part, counteracting our earlier measures to settle as much yeast as possible. The introduction of

sugar, which begins the fermentation in the bottle and carbonates the beer, also causes the remaining yeast cells to re-suspend and then begin the sedimenting process all over again. If you treat the bottled beer as you treated the conditioning of the secondary fermentation—storing it warm to complete fermentation and then chilling it to sediment yeast—you will eventually have bottles of crystal clear beer. This bottle-aging process sometimes takes weeks, however, so we may add finings to accelerate the process.

Gelatin. An animal-derived fining made from the hooves of horses and cows, gelatin combines with tannic acid to form larger particles that adhere to yeast and proteins and carry them out of solution.

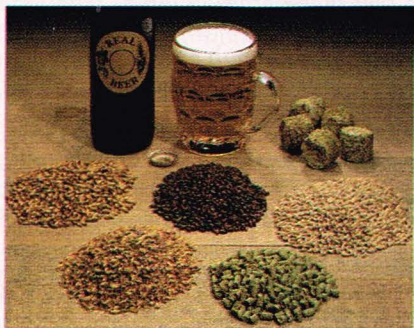
Gelatin should be used when fining lager beer since gelatin requires colder temperatures to work effectively. It needs to be prepared by mixing one tablespoon in one pint of cold water and gently heating to dissolve. Do not boil the solution! The gelatin solution should be added to beer that is 50°F or colder. The closer to freezing it is, the better the solution will work. Add the fining when you rack your beer to the bottling bucket or keg, and make sure the solution is mixed in well.

Isinglass. Derived from the swim bladders of sturgeon, isinglass is positively charged and attracts negatively charged yeast cells. It is a fining used traditionally in cask-conditioned English ales because of its ability to settle ale yeasts quickly. It should not be used in lagers as it will not clear and may even

To maximize settling and clearing...it's best to initially "warm condition" ales at or close to primary fermentation temperature.



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CIRCLE 83 ON READER SERVICE CARD

damage them. Isinglass can be bought in prepared form and added directly to the keg or bottling bucket.

Filtering. Filtering is standard practice for commercial brewers, and many small filters are available to the homebrewer. Homebrew filters work best with kegging systems, as CO₂ can be employed to push beer through the filter. Removing yeast cells requires only a relatively rough filtration as the cells are comparatively large. Filtering can also remove some haze-forming particles.

Chill Haze. Chill haze is the dreaded homebrew phenomenon that causes clear, room-temperature beer to become hazy when chilled. The same chemical processes that cause chill haze are the processes discussed earlier as cold break. Polyphenols (tannins) from the malt husks combine together with proteins at cold temperatures to form larger particles that become visible. Homebrew that has been oxidized, or aerated, during racking or bottling will be particularly susceptible to chill haze. As the haze is caused by the combination of two known compounds, the elimination of one or the other compound is the most effective way to protect your beer. There are two basic methods of interest to the homebrewer: degrading agents and adsorbents.

Papain is a protein-degrading enzyme derived from the skin of the papaya. When added to beer, the enzyme will break down proteins, prohibiting their interaction with tannins and eliminating the possibility of haze. A small amount of papain, found in better homebrew shops and some specialty herb stores, can be added at bottling.

Adsorbents are compounds that physically attract other compounds through static electricity, like your sweater in the dryer attracts your socks. Adsorbents are commonly used by major commercial breweries because they are quick and effective. Polyclar (plastic) and silica gel are two commonly used adsorbents that are often dosed in powdered form to beer on its way to the filter. Because you probably don't want plastic winding

up in your beer glass, you should rack the settled beer off the polyclar after use.

Some breweries also combat the haze problem by intentionally adding tannin to the lagering tanks to encourage formation of haze that can then be more effectively filtered out in large amount.

While the major producers of pale lager beer go to great lengths to ensure complete clarity in their prod-

ucts, as homebrewers we need to maintain a healthy respect for the wonderful diversity of beer. A touch of cloudiness in our amber and brown ales also lends a certain amount of enticing appeal. They appear fuller, richer, more wholesome.

Pay attention to the factors that can increase and decrease cloudiness and haze in the brewing process, then sit back, enjoy that beer, and know that there is no other like it.

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BREW YOUR OWN January 1996

35

CREATE

By Jeff Frane

The first beer I ever made was a “beer.” The second was a “bock.” Needless to say, the first attempt hit a lot closer to the mark. Many shots at brewing my favorite beers followed — brown ales, wheat beers, porters, pale ales—all of them drinkable, and all of them not only missing the mark but frequently missing the target all together.

A year after that first brew, though, one of my beers earned a blue ribbon at the American Homebrewers Association national competition: an all-grain British bitter. Over the years I’ve developed much better aim and can generally pin down a good beer in a couple of tries. (Although I hedge my bets and steer wide of beers I have no hope of emulating, lambics being a good example.)

What happened over time was that I polished the art and craft of brewing. The *art* is something very hard, perhaps impossible, to teach. It’s a sixth sense that nudges the brewer into adding a dab of this or a lot of that. Watch a chef at work some time, and you’ll see what I mean.

The *craft* of brewing is the science part, and it’s the side that can be taught, studied, and learned. For the most part it’s the craft side that is at work when a recipe is being developed.

Beginning brewers tend to look



TODD HAMMOND

YOUR OWN RECIPE





everywhere for recipes. Homebrewing texts are loaded with them, as are brewing magazines. Recipes

from competition winners are also a good place to start.

Eventually, however, the brewer feels the need to strike out on his own. Other people's recipes don't quite make it, or the brewer's creative juices are running so strongly that someone else's beer just isn't enough.

A lot of brewers want to reproduce a commercial favorite, making a beer "just like" Anchor Steam or Cooper's Real Ale. Other brewers set their sights on winning competitions and wisely know that fulfilling the judges' expectations is often more important than brewing to their own tastes.

Brewing Beers Like Those You Buy

That was the title of a book by pio-



Amber

	% Alpha/ Hop Time	Measures
<i>O.G.</i>		12°/1.048
<i>bitterness</i>		25 IBU
<i>pale malt</i>		7 1/4 lbs.
<i>60° L crystal</i>		1 lb.
<i>chocolate</i>		1/2 oz.
<i>Chinook</i>	12%/60	1/3 oz.
<i>Cluster</i>	6%/30	1/2 oz.
<i>Cascade</i>	6%/10	1 1/4 oz.
<i>yeast</i>		<i>ale</i>
<i>mash water</i>		3 gal.

neer homebrewer Dave Line. In the introduction he promised "all the know-how to brew a beer just like your favorite pub tipple, but at a fraction of the price across the bar." But as even Line admitted, the book was "about brewing beers *like* commercial versions. Using homebrew methods, it is impossible to turn out the same beer as a large brewery. What you can do is

emulate your favorite beer with a fair degree of success. Similar flavor, strength, and color can be achieved, and in such a way that you may end up liking the homebrew version better than the original."

A lot has changed in homebrewing since Line wrote those words over a decade ago. We now have access to the same high-quality malts, hops, and yeast that commercial brewers use, and the adaptation of commercial processes to the home brewery has been well established. But the basic problem remains: You can brew something very close to your target beer, you may even (gasp) brew something better (well, for one thing, it's going to be fresher), but you're unlikely to reproduce it exactly.

To match a commercial beer you need to determine and acquire the same raw ingredients the brewery uses. You'll need to find out what sort of malts they're using, which can involve ascertaining the percentages of various specialty malts and blends of

Let the Experiments Begin

Included with this article are 10 standard recipes that provide a good starting point for your own experiments. The recipes are designed to produce five gallons of wort. If you're an all-grain brewer, any mash profile will work. Use enough sparge water to collect 5 1/2 to six gallons of wort before the boil. Start with local tap water and adjust it as needed. Ale or lager yeast is specified, but it's up to your individual preference from there.

Trying out different specialty malts is rewarding. Substituting brown malt for part of the chocolate and/or black barley in a porter or stout recipe adds another layer of complexity. British pale ale malt can be substituted for domestic pale malt to add a subtle toasty, nutty note.

If you are brewing from extracts, malt syrup can be substituted with pale malt pound for pound. If you're using dry malt extract (DME), one pound of pale malt is equivalent to about 11 ounces of DME.

One caveat: If you're attempting to brew to a specific style, then some parameters should be altered with caution. For example the amber ale recipe calls for one pound of 60° Lovibond crystal malt and 1/2 ounce of chocolate malt. This can be changed to 1 1/2 pounds of 40° L to get a different crystal malt character, but changing the chocolate malt to 1 1/2 ounces could easily turn the amber ale into a brown ale.

The bock recipe specifies an original gravity (O.G.) of 1.065 or 16° Plato. If this is lowered, the beer by definition is no longer a bock. Not only does the original gravity sometimes change a beer's name, but it also alters the beer's alcohol content and hence flavor.

Hop variety and the amount of time each type spends in the boil are also fun to experiment with. Since hop bitterness is largely dictated by alpha-acid content and time of addition, it is important to keep this in mind when substituting varieties.

Another key point, again if you're brewing for a specific style, is knowing which varieties can be substituted for other varieties.

The model pilsner recipe calls for Perle, Mt. Hood, and Saaz. If Cascade were substituted for Saaz, you could end up with a hybrid between Sierra Nevada Pale Ale and Pilsner Urquell. A more appropriate substitution, stylewise, would be another European aroma hop such as Hallertau or Tettnanger, or an American hybrid such as Mt. Hood or Liberty.

The important thing to remember when learning how to create great recipes is to be forgiving of mistakes, since they can be very educational. The other important point to keep in mind is your palate. A well-trained palate helps in recipe formulation, because it can help relate raw material flavors to finished beer flavors. This means that tasting lots of different beers is a great way of sharpening your brewing skills. It also makes a good excuse to have a beer!



Bock

	% Alpha/ Hop Time	Measures
O.G.		16°/1.065
bitterness		25 IBU
pale malt		8.25 lbs.
Munich		2 lbs.
20° L crystal		1 lb.
chocolate		1 oz.
Mt. Hood	6%/60	3/4 oz.
Tettnanger	5%/30	3/4 oz.
Mt. Hood	6%/10	1/2 oz.
yeast		lager
mash water		4 gal.

pale malt. You'll need to purchase the same or very similar malts, and these can vary considerably depending on their source. Malts from the Midwest, for example, run much higher in S-methylmethionine than those on the West Coast, and that adds a sulfury tone to beers brewed with them. If you want to match a Midwestern lager, you'll probably need Midwestern malts.

You'll also need to match their hop blends, which is a little easier. Most hop varieties commercial breweries use can be tracked down, either through a retailer or a mail-order hop supplier.

Getting some of their yeast is much more difficult, and the yeast strain can have a tremendous effect on the beer's flavor. But even that hurdle has gotten smaller in the last few years, with a great proliferation of yeast cultures available to homebrewers. It's not always possible to determine exactly which yeast strain a brewery is using, but with some experimentation it's possible to get very close.

Become a Recipe Sleuth

Probably the hardest thing to find is information. Touring the brewery is a big help, especially if one of the brewers is leading the tour and is willing to answer questions. Keep in mind, though, that this information is proprietary. The brewery doesn't really have any interest in sharing it with potential competitors. Asking a lot of nosy questions about mash temperatures and malt blends is likely to close off any

potential communication. Look, listen, and above all, be pleasant. During the tour, wait for the right moment to ask specific questions. When the tour guide is explaining how hops are used, ask what types are added. Some breweries are surprisingly free with their information, and you can always learn a lot about brewing if you take the time to listen.

