SPECIAL 5TH ANNIVERSARY ISSUE

Brew Your Own®

SEPTEMBER 2000, VOL.6, NO.7

THE HOW-TO HOMEBREW BEER MAGAZINE

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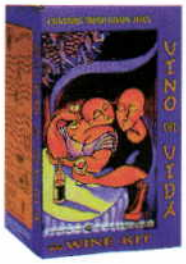

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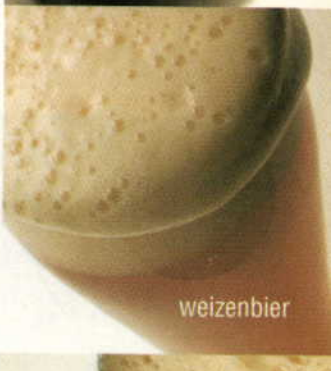

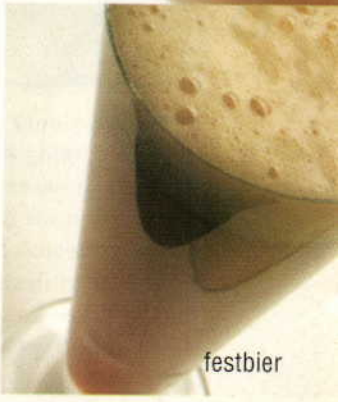

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Editor's Note

Five Years of Great Beer

Lots of great things start in fall. School starts, which might not be great news for kids but gives parents a daily dose of peace and quiet. The football season starts, the Major League baseball playoffs start, the new TV season starts. Most important, the homebrewing year kicks into high gear. With all that in mind, the September issue seemed like a great time to debut two new columns: "Tips from the Pros" and "The Replicator."

Every issue, contributing writer Tom Miller will interview three commercial brewers in "Tips from the Pros." He'll get their advice on a wide range of brewing techniques; this month's inaugural topic is how to harvest and re-use yeast. (Regular readers will recognize this column. It used to appear in every issue of BYO.) Tom is ideal for this task. He's an expert homebrewer and has worked at commercial breweries in Munich, Germany and Jackson Hole, Wyoming.

Each issue in "The Replicator," longtime columnist Scott Russell will serve up a recipe to recreate a popular commercial beer. Our first featured ale is Alaskan Amber. Made by the Alaskan Brewing Company in Juneau, this excellent beer has generated more recipe requests than any other. (If you'd like the Replicator to research your favorite brew, send your request to edit@byo.com.) The Replicator will appear in "Recipe Exchange" and replace Scott's own eclectic recipes, which he's been concocting for BYO since it was launched in 1995.

Speaking of 1995, this is our fifth anniversary issue. We've devoted the feature well to this numeric theme, with five tips from John Maier of Rogue Ales, recipes for five popular beer styles and five easy homebrew projects. We also asked Mr. Wizard to expound on five common homebrewing questions.

High fives all around!

KATHLEEN

Contributors

Professional brewer John Oliver is nothing if not enthusiastic. So we weren't surprised when he accepted his most recent BYO assignment with exuberance. "I had a blast interviewing John Maier," he says of this month's cover story *("Five Tips from the Rogue," page 26)*. "This guy is on the cutting edge of the commercial brewing world, but he's also a regular dude who definitely remembers his homebrewing roots." Maier, whose excellent ales have won a number of GABF and World Beer Cup awards, is head brewer at Rogue Brewery in Oregon and a member of the BYO editorial review board.

Oliver started homebrewing in 1986 and soon landed a job as general manager at The Home Brewery, a former supply-shop chain that was headquartered in Missouri. He also worked as an assistant brewer at the Ebbetts Field Brewing Company in Springfield. Since 1997, he's been part of the brewing team at BJ's Brewery in Brea, California.

Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

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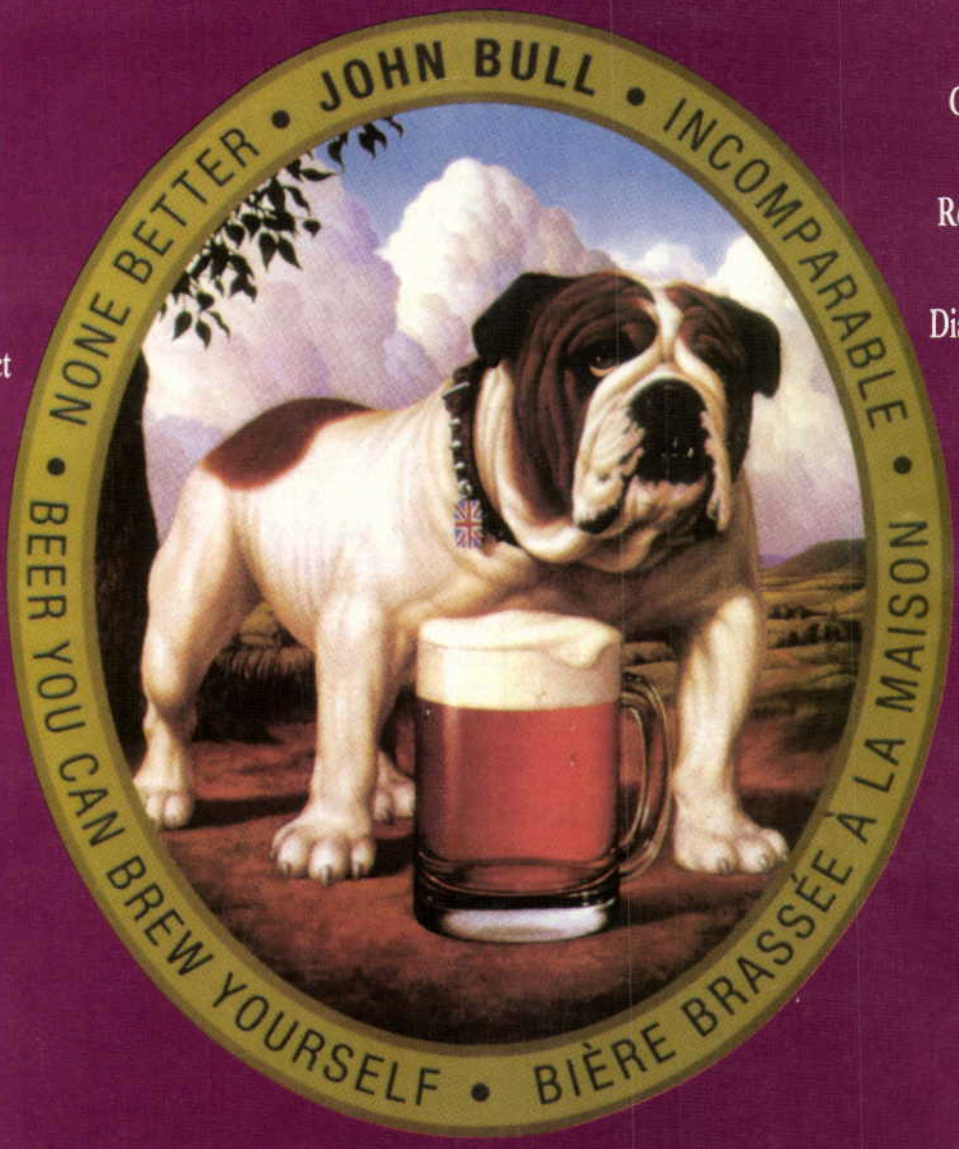

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Sir Sleuth and Sirseth

In the May 2000 issue of BYO, under the "Reader Recipes" column, you were wondering who had submitted the recipe for Haystack Wheat. You need look no further than your October 1998 issue and your very own "Recipe Exchange" columnist, Scott Russell. I've no idea who sent the recipe to you under the name "Sirseth," but I doubt it was Scott. The recipe matches Scott's nearly word for word. I hope this clears up any confusion and I hope no one out there is taking credit for Scott's excellent (and eclectic) recipes.

"Sir Sleuth"
a.k.a Thom Tash
via e-mail

To be perfectly honest, my best guess is that the "Recipe Exchange" files got mixed up during the magazine's winter move from California to Vermont. Sort of like how, months after you return the U-Haul, you finally unpack that last miscellaneous moving box and find your toaster oven. Oh, well. At least it's a good recipe, one worth printing twice. Thanks, Sir Sleuth!

Will Boiling Help?

In your article titled "Hard Facts About Water" (May 2000), you briefly mentioned chloramines, but didn't say whether or not a boil will get rid of this chemical compound, the way it does with chlorine. My city announced that it will be switching to chloramines soon and I would like to know what, if anything, I can do about it.

Mike Runkle
via e-mail

As anyone who's had a swimming pool knows, factors such as sunlight, heat and exposure to air all quickly render chlorine ineffective. Chloramines are much more difficult to break down, so they retain their disinfecting power for a longer time under a wider variety of conditions. That's why some towns are choosing to use them in their water supply. Similarly, the "staying power" of chloramines makes it extremely difficult to remove them from your brewing water.

Boiling will not effectively remove chloramines and can even produce unwanted byproducts, like ammonium or ammonia, which are undesirable in finished beer. With that in mind, I would recommend the old homebrewer's standard: If your water smells and tastes fine, it will probably make good beer. But if your water doesn't taste good once the switch to chloramines is made, the easiest alternative would be to brew with bottled water.

Malt Matter

I want to brew the India Pale Ale you presented in the May 2000 issue ("Style of the Month"). The all-grain recipe calls for Belgian malt and the text mentions "aromatic" malt. DeWolf-Cosyns offers both a pale malt "pilsner" and a specialty "aromatic" malt. Which malt should I use in this brew?

Patrick Galvin
Sacramento, California

Style man Mikoli Weaver says: "A good Belgian aromatic to use is the 'special aromatic' by a Belgian malthouse called Malteries Franco-Belge. This is a two-row malt that measures about 4 degrees Lovibond. It's carried in the United States by Grain Millers Inc. If you can't find it at your homebrew shop or on the Web, the DeWolf-Cosyns aromatic would work, too. It's from the same family of malts; both are very lightly toasted. Have fun brewing your India Pale Ale!" ■

How To Reach

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Spider Beer

A hard-learned lesson on how not to impress your son

Tom Logan • Brick, New Jersey

PHOTO COURTESY OF TOM LOGAN

THE MAD SCIENTIST *at work: Logan had a hard time luring his wife (the photographer) down into the brew dungeon, where "the incident" occurred.*

IT'S BEEN YEARS SINCE IT happened. We don't talk about it much, but when we do, we just refer to it as "the incident."