There are some factors that are impossible for a homebrewer to reproduce. Commercial equipment is very different from our carboys and camp-cooler mash tuns. The Anchor Brewery in San Francisco ferments its famous Steam Beer in shallow, open fermenters, and the procedure certainly influences the flavor of the beer. It works for them because the fermentation room uses positive air pressure to keep out unfiltered air and contaminants. Few home breweries have such amenities.

Furthermore, the scale of the commercial brewery is extremely important. Variations within a bale of hops, for example, are irrelevant when thousands of gallons are being brewed but are tremendously significant when only five gallons of beer and a few ounces of hops are concerned. Yeast cultures will behave differently in the huge amounts used in commercial breweries.

If you are set on copying a commercial beer, get as much information as possible about the beer. Read the brewery's handouts and whatever you can find by other authors. (Michael

Jackson's books, such as *The Beer Companion*, and Fred Eckhardt's *The Essentials of Beer Style* are excellent resources.) Find out whatever you can about the brewery's raw ingredients and their procedures. Determine whether the beer is lagered and for how long. Is it a true ale or a lager beer with an ale name? Once you've made your determinations, then follow the steps below for beer modeling.

Brewing Beers by Style

Even when we're not trying to imitate someone else's beer, generally we have some image of what we're after. It may have elements of another beer,



Dark Lager

	% Alpha/ Hop Time	Measures
O.G.		12.5°/1.050
bitterness		25
pale malt		6 2/3 lbs.
60° L crystal		1/3 lb.
Munich		1 1/2 lb.
chocolate		2 1/2 oz.
Perle	6%/60	3/4 oz.
Mt. Hood	6%/30	3/4 oz.
Tettnanger	5%/10	2/3 oz.
yeast		lager
mash water		3 gal.

or several. "Sort of like Young's Special, only a little paler and drier, and I want to use a blend of Cascade and Willamette in the finish." It's an image that comes from drinking beers we like and imagining how we could do it a little differently or a little better. It's an image that is enhanced by learning how those beers are made and how they are defined.

Consider then the beer's original gravity: Is it high or low? If it's high, then will the beer have lots of alcohol or lots of body? Or a combination of both? If you're making a pale ale, then you should know the ranges for the style. Take into consideration the level of carbonation your beer will have—whether a highly carbonated beer is appropriate for the style—because it will have an effect on your



Golden Ale

	% Alpha/ Hop Time	Measures
O.G.		11°/1.044
bitterness		20 IBU
pale malt		7 lbs.
40° L crystal		2 1/2 oz.
cara-pils		1/2 lb.
Nugget	12%/60	1/4 oz.
Mt. Hood	6%/30	3/4 oz.
Tettnanger	5%/10	1/2 oz.
yeast		ale
mash water		2 2/3 gal.



perception of the beer's body.

Next, you need to determine the color. How dark can a pilsner be? Is

your beer really a brown ale, or have you crossed some mysterious line into porters? What sort of finish will the beer have? What sorts of aromas and flavors will greet the drinker? Will it be dry or sweet? Hoppy or malty? Or will it be something special: sour, tart, or redolent of cherries?

Finally, what sort of ferment will you be using, either by choice or necessity? Can you make a "real" pilsner without lagering, or does the unique flavor of an altbier come from a combination of warm ferment and cold conditioning? How can you control a lactic fermentation?

These days there are a lot of good research opportunities—more than there were 10 years ago, when I started brewing. For one thing it's much more likely that you have a good brewery in your neighborhood as well as some good brewers whose brains you can pick.

You've got plenty of options on the bookshelf as well. There are whole vol-



Märzen

	% Alpha/ Hop Time	Measures
<i>O.G.</i>		13.5°/1.055
<i>bitterness</i>		25 IBU
<i>pale malt</i>		6 1/4 lbs.
<i>Munich</i>		2 lbs.
<i>40° L crystal</i>		1 lb.
<i>Perle</i>	6%/60	2/3 oz.
<i>Mt. Hood</i>	6%/30	1 oz.
<i>Tettnanger</i>	5%/10	1 oz.
<i>yeast</i>		lager
<i>mash water</i>		3 1/3 gal.

umes dedicated to a given beer style and a constantly improving supply of homebrewing texts. The Internet offers a terrific array of possibilities and opportunities to learn from other brewers thousands of miles away. Pay attention, though, because along with the



Weizen

	% Alpha/ Hop Time	Measures
<i>O.G.</i>		12.5°/1.050
<i>bitterness</i>		15 IBU
<i>pale malt</i>		4 lbs.
<i>wheat malt</i>		4 lbs.
<i>Mt. Hood</i>	6%/60	1/2 oz.
<i>Mt. Hood</i>	6%/30	2/3 oz.
<i>yeast</i>		Bavarian wheat
<i>mash water</i>		3 gal.

solid information is a lot of shaky thinking and some serious misinformation.

Define Your Own Style

The history of brewing is a history of innovation. Look at how furiously the British defended their beloved ale from the introduction of hops by Belgian émigrés and witness how inextricably hops and British ales are bound today. Look at how much difference the use of cold temperatures in the fermentation process has made or the use of single-cell yeast cultures (whether to good or bad effect, a subject for debate). No aspect of brewing is exempt from experimentation and innovation.

Which is not to say that chaos should reign in the brewhouse. The laws of good sanitation still apply, yeast cells still need oxygen and nutrients to survive, and fermentation will always produce carbon dioxide and alcohol. By definition beer must contain fermented grains, but which grains and in what proportions is open to debate. Homebrewers have a tendency to be hysterical on the subject of all-malt (that is, all malted barley) beers—partly because they're delicious, but mostly because so many commercial brewers use other grains to cheapen a noble product.

The Bantu people of Africa make a beer of maize (corn) and malted sorghum. The Russians make a beer of rye. Berliner weisse has the hops added in the mash, and some Belgians age the hops before using them to eliminate any unwanted flavor or aroma. The Belgians, apparently, will do just about anything to their beers,

including adding fruit and herbs, using unmalted wheat, letting their mash run on all day, and using spontaneous fermentation. Most commercial brewers, both here and abroad, are the product of brewing-institute educations and view that sort of diversion with horror, like a missionary who finds his congregation placing little dolls in the cornfield.

Homebrewers are an inventive enough crowd that there is a constant argument about which categories should be included in homebrewers' competitions and how those categories should be defined. No matter how carefully writers such as Eckhardt and Jackson chart a taxonomy of beers, the outline will always need to be expanded and revised, particularly if it relies on "traditional" beer styles for definition.

Which is all to say, turn your imagination loose. Then follow the same careful steps to implementation. Try in advance to determine a starting gravity and how the beer will finish. What



Pilsner

	% Alpha/ Hop Time	Measures
<i>O.G.</i>		12°/1.048
<i>bitterness</i>		35 IBU
<i>pilsner malt</i>		8 lbs.
<i>Perle</i>	6%/60	1 oz.
<i>Mt. Hood</i>	6%/30	1 2/3 oz.
<i>Saaz</i>	3%/5	1 oz.
<i>yeast</i>		lager
<i>mash water</i>		3 gal.

effect are you trying to achieve by smoking some of the grains over tea or by adding home-malted triticale? Will you be cold conditioning the beer? Would your purposes best be served by brewing two separate batches and blending them?

Be Realistic

If you are truly a modern brewer, you've probably got some sort of Internet connection, and you've regularly run across little cries for help. My favorite runs along the lines of "Help! I need to brew a beer for my brother's wedding and I need a recipe for

Pilsner Urquell. It has to be an extract recipe, and I don't want to use lager yeast. And hurry, the wedding is next week!"

Some beers require very special and demanding techniques or technology that may be difficult to reproduce at home. Others require special ingredients, special conditions, or a degree of skill you haven't mastered yet. Stick to simple beers at first—porters, pale ales, brown ales, and the like that will allow you to study the building blocks of beer (malt, hops, water, yeast, etc.) and the ways they work together. These skills and the sensibility that goes with them provide the foundation on which to develop more complex and challenging beers.

Building the Beer

If you're going to plan recipes, there are some important steps to take first.

- **Learn your materials.** The accompanying charts provide information on the color and uses of various malts and hops.

- **Do the math.** Plug the relevant information into the right formula for determining original gravity, color, or bitterness. I still do all my math on an ancient computerized spreadsheet program, but there is a lot of really good software available, developed by homebrewing computer nerds, that takes a lot of the work out of the process. The best of these come with not only the numbers necessary for calculating malt color and yield, hop

bitterness, or whatever (and the programs should provide you with a way to substitute your own numbers for theirs), but with profiles of different beer styles so you can target your beer.



Oatmeal Stout

	% Alpha/ Hop Time	Measures
O.G.		13.5°/1.055
bitterness		40 IBU
pale malt		7 lbs.
toasted oats		1 lb.
black barley		1 lb.
chocolate malt		1/2 lb.
Nugget	12%/60	2/3 oz.
Cascade	5%/20	1 1/4 oz.
yeast		ale
mash water		3 1/3 gal.

- **Brew the beer.** Theories are great, but even the boys on the Manhattan Project had to blow one up to see if it worked. The great thing about experimenting with beer is that you get to drink the research, and it won't make your hair fall out.

- **Take good notes.** Keep track of what you did and how you did it. Write it down! If you made last-minute changes to your model ("Ooops! We're out of gypsum") make a note of it.

You will find differences between what you planned (or what someone else did, or said they did) and the way it worked out in practice. Perhaps your original gravity was lower than anticipated. Perhaps the bitterness was greater. Make a note of it.

Maybe the formula was wrong. Maybe your procedures are different, maybe your ingredients are. If you get different results, change the numbers, so that next time your model will be more reliable.

- **Do It Again.** Brew the same beer, and make whatever adjustments you need. But keep a bit of advice in mind: Don't change all the variables at the same time, or you'll never be able to figure out what worked and what didn't.

If the beer comes out perfectly, do it again! Once you can brew the same beer two or three times in a row, con-

sistently, you can say you've begun to master your craft.

- **Get an objective opinion.** Have someone knowledgeable taste your beer, someone who hasn't invested all the time and love in it that you have. Oftentimes, you can get good feedback at a competition—especially if you get a good, knowledgeable judge on a good day. From time to time I've read some truly fat-headed remarks from judges, though, and you never know in advance who's going to taste your beer. Try to find a few people whose judgment you can really trust and run your efforts past them.

If you were attempting to reproduce a commercial beer, get someone to help you with a blind tasting, comparing your effort to the original. Be brutally honest with yourself, and *take good notes*. Don't worry about why the beer is different; figure out where it differs. Is it drier? Sweeter? Is the color way off? Is the balance similar or wildly different?

Later, you can figure out what went wrong or right—and remember, even when you're wildly off the mark you



IPA

	% Alpha/ Hop Time	Measures
O.G.		15°/1.061
bitterness		40 IBU
pale malt		8 lbs.
Munich		1 1/2 lbs.
60° L crystal		1/3 lb.
20° L crystal		1/2 lb.
Fuggles	5%/60	1 1/3 oz.
Goldings	5%/30	1 oz.
Goldings	5%/10	1 1/3 oz.
Goldings (Dry)	5%/dry	1 oz.
yeast		ale
mash water		3 2/3 gal.

can make a beer you love. If you have kept good notes, you should be able to pin down those places your test brew diverged from the model, and you can determine how to correct them. And then, do it again!

Homebrewer Jeff Frane writes *BYO's Style of the Month* column.



Porter

	% Alpha/ Hop Time	Measures
O.G.		13°/1.053
bitterness		35 IBU
pale malt		7 2/3 lbs.
chocolate		1/2 lb.
black barley		1/3 lb.
60° L crystal		1/2 lb.
Cluster	6%/60	1 1/3 oz.
Goldings	5%/20	1 oz.
yeast		ale
mash water		3 gal.