One day, just a few years before the Gulf War and a few months before Super Bowl Sunday, I decided to brew a beer that was light in color, just in case guests dropped in. You know the story; company comes over and you bring out your prized homebrews — stouts, porters, all the weird Belgian stuff and a fine ESB — and they ask if you have any normal beers. So that day, I brewed a simple honey lager. It came out bitter, bitter, bitter.

I ferment my beers down in a tiny cellar where I also store my bottles, and that cellar is shared with spiders, earwigs and an occasional mouse. I use ale yeast in summer and lager yeast during the winter and sometimes I will use a combination of the two.

My oldest son was in the Marine Corps at the time, stationed at Camp Lejeune in North Carolina. When he and a buddy were up on a visit (they call it a "swoop"), they went looking for some of Dad's homebrew. They found the honey lager. At this point, it had been in the cellar a few months and had mellowed out a bit.

After a bottle or two they started to like it so I told them to take it back with them, which they did. They called up a week later and asked me to brew them some more.

He thought I was the world's greatest brewer. I really let him down.

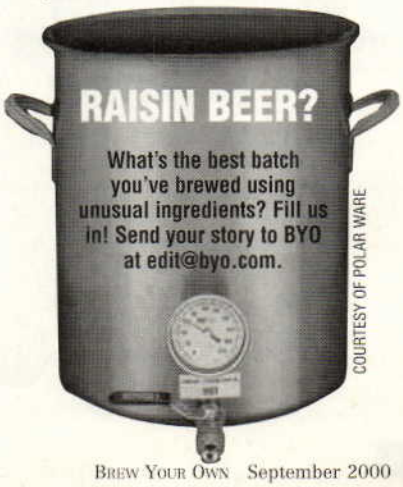
I kept brewing new batches and sending them south and they kept drinking it. They named it "Jar Head Ale" and they thought I was the greatest brewer in the world. I really let them down (sob).

Like I said, I store my bottles in the cellar. When I obtain bottles, I always clean them, rinse them and put aluminum foil over the tops to keep them clean and keep the wee beasties out. On the day I'm going to bottle, I remove the foil, rinse the bottles and run them through the hot cycle of the dishwasher; then I put the bottles back down in the cellar. I always know which bottles to use: They're the ones without the aluminum foil on top.

With so many bottles going south I was starting to run low on my stash. I was getting back into the stuff that hadn't seen the light of day in years. Well, I guess one of the cases had slipped my attention and didn't get the foil treatment. The bottles had been acting as a home for wayward spiders and, you guessed it — bodda bing, bodda boom — Spider Ale was born.

Fortunately, disaster was narrowly averted by an alert, young Marine. She was moving some stuff in the fridge when she noticed the spiders. They had to buy store-bought beer that day. My poor son was so ashamed of me.

My son kept one bottle on a shelf, with the cap bulging and a light behind it to show the world what a horrible father I really am. The rest were disposed of secretly. I'm not really sure how they got rid of the stuff, but we did win the Gulf War awfully quickly. Could Spider Ale have been the real secret weapon of the war? →



COURTESY OF POLAR WARE

Bottle Fed

A particularly bad batch and a beer-swilling pig

Bill Neilson • Sonora, California

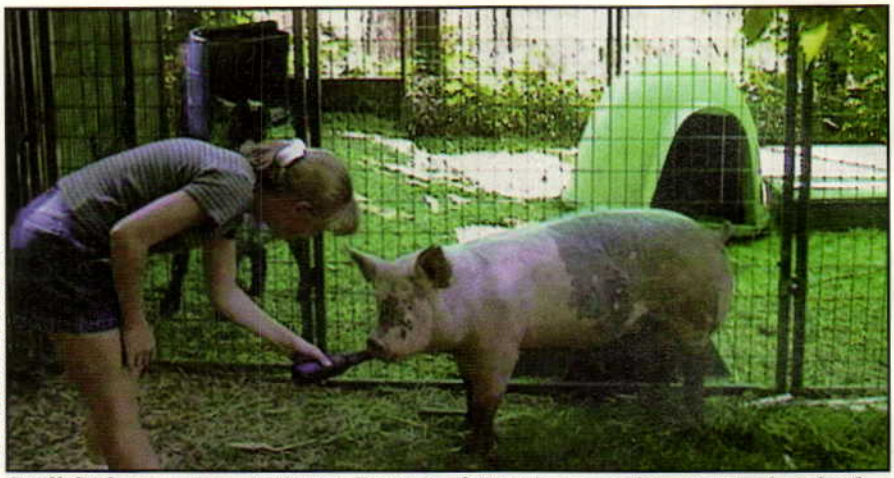


PHOTO COURTESY OF BILL NEILSON

Swill fit for a swine: A Future Farmer of America recycles a nasty batch of homebrew. The weight-gain tonic turned a puny piglet into a prize porker.

I BREWED A BATCH OF BEER last year that tasted so bad, my wife wouldn't even use it for cooking. It not only had the "Band-Aid" taste, but it tasted as if the antiseptic used on the Band-Aid was thrown in as well. I took the batch to our brew club meeting to get an opinion on what, other than airborne yeast, could have caused this. One gentleman took a sip and proceeded to throw it, cup and all, into the trash. Later on, I offered a sample of my good stuff to a fellow member who commented on how good it was, though not quite good enough to wash the taste of the bad stuff out of his mouth. As fate would have it, I had brewed a double batch of this "wonder brew."

There is an upside to this sad tale. The double batch was put to very good use. Our home is a beautifully landscaped oasis where we grow vegetables, flowers and hops. We have a few animal pens on our property to house our pet goats and a few chickens. I allowed a young lady from the Future Farmers of America to use our old pen to raise a pig for the county fair. The kid's imagination really ran wild when she named it: The pig's name was "Pig." Anyway, this young lady's advisor — she refers to him as the "Ag Dude" — told her that the pig was way behind schedule as far as his weight was concerned. He suggested that she feed him some outdated yogurt and some beer to fatten him up.

Guess what? She fed the pig four bottles of my bad beer every single day and he didn't seem to mind a bit. By the time Pig got to the judging arena, he weighed in at a respectable 198 pounds. He not only came up to weight, but also brought in $3.75 per pound on the hoof at the Mother Lode Fair livestock auction.

We also used this picture *(above)* as part of our Parrott's Ferry Homebrew Club exhibit. We offered prizes for the best caption for the photo of the young lady serving beer to the pig. We don't know for sure, but this might have contributed to our winning first prize and $200 for the exhibit. →

Reader Tip

Roberta Powers
Wallingford, CT

I had a problem: My glass carboys wouldn't fit under my faucets, either in the tub or the sink. This made it hard to clean and sanitize them. Then I came up with a handy solution. I simply attach my jet-spray bottle washer to the sink faucet. Then I attach vinyl tubing to the washer. When I push the tubing onto the bottle washer, it keeps it in the open position so the water continues to flow. I put the other end of the tube into the carboy. This eliminates the tedious task of pouring water into the carboy through a funnel. I can fill my carboy in five minutes or less.

I also use this method to avoid lifting the huge bucket I sanitize bottles in. The device also works well when you're cleaning out tubing, if you use the "blow off" system and the tube gets clogged.

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Cut Grass, Burnt Mash

A homebrewing husband proves he's not a multi-tasker

Gregg Ferlin • New Lenox, Illinois

Gregg and Colleen Ferlin enjoy a homebrew between domestic chores.

I ONCE BREWED A WEIZEN that tasted like an ashtray. My wife had just pointed out that men can't handle more than one domestic task at a time, the way a mom with kids always does. So Mr. Hotshot thought he would boil a decoction while cutting the grass.

Once the front lawn was done, I came in to transfer the decoction to the main mash. As soon as I walked in the door, I noticed an acrid smell. My worst fears were confirmed — burnt wheat mash. In a panic, I dumped the decoction into the main mash and continued with the brew.

The rest of the brew session went okay. It didn't taste or smell too bad and I thought I might have a contender for "smoked Bavarian wheat." No such luck. The finished product was awful. I told a friend of mine that I was going to dump it.

He said throwing it out would be sacrilege and offered to take it. I filled a two-liter jug for him, which he drank, but he never asked for the rest. He had to brush his teeth several times a day for a few days to get the taste out of his mouth.

When all was said and done, I had my wife convinced — men actually can't do more than one thing at a time. And I just proved it! ■

Harvesting Yeast

Scoop it out, toss it in, make better beer

by Thomas J. Miller

THE PROS DO IT all the time. But most homebrewers don't realize that harvesting and repitching yeast is an easy and cost-effective way to brew beer.

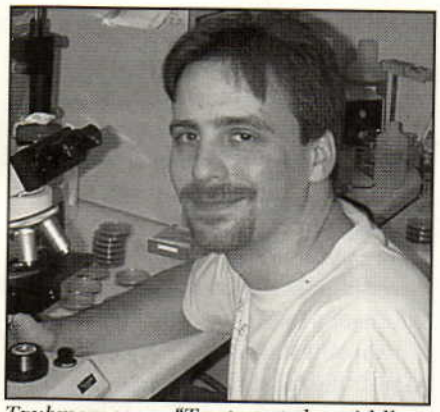
If you've ever had trouble with low pitch rates or "lag times" between pitching and the start of fermentation, your beer definitely will benefit from repitching. With a hearty batch of harvested yeast, you can get a vigorous fermentation started within a few hours. This minimizes the risk of contamination. And, in many cases, beer made with harvested yeast is better than beer made with first-generation yeast.

So, how do you do it? To answer that question, we called three commercial brewers from around the country and asked them to divulge their foolproof methods.

Here are a few general guidelines. For a five-gallon batch of brew, one cup of harvested yeast is plenty. Ideally, you should try to get the middle layer, because that's the best stuff. For the average homebrewer, re-pitched yeast can safely be used for four or five successive batches.

Refrigerated yeast can last about a week or two, but for sanitation reasons, it's better to pitch it within the first few days of harvesting. As always, good sanitation is key. The yeast should feel smooth — like putty in your hands — but never gritty or chunky.