Expose Yourself to

By
Kirk Fleming

You've just finished cooling your latest batch, and after hours in the kitchen your precious nectar is ready for the fermenter. You'd better get it into the carboy, pitch the yeast, and get an airlock on it *now*! Right?

Nonsense! There's another way to ferment that beer: in the open.

"Are you nuts?" you ask. You've gone to all the trouble of sanitizing everything in sight to ensure a healthy brew and wonder, "Why would I leave my beer sitting out in the open air to get contaminated?"

Relax. Proper open fermentation doesn't leave the wort unprotected, and contamination is only slightly more common than with closed ferments. Fact is, many brewers have added this new dimension to their craft and have said they wish they hadn't waited so long to try it.

Open fermentation makes use of the natural, bacteria-hostile products of fermentation to provide a protective blanket over the wort. Immediately after pitching, before that carbon dioxide blanket has formed, the wort must be kept covered. When yeast activity slows down near the end of the most active phase of fermentation, the beer must be protected again either with a cover or by placement in a carboy with airlock. In a typical open fermentation the wort is uncovered only for 24 to 36 hours.

Merits and Drawbacks

For much of brewing's history, beer was fermented in open vessels, and some of the world's best beer still is.

Technology has allowed more people to enjoy better beer, but the use of enormous closed fermenters wasn't driven by a desire for beer with more character. In fact there are good reasons to ferment the old way, and new micro-breweries are being built today to do just that.

There are many reasons micros "go open," and here are some reasons you might want to as well: Open fermentation gives you a wider choice of big fermenters that have easy wort access for sampling and yeast collection, they are easy to manually clean, and possibly give a faster, more vigorous fermentation. In addition using an open fermenter allows you to see, hear, and smell the progress of the yeast and get closer to the brew.

The kind of satisfaction you get from the aroma of the mash and of hop residue on your hands doesn't have to end



Open Fermentation



Thanks

"I must credit the wonderful taste of Samuel Smith as the catalyst that has altered my life in a most dramatic fashion. As a result of tasting Samuel Smith during my travels in England, I began brewing during my third year of pharmacy school. I abandoned my recently acquired law degree to become a full-time brewer."

Mark A. Crossley, Head Brewer, Vino's Brewery and Restaurant, Little Rock, Arkansas

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Alan Livingston, Houston, Texas

"Thank you for carrying and distributing an excellent selection of fine beers. I especially enjoy Samuel Smith's Oatmeal Stout."

Robert W. Kuhn, Phoenix, Arizona

"After reading your ad in *Beer, The Magazine*, I wanted to try one of your Samuel Smith beers.

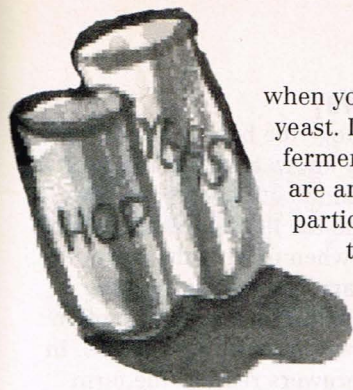
A friend (a true beer genius) told me about a store in Ashland that stocked Smith. I purchased Old Brewery Pale Ale. Upon arriving home, I tried it. What a delightful beer it is. I am very impressed. It was well worth the 100-mile round trip."

Paul A. Harvey 111, Grants Pass, Oregon



You're Welcome.





when you pitch the yeast. In open fermentation you are an active participant as the yeast does its work, which means more fun. You

may just get better beer, too.

An open ferment has a different character than a closed carboy fermentation. Your role as brewer is different, too. Experience it a few times. Brewing is a personal craft and only you can say if open fermentation improves your beer, but it can be a tremendous source of brewing pleasure.

Are there any drawbacks? Sure. With a carboy and airlock, you're free to forget about racking to a secondary altogether if you want to, or you can at least put it off for a day or so with no problem. With an open fermenter you depend on a healthy layer of dense foam to act as a protective cover over the wort. Before that cover vanishes at the end of primary ferment, you need to cover the beer or rack it to a closed vessel. Your schedule is a little less flexible.

You can also put a covered fermenter anywhere you want if the room temperature is good. But with the fermenter wide open to the sky, you have fewer options. Brewers have found unusual things in their poorly located fermenters—tales of live cats and dead bats are two substantiated examples. When selecting a place for the open fermenter, avoid these potential problems:

1. Dusty joists under a well-traveled floor.
2. Pets, rodents, insects.
3. Outdoor drafts from open doors and windows.
4. Children. An open bucket of liquid can be a fatal trap for infants.

Some closed fermentation worries simply don't come up with the open process. These include the airlock water that sometimes flows back into the carboy, obtaining samples from the carboy for specific gravity readings, and cleaning blowoff tubes. These

aren't huge problems, but they largely go away with the move to open fermentation. So as always, there's a tradeoff.

What Shall We Brew?

Any beer can be fermented in an open bucket, but it's especially fun to make ales and lagers that were historically brewed this way. Belgian and British ales and German lagers come quickly to mind, even though some Belgian ale is fermented in unstoppered wooden casks. If you enjoy the enormous range of delightful beverages called pale ales, bitters, pilsners, or steam beers, then you may enjoy them even more when you mimic their traditional production.

Let's Try It

You have plenty of choices for a fermenter. The white food-grade plastic buckets sold at many supply shops; large, clear, polypropylene food storage containers; and stainless steel or enamel stock pots are all good choices. You'll only tie up the fermenter for at most four to five days before racking to an airlocked secondary vessel, so don't worry about having to dedicate an expensive pot to fermenter duty. Aluminum isn't recommended for this job. Aluminum is okay for kettles, but the wort gets more acidic as it ferments and the contact time is quite long.

Use a wide container rather than a tall, skinny one if you can. The container should be large enough to hold the batch of wort with one-quarter to one-third of its volume left empty for head space. It should not be too short; 15 inches is a minimum wort depth.

After you start the boil and your brewing routine gets rolling, sanitize your fermenter using whatever procedure has worked for you before. Also sanitize your hop strainer if you use one. After sanitizing both, try putting the strainer in the fermenter and putting the lid on to keep things clean during the boil.

After chilling the wort, cover the kettle, open the fermenter, empty out any sanitizer, and set the strainer up over

the rim. Drain (or pour) the chilled wort into the strainer, allowing it to splash against the bottom of the fermenter.

A healthy, fast-starting fermentation is essential to any good beer and is even more important here. Pitch a good charge of yeast and begin your aeration. Carboy shaking is not an option if your open fermenter doesn't have a cover that seals, but you do have other options. Try a kitchen hand mixer with sanitized metal beaters. Turn the speed control to the fast setting and hold the beaters vertically in the wort. This is an effective aerator, but if you filled your fermenter too high, wear a slicker. If you already use an air pump and airstone for aeration, you're in business. If not, you can simply pour the wort back and forth between two containers, splashing as much as possible. Cover the fermenter after aeration.

After about 12 hours a well-aerated, properly pitched wort should be in full ferment with a complete cover of dense, cauliflower-like foam called krausen, sometimes three or more inches thick. Krausen is a bacteria-hostile layer formed by vigorous yeast that protects the wort from most airborne problems. (A fast, aggressive yeast also provides a cloud of protective CO₂.)

Carefully uncover the fermenter and look at the beer—this is one of the many pleasures of open fermenting! If things have gone well and the surface is blanketed with a layer of krausen, then just leave the cover off. If



you feel a little timid about all this, leave the fermenter loosely covered and sneak a peek occasionally.

You'll soon see a lot of trub floating on the krausen. This material should be removed from the beer by either "skimming" or "dropping." Skimming is just taking the float-



ing trub off the krausen with a sanitary spoon. It takes some practice to avoid opening up the foam and exposing the wort. If the ferment is very vigorous, you'll see large clumps of dense, curling, wavy froth, like the top of a baking angelfood cake. Skimming this rocky surface is tough, and you may prefer method two.

Another Way

"Dropping" the beer is a technique you already know: racking. You want to leave behind both the settled break material and the floating, gummy trub (sediment) when moving the wort to the secondary. Dropping is popular with some British brewers, who often aerate the wort during the process. In fact some brewers reserve the term "dropping" to mean racking with aeration. It's best to aerate only when you think you'll be able to identify the effect it has had. Until then, rack as you normally would into a secondary fermenter you can airlock.

To determine when to rack from your open fermenter to a closed secondary, look in on the fermenter twice each day. Rack when:

1. Fermentation has slowed and the rocky head of foam has started to recede.

2. The dark trub is still suspended on foam surface, *before* it drops down onto or into the beer.

It's better to rack too early than too late. The constant flow of gas from the fermenter helps protect the wort from unwanted guests. If you wait too long, you risk exposure of the beer surface from a lack of CO₂ and a lack of krausen, and you risk having the trub sink back into your beer.

The Taste Test

You'll want to know if open fermenting did your beer any good. To compare your results with a closed system, split your next batch between one carboy and your open fermenter. When it's time to rack the open fermenter to a closed secondary, first rack the carboy-fermented portion to a second carboy. Then clean and sanitize the first carboy, and use it as the secondary for the beer in the open fermenter.

Bottle both portions at the same time with the same techniques, but keep the bottles separate or mark them. Each time you evaluate the beer, perform a side-by-side comparison. Try doing objective, blind taste tests with your friends.

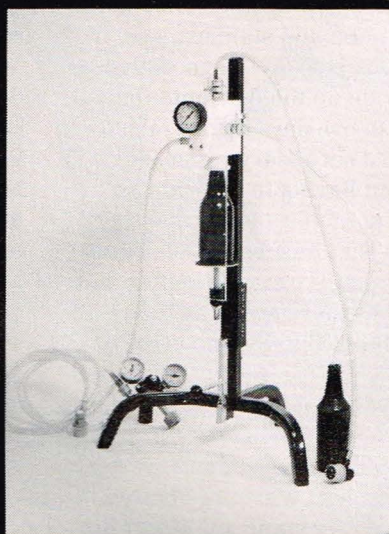
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By **S a l E m m a**

So you don't have a pot to brew in.

Brew Your Own to the rescue!

The crack staff of BYO traveled far and wide in search of the perfect brewpot. We hit the streets, pounded the pavement, and stalked cookware in many venues.

Here's the skinny.

What's All This About a Brewpot?

In case you are one of those brave souls just thinking about taking the plunge into the weird, wacky, and wonderful world of homebrewing, you are going to need a vessel to call your kettle. Or you can call it Betty, for that matter. Whatever makes you happy.

You see, good beer is boiled, vigorously, before it's beer.

That's what "brewing" means. It's when the sweet extracted juice of malted barley is boiled, usually with hops. Boiling gets the alpha acids of the hops into solution, mingles the flavors, solidifies proteins, sterilizes the mix, and does a whole lot of other neat technical things that end up making beer taste great.

Suffice to say good beer is boiled, like mad, for an hour or so. It's alchemy. Magical, bubbling golden wort,

foaming and spitting, rocking and rolling.

Boiling is absolutely essential for making good beer. And for that you'll need a kettle. A big kettle.

The First Requirement

Big. Even if you never plan to go "all the way" and make your beer from scratch (by brewing all grain) you still need a really big pot. Probably bigger than the biggest stock pot currently lurking in your kitchen.

Most extract brewers boil a concentrated wort—as much as their pot will allow. Two or three gallons is a good minimum. But to boil three gallons of foam-prone wort, you will need a five- or six-gallon pot to leave enough room for the controlled violence of the bubbling boil.

You see, a pot's rated capacity is liquid up to the rim. Obviously, you can't boil anything without some breathing room. To boil three gallons you need a five-gallon pot. To boil five gallons you need an eight-gallon pot. General rules of thumb, but you get the idea. Of course you can go bigger. You can boil six gallons in a 15-gallon vessel if you have one.

What's Your Budget?

How many times have we heard those annoying words? Well, unfortunately, dinero makes the world go 'round, and it's no different if you're buying a brewpot or designing a new airplane for Boeing. And like every other human endeavor, you can start at zero dollars and end at infinity.

Let's start at the bottom of the scale, zero dollars. If you are a scrounger, you might be able to get a brewpot for nothing. Teaching you how to become a scrounger is beyond the scope of this article. In fact it's beyond the scope of anything written anywhere. Scroungers are born that way. It's in their DNA.



PAUL J. CURRERI

The six-year-old test: If your brew kettle will comfortably hold a six-year-old child, it is definitely big enough to brew in. This six year old is Michelle Reilly, daughter of homebrewer Pat Reilly of Seaville, N.J.

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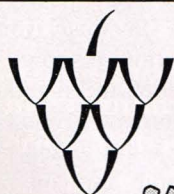
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Suffice to say there are probably a few thousand big stock pots, canning kettles, and other large metal vessels collecting dust in a few thousand garages, basements, and closets around the world.

Follow your nose. If you are not a scrounger, do the next best thing—get to be good friends with one. A scrounger has a keen sense of smell. Ask a scrounger to find you a big pot and he or she will be able to smell one from several miles away.

The zero-dollar category slightly overlaps the next one, up to \$30. Some scrounging activity is appropri-

(Enamel pots are) light weight even in the largest sizes and easy to clean. The enamel surface will not react to acidic wort. Best of all, they are cheap.

ate in the lower end of the cost scale. One New Jersey brewer's first brew kettle is a big enamel-steel canning kettle, the large pot home canners use to boil their mason jars. It holds over four gallons and boils three comfortably. He bought it at a yard sale for \$5. The outside has some chips and dings, but the inside is still in good shape.

Since he moved the brewery outdoors, this pot no longer serves as his brew kettle, but it is still in use as the mash tun.

Since we are on the subject of the enamel-steel pot, let's cover its basic advantages and disadvantages.

The enamel-steel pot is dipped in liquid clay, glazed, and baked in a kiln. When it emerges, it's a steel pot covered in smooth, glassy porcelain. It's the classic blue-speckle ware. The enamel pot holds several advantages for the homebrewer. It's lightweight, even in the largest sizes, and easy to clean. The enamel surface will not react to acidic wort. Best of all, they are cheap.

Brand new enamel pots start at \$5 for the small saucepan size. The 33-quart spaghetti/lobster pot (8.25 gallons) can be had for under \$25, with a lid, in many discount stores, kitchen shops, and larger hardware stores. That size can be used for extract or



PAUL J. CURRIERI

Now that's a pot. The author eyes a \$900 copper kettle at Zabar's. While not that great for brewing, this pot is the hands-down winner for the King-of-the-Kettles title.

all-grain brewing, as it will hold a full five-gallon boil quite comfortably.

Enamelware holds one major disadvantage: It does not stand up to bumps and bruises. If you bang the pot on your sink or drop it, the porce-

The Aluminum Issue

Conventional wisdom says you can't brew in aluminum. It seems this is a hard-and-fast rule among professional brewers, but in the homebrew game the anti-aluminum rule may be more flexible.

Here's the deal: The professional brewer cleans his or her gear with caustic soda, a dangerously strong alkaline compound chemically similar to lye. Caustic soda not only eats the aluminum away, practically before your eyes, but the reaction also results in a variety of dangerous gases.

For obvious reasons you won't find much aluminum inside a brewery.

At home? You could brew in aluminum if you had to. Some recommend against it in fear that acidic wort will react with the metal and create an off flavor in the final product. On the other hand, plenty of peo-

ple have been cooking acidic tomato sauce in aluminum for years without tasting anything weird in it.

As long as you don't store the wort in the aluminum for an extended period of time, your beer will probably be okay.

The other aluminum issue is a theory that aluminum ingested over a lifetime collects in your brain, possibly causing Alzheimer's disease late in life.

Unfortunately, the jury is still out on this one, too. For every study that shows aluminum to cause higher incidence of Alzheimer's, there is another study that shows no link between them. What researchers have discovered is that the brain of the Alzheimer's patient has abnormally high levels of aluminum in the tissues. But scientists are simply not sure if the aluminum has caused the

Alzheimer's or if the Alzheimer's somehow causes the brain to accumulate aluminum.

As far as we know, no one has studied whether aluminum leaches into beer brewed in an aluminum kettle. But BYO's own Mr. Wizard speculates that even if some aluminum did make it into your wort, the yeast would probably eat it up. "Yeast are famous for scavenging all kinds of heavy metals during the ferment," the illustrious Wizard says.

The bottom line: If some wacky relative gives you a 10-gallon, restaurant-grade aluminum marmite for your birthday, go ahead and make beer in it. But to avoid trouble, if you are going out to purchase a brew kettle, you might want to skirt the whole issue by choosing another material.



PAUL J. CURRERI

If your local homebrew store doesn't have the pot to fit the spot, check out the East Coast's pots and pans mecca: Zabar's in New York City. You can reach their mail-order department at (212) 787-2003.

lain jacket is likely to chip. The enamelware pot will probably not last a lifetime. But if you are careful, you will get many years of service out of it. And even if you chip the outside, you can still use it without too much trouble as long as the inside does not crack.

Entering the Stainless Market

Moving up the budget ladder takes us to low-end stainless stock pots. Like the enamel pots, these are also available in discount department stores and big hardware stores. They are made of thin-gauge stainless and, for the most part, are manufactured overseas. You can find these in the right size for homebrewing, with lid, for under \$50.

Examine low-cost stainless pots carefully. If you use a high-heat method, such as a Cajun-cooker, the metal may be of too thin a gauge to stand up to the big blowtorch. Consider your own brewery set-up and use your noodle when making your choice.

When to Buy

On the consumer market large stock pots are considered by some chain stores as "seasonal" merchandise, based on the assumption that clambakes and crawfish-lobster boils are generally summertime activities. You might see the supply appear in the spring and dry up by early sum-

In a restaurant supply store a stock pot is known as a marmite (mar-MEET). When you give anything a French name, you can easily charge an extra 50 bucks for it.

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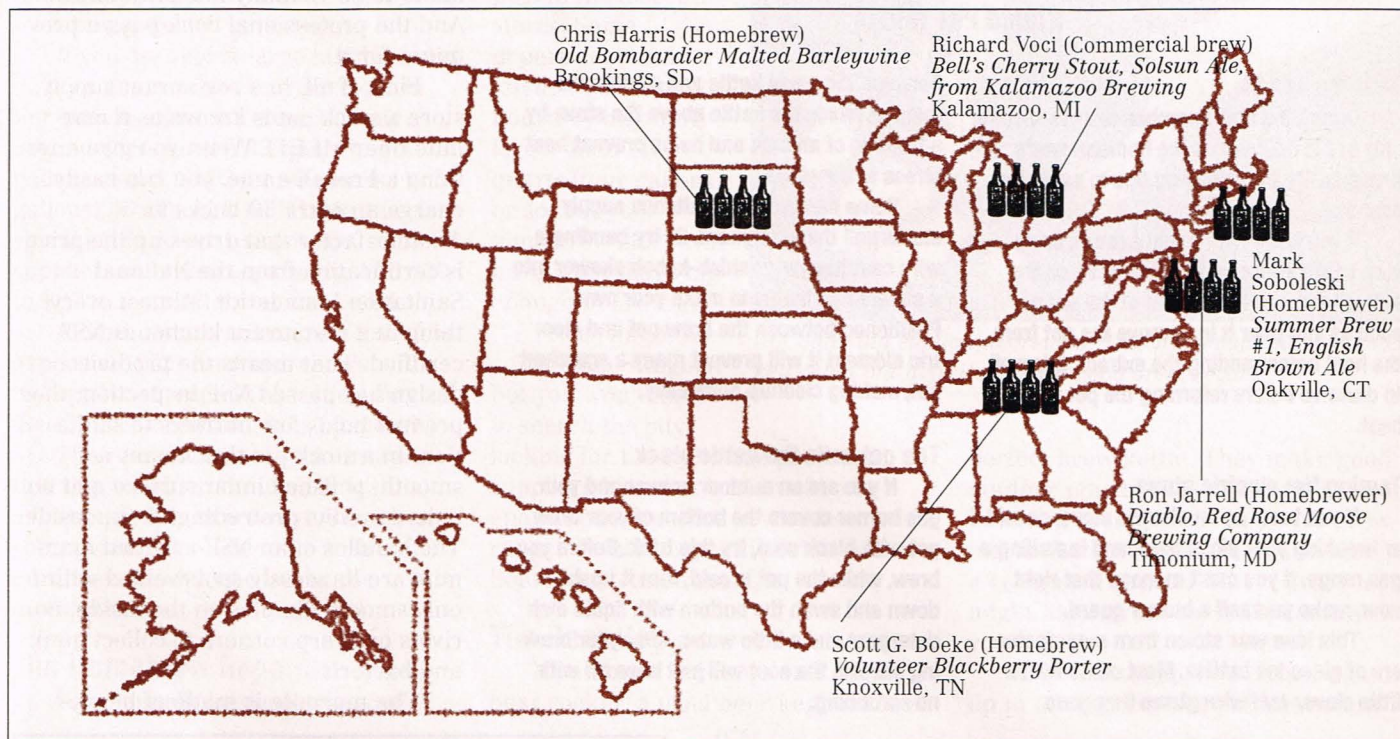


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mer. This is by no means true of every chain in every region. But if you do not see any big pots in your neighbor-

hood outlet, ask the manager if he or she expects to carry them at a different time of year.

Stupid Pot Tricks

Beat the scorch

During the boil, scorched wort is second only to the bollover as the homebrewer's nemesis. Try the following tips to avoid the scorch.

If you brew with liquid extract, bring your kettle water up to full boil. Since the extract sinks to the bottom of the pot as soon as you pour it in, remove the pot from the heat before adding the extract. Stir well to dissolve before returning the pot to the heat.

Taming the electric stove

If you brew on an electric stove, consider breaking your piggy bank and installing a gas range. If you can't manage that right now, make yourself a burner guard.

This idea was stolen from manufacturers of glass tea kettles. Most come with a little clover-leaf wire gizmo that goes

between the glass kettle and electric element. It raises the kettle above the stove by a fraction of an inch and helps prevent heat stress to the glass.

Some hardware and kitchen supply stores sell the wire guard. Or try bending a wire coat hanger or shish-kebab skewer into a square or triangle to make your own. Positioned between the brew pot and electric element it will prevent many a scorched pot, making cleanup quite easy.

The pot calls the kettle black

If you are an outdoor brewer and your gas burner covers the bottom of your brew pot with black soot, try this trick. Before you brew, while the pot is cold, turn it upside down and swab the bottom with liquid dish detergent and a little water. After your brewing session the soot will just hose off with no scrubbing.

The Restaurant Supply House

The restaurateur and the home gourmet play by a completely different set of rules. Restaurant equipment is made to be virtually indestructible. And the professional cook pays a premium for it.