The technique is easy: You can pitch your harvested yeast directly into the fermenter or use it to make a starter. As long as the yeast strain is appropriate to the beer style, repitching can help you become a better brewer. Now a few words from the pros.



Taubman says: "Try to get the middle yeast, since this is the healthiest stuff."

Brewer: Aaron Taubman is a brewer at the Millstream Brewing Company in Amana, Iowa. He earned a biochemistry degree from the University of Iowa and took the seven-week microbrewers' prep course at the Siebel Institute. Taubman worked for Isadore Street Brewing in Wisconsin before joining Millstream.

Repitching is the best way to ensure that you get a nice, aggressive fermentation. The quantity of yeast is essential, as is the quality of that yeast.

As a homebrewer, I always thought it would be neat to get an inverted carboy so I could harvest by drawing off the yeast. Here at Millstream, we have flat-bottom fermenters so we can't draw out the yeast. We put on clean suits, a mask and a hair net, then we reach into the vessel with utensils and scoop the yeast out.We use plastic utensils that have been acid-washed and are used exclusively for collecting yeast.

Plastic bucket fermenters are the easiest way for the homebrewer to collect yeast. All you have to do is reach in, scoop out and store the yeast in a sanitized container. Try to get the middle yeast, since this is the healthiest stuff. The very bottom is just dead yeast and trub. In the middle, you'll find yeast with a yellow, putty-like consistency. This is what you want. If it's too dark, you should dump it, since the yeast has probably gone bad.

Another key is never to harvest from a high-gravity beer and repitch it in a light beer. For example, don't use yeast from a stout to pitch a German lager. This will almost certainly change the color of the beer and probably the flavor. The best thing is to consider high-gravity brews (like stouts or barleywine) as dead-ends for your yeast. The same is true for bitter beers. Don't pitch yeast from an IPA into a lager. Yeast tends to hold the bitter characteristics of a bitter brew. If you reuse it, the bitterness will carry over.

Hartmann says: "Always be on the lookout for contamination."

Brewer: Dave "Buzz" Hartmann has been a brewer at the Empire Brewing Company in Buffalo, New York since 1994. He's a graduate of the U.C. Davis Master Brewer's Program. He has also worked at Long Trail Brewing (Bridgewater, Vermont) and Sudwerk Privatbrauerei Hübsch (Davis, California).

We keep the yeast in the fermenter until we're ready to use it, and this works fine because we have a cooling system around the fermenter cones. When we harvest the yeast, we go by the weight of the yeast rather than volume in determining how much we draw off. In the past we have done cell counts, but for consistency and ease, weighing it works fine.

All we do is draw off the middle yeast into stainless steel buckets and weigh it. Generally, we do this one hour before repitching the yeast to the next batch. We keep a very close eye on the quality of our yeast and re-culture fresh yeast every 10 to 15 batches.

It's important to collect the middle yeast. We blow off the first 10 to 15 pounds of yeast before harvesting anything for repitching. Of course, there's no way to really know the quality of the yeast that you are getting. Unless you are a major brewery like Anheuser Busch or Sierra Nevada, you just have to eyeball it.

If yeast ferments in a previous batch, it should be okay in the next batch of beer. Healthy yeast is pretty resilient; it does a good job of putting bacteria into submission. But still, you should always be on the lookout for contamination.

Homebrewers should do some planning if they're going to harvest yeast. They should pick a good strain and then brew successive batches that will work well with it. For example, you could brew an IPA, a bitter, an ESB and a stout. Make a starter batch by pitching it into a quart jar filled with two cups of wort; make the wort from dried malt extract. When the first batch is done, harvest a quart jar of yeast for batch two, and so on!

Licht says: "First, rack the beer off the settled yeast and trub."

Brewer: Peter Licht is the owner and head brewer at the Coast Range Brewing Company in Gilroy, California. He is also a graduate of the Master Brewer's Program at the University of California at Davis.

We harvest our yeast five days or more after pitching it, when fermentation is complete. We're always careful to draw off the trub and spent yeast that has already settled in the cone of our fermenters. We do this by opening the valve at the bottom of the tank and blowing off the first bunch of sediment.

Collecting the middle layer is easy for commercial breweries with cone-bottom fermenters. We're working with lots of yeast, so the middle layer is abundant. It's obviously more difficult for homebrewers, who usually are working with a flat-bottom fermenter. The yeast has settled at the bottom of the bucket or carboy, and the yeast pile is only a quart or two.

My suggestion is to first rack the beer off the settled yeast and trub. Do this at the end of fermentation. Have a small vessel ready for the yeast, like a pitcher or a small glass jug. Make sure this container is sanitized and that you have something to cover it with to keep bacteria from sneaking in.

As you rack the beer over to another container, try to stop when there is about one inch or less of beer still above the yeast and trub. Now, swirl the container gently to loosen everything up and pour it into your smaller yeast container.

Let this sit for a day, until the layers settle. Again, make sure it is covered. It's a good idea to store it in a cool area or refrigerator.