First of all, in a restaurant supply store a stock pot is known as a marmite (mar-MEET). When you give anything a French name, you can easily charge an extra 50 bucks for it. Another factor that drives up the price is certification from the National Sanitation Foundation. Almost everything in a restaurant kitchen is NSF certified. That means the product design has passed NSF inspection; the product holds few barriers to sanitation. In a stock pot that means a smooth, polished inner surface and no bolts or rivets protruding on the inside. The handles of an NSF-certified marmite are flawlessly spot-welded with only smooth dimples on the inside, no rivets or sharp corners to collect gunk and bacteria.

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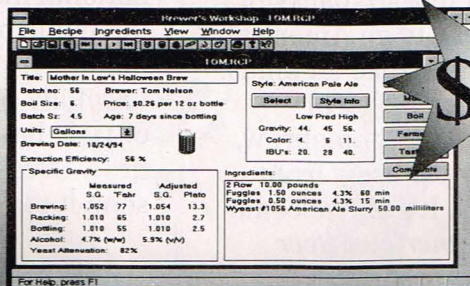
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gauge stainless or aluminum. It can be dropped, hammered, kicked, and probably run over by a fork lift before becoming unusable. At home that means it will be the last brewpot you ever buy, unless it gets stolen.

If you are seeing large numbers and dollar signs, you are very perceptive. For stainless you can expect to pay around \$160 for the 32-quart (eight-gallon) model, \$175 for 40 quarts (10 gallons). That's with no lid. Most professional chefs do not use pot lids, so the suppliers sell them separately. Add \$20 to \$25 to the total if you want a lid.

Aluminum marmites are a little less expensive, but aluminum comes with its own set of potential question marks. (See "The Aluminum Issue," page 49.)

The restaurant pot's advantages: It is big, tough, and durable. It's disadvantage: It is expensive. But when you consider it's a once-in-a-lifetime purchase, it might be worth the investment.

The Homebrew Supplier

Your homebrew store is a good

place to find big brew pots, especially if you have trouble finding larger pots in the discount stores. Some department and kitchen stores do not carry anything larger than 16 quarts (four gallons) or so, but your homebrew store will have a pot that's big enough to brew in.

Prices might be a few dollars higher, but you won't have to search the city looking for the right size pot. Some suppliers have a selection of both enamel and stainless kettles for a wide range of wallet capacities. Ask your homebrew store manager.

The Beer Keg

If you brew outdoors on a high-heat cooker, a used beer keg makes a



PAUL J. CURREN

Not quite big enough to brew in. This pot would make a good key chain but definitely not a good brew kettle.

perfect brew kettle. They make good outdoor pots because the half-barrel beer keg is simply too large for brewing on the kitchen stove. If you can get a converted quarter-barrel keg, that might be okay indoors, depending on your range.

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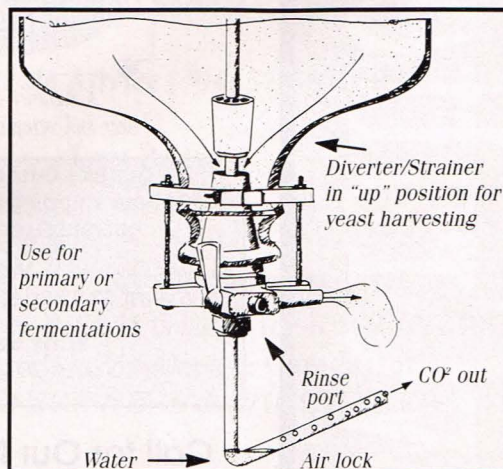
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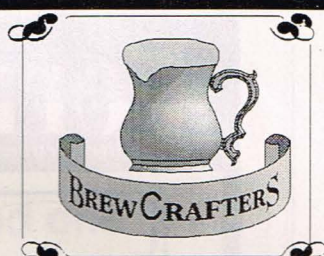


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ing or burning. They also clean up well. But this choice comes with the strongest caveat emptor (let the buyer beware!). Put simply, the vast majority of beer kegs outside of taverns and restaurants are owned illegally. Even if you buy a keg from a shop or scrap yard, it may not rightfully belong to the organization that sells it to you.

"It's a big problem that's getting bigger as homebrewing becomes more popular," says Rick Henzler, sales manager at Sabco Industries. Sabco repairs, reconditions, and sells kegs to both professional brewers and homebrewers. And Sabco is very clear about the rules surrounding ownership of the keg: It's not yours unless you can prove it's yours.

"The issue of lost property is significant, to be sure. But the larger issue is liability. The breweries do not want their kegs in the hands of consumers, because a pressurized keg can be dangerous.

"It goes back to the unfortunate soul who obtained a keg with 15 or 20 pounds of CO₂ pressure inside. He was trying to get the valve out by any means possible. He pried, hammered, and wrenched, until the valve blew out of the keg like a bullet, hit him in the head and killed him. His family sued the brewery, even though he had obtained the keg illegally," Henzler explains.

He says handing the bartender or retailer the \$10 keg deposit does not constitute ownership. That deposit is simply an attempt to provide an economic incentive to return the keg. "It's absurd to think you can 'buy' a keg for \$10 or \$15. Just the Sankey valve alone is worth \$13. And kegs in good working order fetch around \$80 on the legitimate market."

So how does the homebrewer protect him or herself from illicit possession? Henzler says to follow a few simple rules. "Both Anheuser-Busch and Miller prohibit the sale of their kegs, to anyone. That means that nobody can buy an A-B or Miller keg legally. If you see a converted Miller or A-B keg for sale, think twice.

"Second, ask to see proof of ownership, in writing, that shows the keg you are buying is legal to sell," he says.

Sabco is doing its best to educate homebrewers on the issue. An information sheet the company published states that the big breweries are perfectly willing to spend anywhere from \$95 to \$120, plus freight, to recover stolen kegs. They have enlisted beverage distributors to report "hijacked inventory." The breweries are waging war against unauthorized keg use, and they are winning.

"They are getting testy about it," says Henzler.

Sabco sells legal converted kegs to homebrewers. A "standard boil," reconditioned, half-barrel keg with the top cut off and deburred is \$95. And Sabco has souped up the basic keg to include a stainless ball valve, industrial thermometer, and stainless false bottom for lautering. You can pick and choose the features you want. For around \$290, you get the whole shooting match: mash tun/lauder tun/kettle. Sabco sells direct to brewers and also wholesale to homebrew shops.

The Money-Is-No-Object Option

Our trek took us to the East Coast's mecca of kitchen supplies and pots and pans, Zabar's in New York City.

Zabar's has been supplying the NYC area from its ever-growing store at 80th and Broadway for generations. The place is nothing short of amazing. And they have three models of everything. Whether it's a spoon, espresso pot, egg whisk, or stock pot you need, Zabar's probably has it. They stock a full line of French tin-lined copper cookware, the object of our recent trek.

Their 70-liter model, that's 18.5 gallons, is the mother of all marmites. It's a mere \$899. They have smaller models, ranging in price from \$400 to \$770.

In all honesty they might not make the best brew kettles. Zabar's sells them with the warning to use only over a "low flame." The copper will discolor and dull if it is overheated. But if you are a real beer historian and feel the primeval need to brew in copper, take out a bank loan and make a trip to Zabar's.

And Still Other Sources

If you weld or have access to someone who does, you might try foraging at your local scrap yard/metal salvager. Though they are hard to come by, some 30- and 50-gallon drums are made of stainless. Some of these types are used to transport flavoring agents to large food factories. A stainless drum cut, deburred, and welded with perhaps a pad of heavier stock to protect the bottom from heat

makes a good kettle.

And if you can find an old Speed Queen wringer washer, it might still contain its stainless wash tub, which holds 22 gallons (see Wash n' Wear Brewing, October BYO). You might also look for old stainless swimming-pool filter housings to convert with a little creative welding.

So consider your budget, your heat source, and available space. And have fun shopping. 

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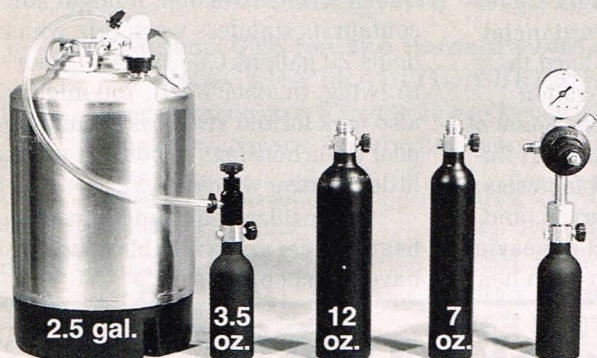
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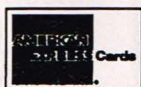
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Go with the Flow

Build Your Own Sparge System to Get the Most Out of Your Grains

by Tom Fuller

Sparging couldn't be easier. Put your crushed grain in a kettle with a little water and make a grain tea, pull out a strainer, fill it full of the grain, and pour hot water from a tea kettle over the top of it. You've sparged. Sort of.

Proper sparging is one very small step you can take to improve your homebrew. There is no reason a homebrewer can't graduate from the bare-bones-tea-kettle method to proper, easy-to-make sparge equipment to improve yield, flavor, and clarity of your beer every time.

While professional, large-scale sparging relies more on the sparging temperature than the actual technique, in homebrewing technique plays a large role.

Why? In the commercial brewery the grain bed may be anywhere from 12 inches to six feet deep. You could achieve a respectable extraction on a bed like that with a garden hose, if the water in the hose is the right temperature. With the grain bed we have at home being four inches to one and a half feet thick we could blow a hole clear to the bottom with a hose and never sparge an ounce of grain.

With a good sparging system you can increase your potential mash extract. For extract brewers you can get more flavor out of your specialties as well.

Choosing a System

The type of sparging system you use depends greatly upon your current lauter tun. The round-shaped Zapap (bucket with a gazillion holes), kettle, keg, or Gott cooler will work

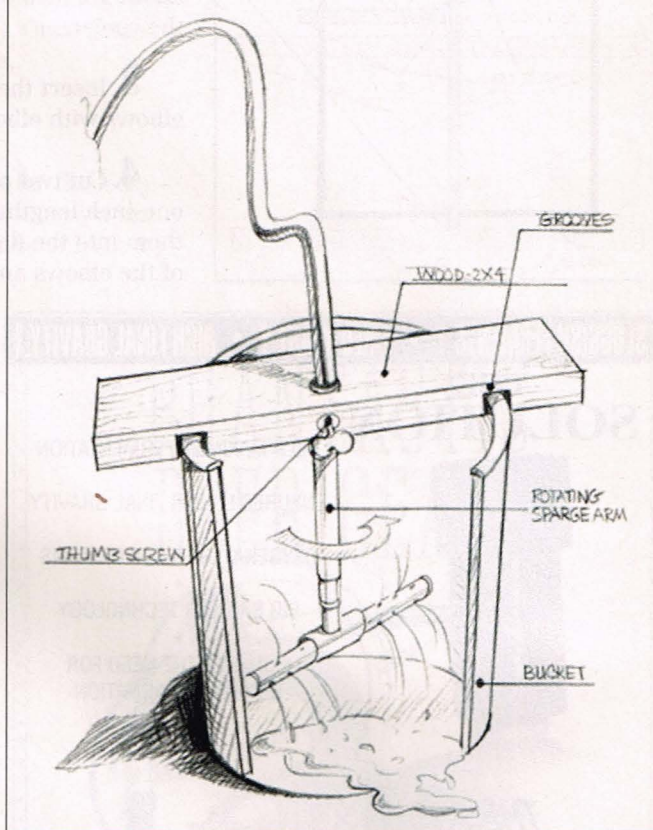
with most any sparge system. A rectangular cooler is more difficult to fit, because many sparge systems cannot reach into the corners.

We will examine three basic systems: the shower head, the sparge bar, and the rotating sparge arm. All three get the job done with reasonable efficiency and not too much effort. All are easy to build with readily available parts and minor mechanical skills.

In the following instructions the actual pipe sizes for the systems won't be listed because they will vary greatly depending on your lauter tun.

For both the sparge bar and the rotating sparge arm the smallest effective pipe size is 3/8-inch O.D. (outer diameter) "L" copper. L copper pipe is the soft copper that comes in coils. This is the best for small gravity-feed systems. The largest pipe you should use is 1/2-inch O.D. hard copper. Use the 1/2-inch copper for powered systems or systems larger than seven gallons where you also have room for five or more feet of height for a good gravity feed.

FIGURE 1
ROTATING SPARGE ARM



Sparge Bar

The "sparge bar" is the ideal system for rectangular coolers. This is basically a copper bar with holes drilled into it. The pipe size depends upon your system size and whether or not the water will be gravity fed, pump driven, or will flow from your tap or keg power sparger (sparge water forced from the keg with CO₂). Half-inch O.D. works fine for cooler systems

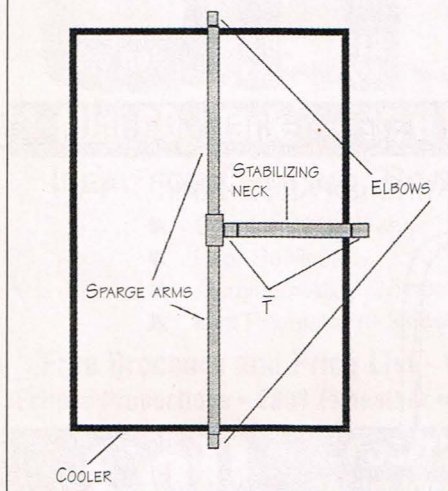
as small as five gallons as long as the drill holes are 1/32 inch in diameter.

Parts

- 1 copper pipe. Length should equal cooler width plus one half of

FIGURE 2

SPARGE BAR
(TOP VIEW)



depth.

- 3 elbows (same diameter as pipe.)
- 2 T's (pipe diameter).
- 3 pipe caps (pipe diameter).
- 1 male hose fitting (pipe diameter).

Construction

1. From the copper pipe cut the sparge arms to a length equal to the distance from the center of the cooler to the outside edge of the cooler.

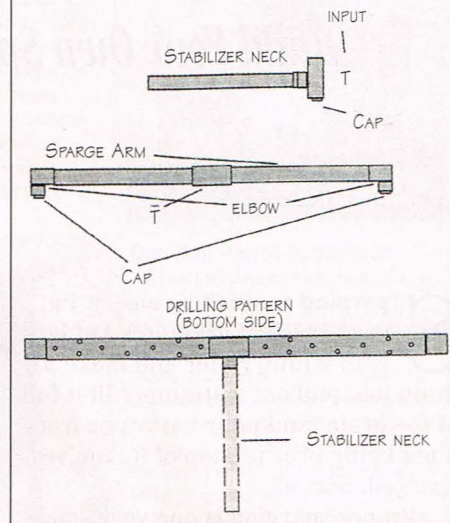
2. Insert the arms into opposite ends of a T. With the T in the center of the cooler, the arms should reach about 1/2 inch outside of the edge of the cooler.

3. Insert the arm ends into the two elbows with elbows pointing down.

4. Cut two pieces of copper pipe to one-inch lengths (nipples) and insert them into the downward-pointing end of the elbows and cap.

FIGURE 3

SPARGE BAR
(SIDE VIEW)



5. Insert the remaining piece of pipe into the center of the T. This is the stabilizing neck.

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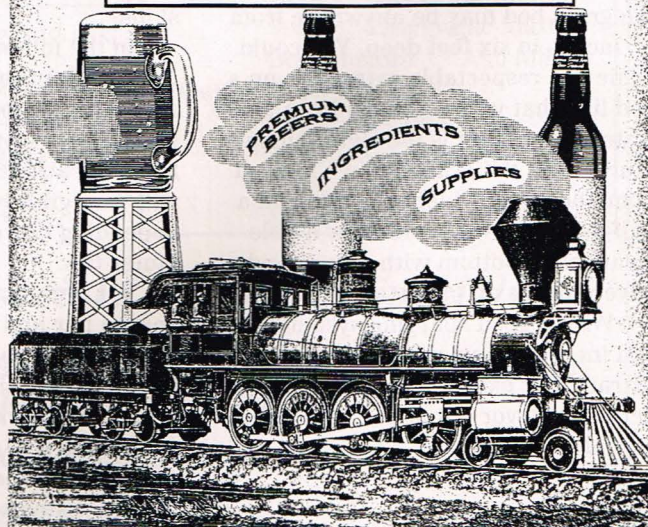
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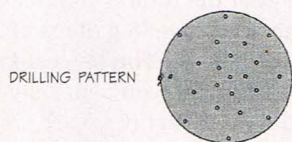
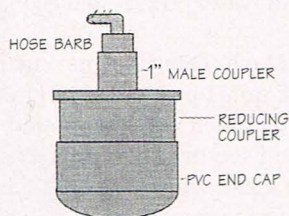
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FIGURE 4
SHOWER HEAD



6. Cut the stabilizing neck so it extends 1/2 inch beyond outside edge of cooler.

7. Insert the end of the stabilizing neck into the center of the remaining T, with T set vertically.

8. Cut a one-inch nipple and insert it into the bottom of T and cap.

9. Put male hose thread on top of T.

The elbows and the bottom of the front T are to hold the unit stable on the cooler.

All parts can now be disassembled and soldered together (Figure 2, page 58). Once the pieces are soldered, drill the holes in the arms. Do not drill holes larger than 1/16 inch. 1/32 inch is recommended. Refer to drilling pattern (Figure 3, page 58). Once drilled, the unit is ready for use.

Shower Head

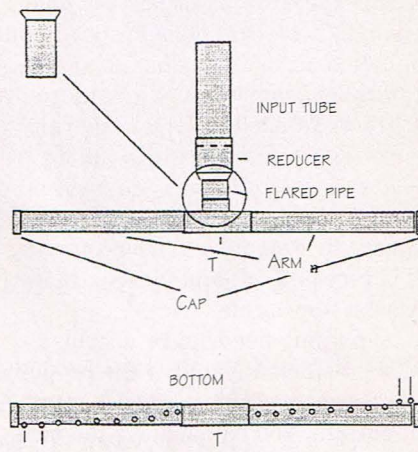
The name says it all for this easy-to-construct and easy-to-use system. It's a "shower head" made of PVC, a type of hard plastic.

Parts

All parts should be schedule 40 CPVC (a type of plastic designed for heat) if available. If not available, PVC is fine.

- 1 two-inch end cap.

FIGURE 5
ROTATING SPARGE ARM



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Sparging Principles

Sparging is the act of applying water to the grain bed after mashing to rinse the sugars from the grain. For extract brewing, rinsing adjunct grains provides color and added flavor.

Sparging is part of lautering, the process of straining the spent grains from the wort. The whole idea of sparging is to rinse the grain of its resulting sugar, so the sugar becomes part of the wort. The idea is simple enough, but extractions for one pound of pale malt in one gallon of water can range from original gravities of 1.018 to 1.033. That is a large variance. These variations have to do with four major factors: fineness of grist (grain), sparge temperature, sparge technique, and over-sparging. It is very difficult to under-sparge. Almost impossible.

Sparging needs to be accomplished efficiently and at the proper temperature. Temperature is very important. You can achieve the best

extractions at 167° to 175° F. Why? At temperatures above 166° F the sugars are more soluble and will more freely leave the grain bed. The higher the temperature the more freely the sugars will run, yet at temperatures above 175° F other off flavors can develop, such as woody flavors and tannins from the grain husk. The best temperature to shoot for is about 170° F.

How Much Water

In general all water used in brewing should be from the same source so it has the same mineral content. What you don't use for the mash you use in sparging. Sometimes in higher-gravity beers this will change.

The easiest way to figure water amount is with a simple formula. The formula is:

$$B \times 1.6 = BW. \quad BW - M = S.$$

B represents batch size, BW represents brewing water, M represents mash water, and S sparge water.

Mash water is generally one to 1 1/2 quart per pound of grain. A five-gallon batch using 10 pounds of grain would require eight gallons of water. The mash would require 2.5 gallons, which leaves you with 5.5 gallons for the sparge. The grain will absorb 12 to 14 percent of the total water, leaving you with 7.04 to 6.88 gallons of good wort for boiling. The biggest key is to know how much you generally boil off and only collect the wort needed for that batch.

Some brewers recommend lautering until a certain specific gravity or pH is achieved. Sounds good, but how do you take an accurate reading of 167°-plus sweet liquor? Collect the amount needed considering your usual boil off. It is okay to dump unused sparge water; it's not beer yet.



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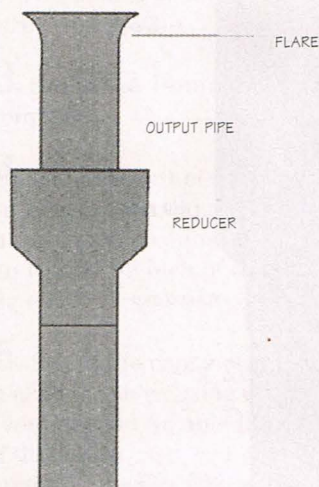


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FIGURE 6

ROTATING SPARGE ARM



- 1 two-inch-to-one-inch female thread reducing coupler.
- 1 one-inch male threaded reducer to 1/2-inch female thread.
- 1 1/2-inch male thread hose barb.

Construction

1. Screw the one-inch reducer into reducing coupler.
2. Screw the hose barb into the 1/2-inch end of reducer.
3. Drill the end cap as shown in Figure 4 (page 59) with 1/32-inch drill.
4. Cut a two-inch hole in the lid of your lauter tun.
5. Insert reducing coupler into hole.
6. Slide on the drilled end cap.

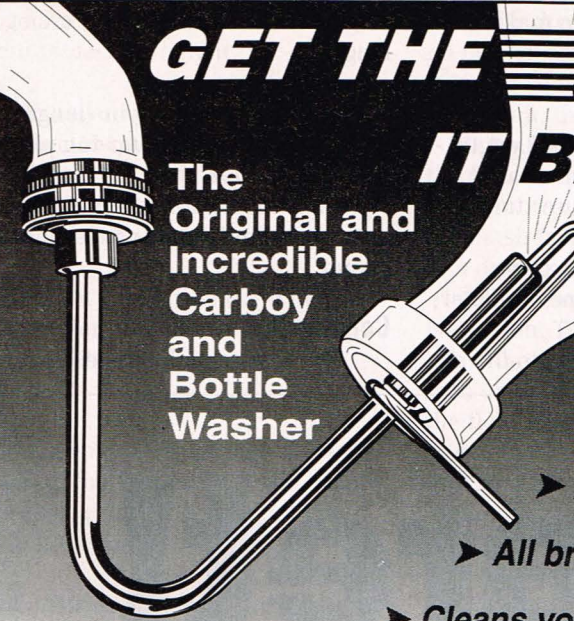
If the end cap is loose fitting, wrap the coupler with a length of Teflon tape before sliding it on. Don't glue the end cap on because you will have to remove it occasionally to clean it.

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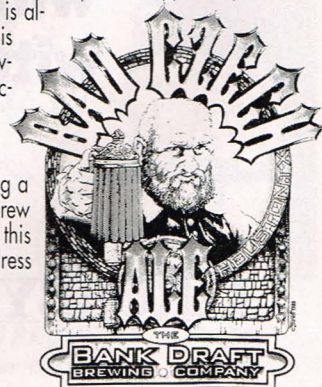
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It is a little more difficult to make than the other two systems.