Once it has settled, pour off the top of the yeast pile, collect the middle of the yeast and store it in a sealed jug. Do not use the bottom layer. Your goal is get as much of the middle layer as possible, since it is the healthiest. The bottom line is: Homebrewers should just do their best to harvest the healthiest yeast. It'll help them make better beer. ■

Tom Miller is an avid homebrewer who previously worked as a professional brewer in Jackson Hole, Wyoming. He now lives near Buffalo, New York.

"Help Me, Mr. Wizard"

Milling for High Yields

Overcarbonation, weak yields and the question of caramel malts

Mr. Wizard

I have a keg of wheat beer that I overcarbonated. When I decant a glass, I get 99 percent foam. I think I know what I did wrong to produce this, but is there anything I can do to salvage this batch?

David Wilhelms
Aberdeen, Washington

I prefer to package beer in kegs for several reasons. Besides being convenient, perhaps the best thing about a keg is that it's very easy to change the carbonation level in a beer. In your case, you either added too much priming sugar or went overboard with your carbon dioxide pressure during the carbonation step. Whatever the reason, the problem can be solved simply by releasing the top pressure on the keg. This method works to drop the carbonation level, but unfortunately, it's not a real sexy technique.

If you drop the head pressure in the keg, it will slowly return as the carbon dioxide in the beer re-equilibrates with the headspace in the keg. If you have a Cornelius keg, make sure the lid re-seals properly, or you could lose a lot more carbon dioxide than planned.

After a few hours, you can hook your gas supply back up to the keg at your normal dispense pressure and check the level of carbonation. You may need to repeat this method a time or two, depending on how badly you over-carbonated your wheat beer! Although this is a nuisance, it is definitely a solvable problem. That's the beauty of kegged beer. If the beer were bottled instead of kegged, then you would be out of luck.

Mr. Wizard

Help! My last two batches of all-grain beer turned out to be non-alcoholic ... obviously, by mistake! I used a step-infusion method as usual, boiled for an hour and had the prettiest colors, but my specific gravities are less than 1.020. Needless to say, there isn't any sugar for the yeast to feed on. I can't figure it out.

The only difference is that I am cracking the grains a little larger instead of grinding them into smaller pieces. Could this be the problem? Are the moons out of phase? Do I have to make a deal with the devil? Grains aren't that expensive, but it's frustrating enough that I'm considering a return to extract brewing.

Terry "Tidge" Stewart
Highlands Ranch, Colorado

Before you head to a psychic to have your charts done or make any deals you might later regret, here are a few things you should consider. Low yields can be tracked to three general areas: milling, mashing technique and wort separation method. Typically, decoction mashing gives the highest yield, followed by temperature profile and infusion mashing methods. The difference in yield among these mashing styles may be about five percent — really not a huge difference. Wort separation method is also an important consideration, but this is mainly a commercial brewery issue because homebrewers don't have too many options with respect to lauter tun design. This leaves milling.

There is no doubt in my mind that your problem is a direct result of coarse grist. In order for malt starch to be converted to sugar by amylase enzymes, it first needs to dissolve. Generally, most malts have a laboratory extract yield of about 80 percent. This means that, under laboratory conditions, 80 percent of the weight of the malt will end up in the wort as extract. Laboratory conditions are quite different from brewery conditions because wort clarity and ease of wort recovery are not important — the laboratory yield is simply the maximum yield possible. Most systems can easily yield about 90 percent of the laboratory number. This number is most

commonly referred to among brewers as the "brewhouse yield."

Using a more finely milled grist can increase brewhouse yield. I like to use the finest grist possible without creating cloudy wort or slowing wort collection. This is simply a matter of gradually reducing the gap on your mill until you get to the point where the grist is too fine and then backing up a step. This is where your problem could get a bit more complicated.

You may have found that the only way to produce clear, easy-flowing wort is by using a very coarse grist. If this is the case, your mill may be chewing up the malt husk or the design of your false bottom may be inadequate.

Experiment by milling samples while using different mill gaps and visually examining the grist. Ideally, you should see chunks of white endosperm (malt starch) and nice, big, fluffy pieces of husk. If you don't see nice pieces of husk you may have an inadequate mill. If that's the case, I suggest finding a homebrew supply store that has a good mill and buying milled malt or, if you like milling your own grain, then you should buy a different mill.

Your mill, however, may not be the problem. If you have a false bottom with large holes or slits, you will be forced to use a very coarse grist to produce a clear wort. Changing your false bottom will address this problem. I have always liked the copper manifold wort collection device that can be assembled in the bottom of a cooler. The width of a hacksaw blade produces a narrow gap that works well with relatively fine grist. This system produces very bright wort, gives a good flow rate and has an excellent brewhouse yield.

I don't think your problem has any supernatural cause and am confident that you will be able to get your yields back on track after making these adjustments.

Mr. Wizard

Could you please explain Carapils to me? What does this brand-name malt do in a mash, and how does it work? One of my homebrewing pals and I had a recent disagreement about this. He seems to believe Carapils works by leaving behind unconverted starches that the yeast cannot ferment, leading to greater body, mouthfeel and foam stability. I remember reading from various sources that starches are bad in beer, because yeast can't eat them but bacteria can, and so this leads to infections. I believe there should be no starches in finished beer and that starch is not what contributes to improved body, mouthfeel and foam.