Parts

- 1 copper pipe for arms. Length should be equal to one and a half times the width of your lauter tun.
- 1 T (pipe diameter).
- 1 copper reducer arm (pipe diameter to next larger pipe diameter; i.e. 3/8 inch to 1/2 inch).
- 1 length of copper pipe to fit

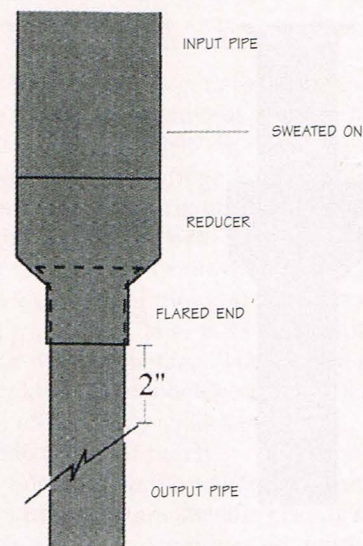
large end of reducer (about a foot in length).

- 2 end caps.
- Piece of two-by-four (length should be width of lauter tun plus two inches).
- 1/4-inch thumb screw and 1/4-inch barbed or threaded insert or hose clamp.

Construction

The sparge arm rotates because

FIGURE 7
ROTATING SPARGE ARM



of water pressure and the spiral pattern in which the holes are drilled. For smaller systems (five gallons), 3/8-inch O.D. L copper tubing should be used with 1/32-inch diameter holes.

Systems of 10 to 15 gallons using 1/2-barrel kegs, for example, can use 1/2-inch O.D. tubing with holes up to 1/16 inch in diameter.

If you're using a gravity-feed system, drill 1/2-inch pipe with 1/32-inch diameter holes and use a gravity feed of about five feet above the sparging arm to get proper rotation.

This particular sparge system is a little tricky. The first thing you need to do is get the pipe to fit very loosely into the small end of the reducer. Really loosely. You can grind the inside of the reducer down with a Dremel tool or file. Sandpaper works well on the pipe. The pipe has to be able to freely turn inside the reducer and come through it far enough to flare the end of the pipe.

To simplify instructions we will refer to pipe sizes as just input and output, input being the larger pipe.

1. After creating a loose fit for the output pipe in the reducer, push the pipe through the reducer and out of the large end (Figure 6, page 61). With

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a pipe flaring tool, flare the end.

2. Pull the pipe back down into the reducer and cut the unflared end off at about two inches past the reducer (Figure 7, page 62).

3. Sweat the T onto the unflared end of pipe.

4. Cut arms out of the output copper at lengths equaling the distance from the T in the center of the lauter tun to within 1/2 inch of the tun's inside edge.

5. Sweat the caps onto one end of each arm. If you're using L copper tubing, you may not be able to find caps to fit. If this is the case, you can simply crimp the pipe ends with pliers.

6. Sweat arms into the T.

7. Drill arms as shown in pattern (Figure 5, page 59).

8. Sweat input pipe onto reducer

(being careful not to solder the flare) and cut to desired height.

9. Cut two-by-four to length equaling one inch beyond outside end of each side of lauter tun and dado or groove the underside of two-by-four to rest along edge of the lauter tun.

10. Drill a hole into the two-by-four at center. The diameter of the hole should be the diameter of the input pipe.

11. Insert the input pipe through the hole in the two-by-four and secure with either a thumb screw and insert or with hose clamp.

12. Attach the water hose from the sparge water directly to the pipe or sweat on a hose barb or hose thread. Sparger is now ready for use (Figure 1, page 57).

Sparging

The use of all of the spargers is

basically the same. A few rules apply no matter what apparatus you are using. If you do not mash in your lauter tun, the first thing you must do is fill the lauter tun to 1/2 inch above the false bottom with sparge water. This creates a foundation to prevent the mash from compacting on the bottom and creating a stuck run-off.

Then transfer the mash to the lauter tun. Turn on the sparger and allow the sparge water to rise to an inch or so above the grain bed. Start the flow of sweet liquor out of the lauter tun at the same rate as the sparge. Collect about a gallon of sweet liquor and pour it back into the lauter tun. This is to achieve a good filter bed and clarify the wort.

Now the lauter may take place. Work the valves on your hot liquor bucket (sparge water) and lauter tun to achieve an even flow of sparge water and sweet liquor. Continue until you have collected the amount of liquor you need for your boil. After that boil it, hop it, ferment it, bottle it, drink, and enjoy. 

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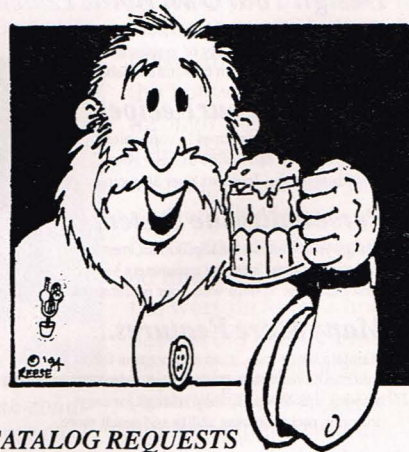
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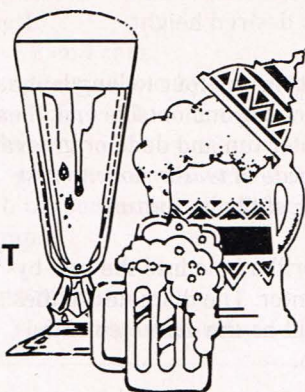
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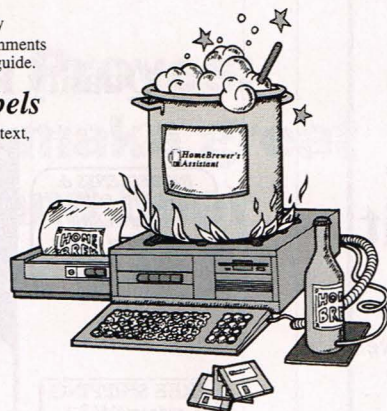
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Atlantic Forecast: Cask Conditions

by Steve Johnson

Despite having visited nearly 300 new breweries during the last decade, I have been unlucky when it comes to actually being at a brewery when it opens. There were some near misses—once in Nashville, another time in Columbia, S.C., again, in Portland, Maine, and a vicarious experience via telephone when Bluff City Brewing opened in Memphis.

The one opening I attended, if you want to call it an actual opening, was for Atlantic Coast Brewing, located in the Charlestown area of Boston. It was May 14, 1994, and I was trying to squeeze just one more brewery into my schedule before the start of the Boston Brewers' Festival later that day. I was on the brewery's loading dock, talking to owner-brewers Chris Lohring and Alex Reveliotty when Alex exclaimed, "I almost forgot, I've got to deliver some beer." He grabbed a keg, dumped it in the back seat of his car, and took off down the narrow streets of Charlestown.

When I asked Chris how many kegs of beer they had delivered so far, he replied, "One...that one."

That was it, the official opening. There was no roll of drums, no cheering crowds, no ribbon cutting. Although they had celebrated the opening in a bar the night before, this was the first keg to be sold by the brewery. Wow! When Atlantic Coast gets as big as Anheuser-Busch, I can tell my grandchildren I was there.

Unfortunately, Chris and I were both too tired to appreciate the significance of the moment. I had just completed two days of intensive training at a brewery in Maine and Chris had been working hard all spring getting the brewery ready to open. As we sat on the

loading dock and sipped his Tremont Ale, we watched the traffic on the Tobin Bridge over the Mystic River. Chris talked about the long hours they had been putting in preparing the brewery.

He remembered watching the commuters' cars going south on the bridge at 5 a.m. and going home again at 5 p.m...while he still had hours of work ahead of him.

Then, to illustrate how simple, little things can go wrong when opening a brewery, Chris pointed to a wharf barely a stone's throw away and told me about the delivery of their brewing equipment.

It had arrived on a ship from England at that very wharf. The truck driver sent to pick it up thought he knew the address, but soon became lost. Then he got his truck stuck on one of the narrow streets of Charlestown. After two hours, some frantic phone calls, and a considerable amount of frustration, the driver

ing at Northeastern University. They became interested in opening a brewery when Chris, a small-business major, worked with a local entrepreneur to open a brewery in the Boston area as a senior-year project. The entrepreneur was John McDermott, who had worked at the Catamount Brewery in White River Junction, Vt. Unsuccessful at his venture in Boston, John moved south and eventually founded the Highland Brewing Co. in Asheville, N.C. (BYO, September 1995).

Alex and Chris interned at the Kennebunkport Brewing Co. in Kennebunk, Maine for a month, where they were trained by brewmaster Alan Pugsley and his staff. Alan also helped them formulate their recipe for Tremont Ale and sold them a 20-barrel, Peter Austin brewing system.

This traditional English system features open fermenters and a hop back for extracting hop flavor and aroma. It featured a mash tun, brew kettle/whirlpool, hot liquor tank, hop back, two 20-barrel open fermenters, and two conditioning tanks.

A hop back is a canister in which you insert an arm-load or two of whole-leaf hops. After the whirlpool the hot wort is pumped through the canister before going through the heat exchanger and into the fermenter. This is how the hop flavor and aroma is extracted into the wort. Passing the wort through a hop back is the closest thing to dry hopping the beer (adding fresh leaf hops in the fermenter) without going through that lengthy process.

A third fermenter was added later. When the brewery opened in 1994 their total investment was about \$250,000.

Because the fermenters are the tradi-



Chris Lohring (left) and Alex Reveliotty, who specialize in cask-conditioned ales, delivered their first keg from the back seat of Alex's car.

arrived with the equipment, within eyesight of the wharf where he had picked it up!

Chris and Alex first met while study-

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tional English, open-topped, flat-bottomed kind, the beer is racked to the first conditioning tank after just seven days.

This gets the beer off the thick layer of trub that builds up in the bottom of the fermenter. The first conditioning tank acts as a fining tank, where the yeast and protein precipitate out of the beer.

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Their cask-conditioned ales are racked straight from the fermenter into casks and are ready in less than 10 days.

As a homebrewer, this might seem surprisingly fast. Recently I heard a homebrewer knock a brewpub that had its beer ready in two weeks. He said they were "really pushing their beer through the system." At Atlantic Coast nothing could be further from the truth.

Most homebrewers can't drink their beer for four to six weeks because it is conditioned in the bottle. Before homebrew goes into the bottle it is flat, and fermentation has almost completely stopped.

In a brewpub, where the beer is racked into a conditioning tank, fermentation is still fairly active and pressure builds up in just a day or two. As Chris says, "It is yeast dependent." Some yeasts will have the beer ready in a week or ten days, some take several weeks.

The phrase "don't try this at home" is very appropriate here. If you try to bottle homebrew before fermentation is complete, you will end up with exploding bottles.

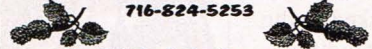
Chris and Alex pride themselves on the fact that they make authentic English ales. All of the equipment is from England. They use all English malt, which they purchase from Munton & Fison or Hugh Baird. The hops are English Fuggle and English Kent Goldings, though they sometimes use



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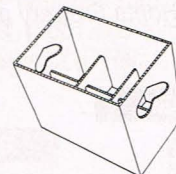
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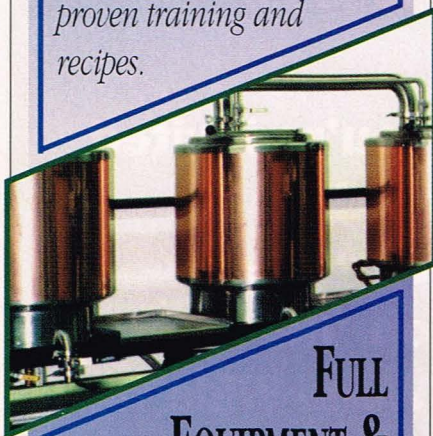
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foreign equivalents such as American Fuggle and Styrian Goldings from Yugoslavia. All malts are milled at the brewery. The yeast originated from the Ringwood Brewery in Ringwood, England, and they get it directly from the Brasserie McAuslan in Montreal, Canada.