Carapils is also called "dextrin malt." I know there are also other "cara" malts, such as cara-Munich, cara-Vienne and carastan. Can you

sort out this whole cara-issue? Thanks for your sagely advice, Sir Wizard. It is always much appreciated.

Bill Wible
Philadelphia, Pennsylvania

Caramel, cara or crystal malts are synonymous terms describing a large family of malts that are made by changing the kilning process. All malts are kiln-dried to arrest germination. To make caramel malts, the maltster adds a key step, known as "stewing" or saccharification, before drying. The "stewing" step heats moist, unkilned malt (or re-hydrated kilned malt) to about 158° F. The malt is held at this temperature for 1 to 2 hours with minimal ventilation to minimize drying.

Most caramel malts are made in roasting drums where ventilation and temperature are easily controlled. Stewing allows the starch inside of the malt kernel to convert to sugar, just like mashing. After the stewing step, the malt is then dried and roasted at various temperatures and times.

Caramel malts contain high concentrations of Maillard reaction products ("MRPs"). The Maillard reaction is a complex series of chemical reactions initiated when "reducing sugars" react with free amino nitrogen. This occurs in hot, moist environments. Reducing sugars include sugars like glucose and maltose that are formed when starch is broken down by amylase enzymes. The stewing step drastically increases the concentration of reducing sugars inside of the malt kernel. Free amino nitrogen refers to the nitrogen end of a protein or polypeptide not chemically tied up in a peptide bond (the bond between two amino acids in a protein or polypeptide chain).

The concentration of free amino nitrogen increases when barley is converted to malt. Well-modified malts have a higher concentration of free amino nitrogen (frequently called FAN) than poorly modified malts. When sugars participate in the Maillard reaction they become

unfermentable; that's why using a high proportion of crystal malt increases the final gravity of beer.

The Maillard reaction is responsible for the formation of a wide array of aromas including toffee, caramel, toasty, nutty, raisin-like and sherry. The reaction is also responsible for an increase in color.

Toasted bread is a classic example of the Maillard reaction and can be used to illustrate how the reaction can progress from subtle to very pronounced colors and flavors. Some crystal malts are very light in color and flavor and are made using kilning regimens (after stewing) similar to pale malts. Darker crystal malts are kilned at higher temperatures for longer periods of time after stewing. Maillard reaction products are also widely believed to improve mouthfeel as well as beer foam stability.

All the malts you name in your questions are different types of crystal malt. Carapils is produced by Briess in Chilton, Wisconsin and is a very pale crystal malt. Other maltsters make similar products and sometimes use names like dextrin, dextrin or cara-pils to describe their products.

A dextrin is an unfermentable carbohydrate chain that is not large enough to be considered starch because it does not turn iodine black in the iodine reaction. This can be confusing because dextrins don't have much to do with why these malts react the way they do! Cara-Vienne and Cara-Munich are darker in color than these lightly colored caramel malts.

As far as your friendly debate is concerned, you and your pal are both correct! You are correct in saying that starch is unwanted in beer and that caramel malts do not leave starch in the finished beer. And your friend is correct when he says that caramel malts do improve mouthfeel, body and foam stability! I hope this settles your homebrewing disagreement. ■

Mr. Wizard is a leading authority in homebrewing whose identity, like the identity of all superheroes, must be kept confidential.

DO YOU HAVE A QUESTION FOR

Mr. Wizard?

Write to him at Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255. Or send your question via e-mail to wiz@byo.com.

The Replicator

Alaskan Amber from the Alaskan Brewing Company

by Scott R. Russell

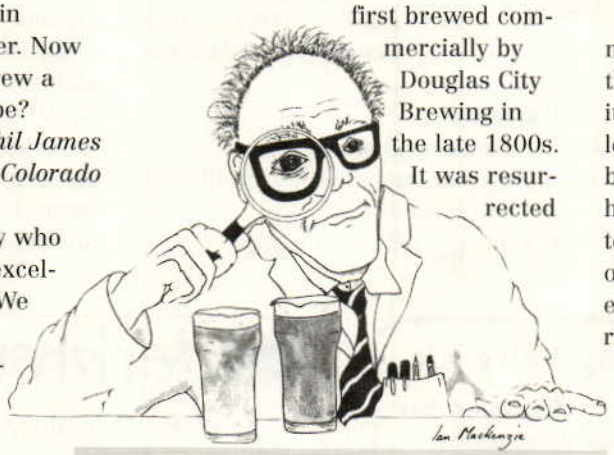
Dear Replicator:

I recently returned from a ten-day fishing trip to the Kenai Peninsula of Alaska. We caught a lot of king salmon and halibut and toasted our success with cold bottles of Alaskan Amber, brewed by the Alaskan Brewing Company in Juneau. That is one fine beer. Now that I'm home, I'd like to brew a batch. Can you get the recipe?

Phil James
Fort Collins, Colorado

You're not the only guy who loves Geoff Larson's excellent Alaskan Amber. We receive lots of requests for commercial clone recipes — that's why we launched the column, in fact — and the great amber from Alaska always tops the wish list.