Their beers include Tremont Ale (an English pale ale) and Tremont Best Bitter (cask conditioned), which are both available year round. Seasonals include porter in the winter, India pale ale in the summer, extra special bitter in the fall, and barleywine at Christmas. With each seasonal beer, part of the batch is released in kegs and part in casks. None of it is bottled.

The Barleywine first became available at the end of 1995. The original gravity was 1.095, and they plan to match the gravity with the corresponding calendar year, each year it is brewed.

The cask-conditioned ales are unfiltered, unfiltered, unpasteurized, and naturally carbonated. If you haven't had a cask-conditioned ale, you've got to try it. It has a soft, creamy mouth feel and provides a pleasant contrast to beers that are served from artificially carbonated kegs. It's like drinking homebrew.

Chris says, "We take the time and effort to make sure it's done the way it's traditionally done in England. It must be carbonated in the same cask it's served from—it cannot be served under CO₂ pressure. It must be pulled on hand pumps or served through gravity taps. To be authentic it must be served between 50° and 55° F."

The biggest problem in marketing cask-conditioned ales, he says, has been public awareness. In particular some other breweries call their kegged beers "cask conditioned" even though they are being served under CO₂ pressure or a combination of CO₂ and nitrogen pressure.

Of Atlantic Coast's 70 accounts, only four are currently serving the Best Bitter. They are Doyle's in Jamaica Plain, Cornwall's in Cornwall Square, Hill's Tavern in Beacon Hill, and Redbone's in Somerville.

Serving cask-conditioned ale involves a commitment of both money and training. Chris says the investment in equipment and installation costs for a bar is

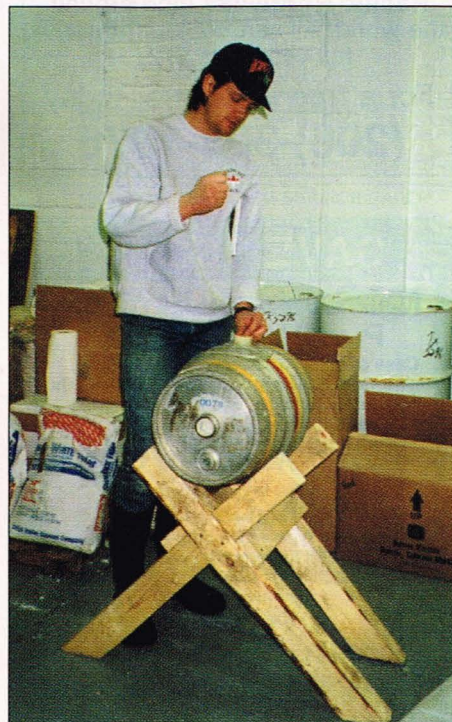
about \$1,000. This includes plastic taps, a cask breather, either a refrigeration unit or a stillage cooler (a refrigerated blanket that is wrapped around the cask), hoses, a hand pump, and labor costs. A cask breather allows unpresurized CO₂ into the cask as the ale is evacuated.

The brewery works closely with the bar to ensure the beer is properly handled. This includes ordering the equipment, making sure that it is correctly installed, and training the staff in tapping, cellaring, and proper serving of the beer.

On your next trip to Boston, be sure to visit one of the bars that serves the Tremont cask-conditioned ales.

If you would like to visit the brewery, tours are offered at 4 p.m. on Friday and noon on Saturday. The brewery is located not far from Bunker Hill in Charlestown at 50 Terminal Street. Give them a call at (617) 242-6464 for more specific directions. ■

Steve Johnson lives in Clemson, South Carolina, and is author of three brewery guidebooks: On Tap: a Field Guide to North American Brewpubs and Craft Breweries, On Tap New England, and On Tap Northern California (due out in March 1996).



Chris Lohring plugs a firkin, the cask used for cask conditioning.

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A Relaxed View of Homebrew

by Alex Chase

Although I like to know what I'm doing, my beer is usually the result of a spontaneous urge to brew carried out under the influence of several bottles of a previous batch. This occasionally results in a mishap or two, but that's part of the fun.

One reason for this on-the-fly approach is the difficulty I have coordinating a brewing time with my brewing partner, Ryan. If we're really on top of the situation, we decide to brew a day or two in advance, and then go to the brew shop on "B-Day." Half of the time we don't even know what kind of beer we're going to make until the friendly salesperson asks us. At that point one of us says, "What kind of beer do you want to make?"

"I don't know. What do you want to make?"

"How about a...Let's see...How about a pale stout?"

"Again? Let's try a dark wheat."

Once we have completed the rigorous selection process for our upcoming masterpiece, we put our well-honed brewing minds to work and quickly determine which ingredients we'll need and calculate the correct quantities for a six-gallon batch.

And if that doesn't work, we ask for professional advice.

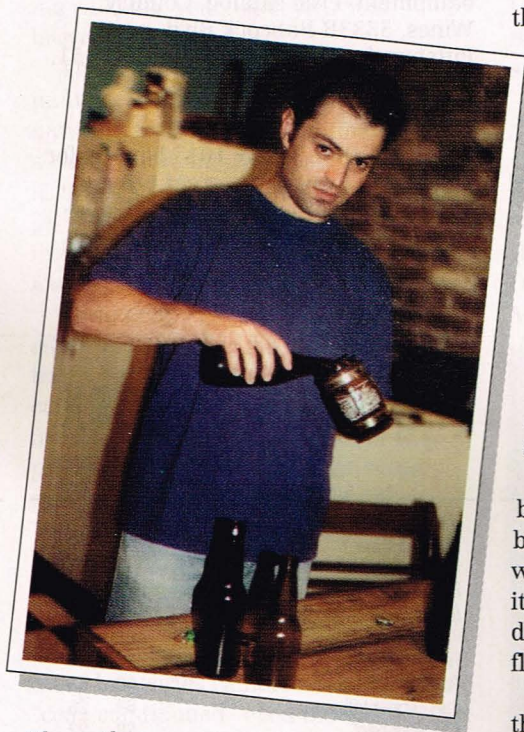
In the case of the dark wheat, we figured it out ourselves: nine pounds of liquid wheat malt extract (we like strong beer), a half pound of 80° Lovibond crystal malt, a half pound of chocolate malt, three ounces of Northern Brewer hop pellets, Windsor ale yeast.

Once home, we started boiling some water and opened a couple of bottles of our previous batch called "I Can't Believe It's Not Porter." When the cold beer mixed with our warm blood, it produced a positive energy that we channeled into the creation of the new brew. There is no substitute for good brewing karma.

Once we achieved a rolling boil and added the malts to the bubbling cauldron, we celebrated the important milestone with two more beers.

After this step we usually leave the burner on high until the foam begins to rise. Then we turn the flame off, let the foam settle, and fire it up again. The foam won't rise again.

Unfortunately, we were distracted by a compelling television documentary on of the feeding and breeding behavior of African lions when the foam rose. We heard it boiling over, but it had already erupted by the time we got it off the fire. What a mess!



The author swears boilovers are good luck!

We finished up without any more severe problems that day. It wasn't until later in the week that we discovered that we had not sufficiently appeased the volcano god. We had added a little too much water to the wort in the fermentation bucket, and the pressure built until it started spewing out of the airlock and onto the kitchen floor.

Brewing can be a messy activity,

and sometimes I think that the messier the process is, the better the beer will turn out. Really! Spilling is a sign of good luck. This comforts me after I've made a big mess.

Bottling, for us, is an especially messy stage of the process. We always expect a few bottles to overflow onto the floor, but our floor was already moist and sticky because of yet another oversight: We had left the spigot open in the priming bucket. As soon as we siphoned the aromatic liquid from the fermentation bucket, it flowed straight through the nozzle, onto my foot, and all over the floor. Talk about good luck! This beer was destined to be a masterpiece.

We lined up the bottles and began to fill them, but we soon realized that our last shopping trip to the brew store had been incomplete. Dumbfounded, we looked at our supplies and saw that we only had about a dozen bottle caps for 60 beers. I may have majored in English, but even I knew this wasn't going to work out. So off we went on a bottle cap run.

When we got back, we bottled the beer and began the long wait. No, the bottles did not explode. After a few weeks I impatiently opened one, poured it into my favorite stein, admired the deep dark color, and savored the rich flavor of the fermented wheat malt.

Ryan and I were very pleased with the results of our meticulously prepared recipe. We were proud of our beer, but we didn't enter it into a competition. We don't need our efforts to be validated by others. The beer we brew is for us and our friends to enjoy. If it fulfills these two criteria (especially the first), we were successful.

Homebrewing is always an adventure for us. That's the way it should be. ■

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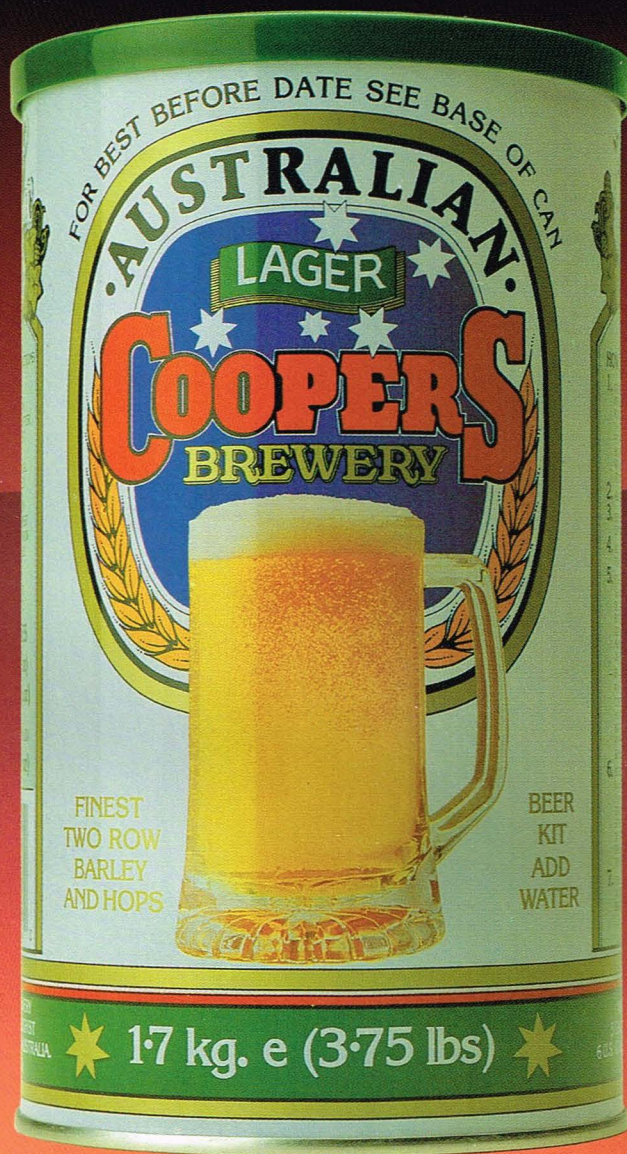
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