Alaskan Amber is the brewery's flagship beer. It's based on an historic recipe; the original version dates to the Gold Rush days of the 1880s, when a thirsty immigrant supposedly fermented his beer in the mine tunnels. The beer was first brewed commercially by Douglas City Brewing in the late 1800s. It was resurrected almost a century later by Geoff Larson, who in 1986 founded his Alaskan Brewing Company in the coastal town of Juneau. His amber has won a slew of awards since then, including several Great American Beer Festival medals and a first-place finish at the 1996 World Beer Championships.



Alaskan Amber is an altbier, more in the Münster tradition than the Düsseldorfer (in other words, it's sweeter, richer, less bitter and less dry). An easy-drinking "session" beer with lots of malt character, it has just enough German hop profile to keep the maltiness from getting out of hand. It's a nice beer and easy to approximate, if you use the right ingredients and yeast.

Need the Replicator's help? Then e-mail your recipe request to edit@byo.com.

Alaskan Amber
(5 gallons, extract with grains)

OG = 1.054 FG = 1.015 Bitterness = 20 IBUs

Ingredients

1 lb. two-row pale malt
1/2 lb. medium crystal malt
1/2 lb. light crystal malt
5 lbs. Munton's unhopped light dried malt extract (DME)
4 AAU Cascade hops (1 oz. of 4% alpha acid)
4 AAU Saaz hops (1 oz. of 4% alpha acid)
1 tsp. Irish moss (last 15 minutes of the boil)
German ale yeast slurry (Wyeast 1007, White Labs WLP-029 or equivalent)
7/8 cups light DME for priming

Step by Step

Crush pale and crystal malts. Steep in 2.5 gallons water at 150° F for 45 minutes. Remove grains, add DME and stir well. Bring to a boil, add Cascade hops. Boil 45 minutes, add Saaz hops, boil additional 15 minutes.

Remove from heat, cool. Add to fermenter along with enough chilled, pre-boiled water to make up 5.25 gallons.

When cooled to 68° F or so, aerate well and pitch yeast. Ferment at 68° F for ten days. Rack to secondary, condition cold (40° F) for fifteen days. Prime with DME. Bottle and condition at a cool cellar temperature (50° F) for two weeks. Serve at 50° F in a straight-sided altbier glass.

All-grain option: Omit the dried malt extract and mash 8 lbs. pale malt plus the crystals (as above) in 12 quarts water at 152° F. Sparge with 15 quarts at 168° F. Proceed as above from boiling and reduce wort volume to 5.25 gallons.

Smoked Harvest Apple Ale

(5 gallons, extract with grains)
OG = 1.070 FG = 1.016 IBU = 30

I live on the Upper Peninsula of Michigan. Winters can get long and bitter up here. A strong ale on a cold day is a lovely thing.

Michael Healey
Chassell, Michigan

Ingredients

8 lbs. Alexander's pale malt extract
0.5 lb. Gambrinus Honey malt
0.5 lb. German rauchmalt
8 AAU Magnum hops
(1 oz. at 8% alpha acid)
4 AAU Saaz hops
(1 oz at 4% alpha acid)
Two 12-oz. cans frozen apple juice concentrate (all natural)
1 pt. starter of American Ale yeast
1.25 cups unhopped light DME

Step by Step

Steep honey malt and rauchmalt in 3 gallons water at 150° F for 45 minutes. Add malt extract and bring to a boil. Add Magnum hops and boil 55 minutes. Add Saaz hops and apple juice, boil 5 minutes. Remove from heat, top up to 5.25 gallons in fermenter, cool to 68° F and pitch yeast (Wyeast 1272). After 2 weeks at 65° F, rack to secondary and continue four more weeks. Prime with DME, add 0.5 pounds lactose and bottle. Condition several months at cool temperatures.

Pit Bull IPA

(5 gallons, all grain)
OG =1.085 FG = 1.023 IBU = 89

This wonderfully bitter IPA is every bit as tenacious as its name.

James Ingle and Don Jenkins
Lyman, South Carolina

Ingredients

13.5 lbs. Engish pale malt
0.5 lbs. caramel malt (20° Lovibond)
0.5 lbs. carapils malt
0.5 lbs. toasted pale malt
(10 minutes at 350° F)
20 AAU Northern Brewer hops
(2.5 oz. at 8% alpha acid)
1.9 AAU Fuggles hops
(0.5 oz. at 3.8% alpha acid)
1.95 AAU East Kent Goldings hops
(0.5 oz. at 3.9% alpha acid)
1/2 tsp. Irish moss
1 pt. starter of Wyeast 1318

Step by Step

Mash grains at 153° F for 65 minutes in 5 gallons of water. Sparge with 4 gallons water (treated with 1 tsp. gypsum) at 175° F.

Bring to a boil, add Northern Brewer for 60 minutes, Fuggles for last 15 minutes, Goldings for last 3 minutes. Add Irish moss with Fuggles. Boil to 5.25 gallons, chill and pitch yeast. Ferment at 68° F for 10 days, rack to secondary for 5 days, add 1/2 tsp. Polyclar for last 2 days. Prime with 3/4 cup corn sugar, bottle and condition at 45° F for two weeks. ■

The Fall Classics

A refreshing Dort and an English oatmeal stout

by Mikoli Weaver

The air is cool, the leaves are changing and it's time to get ready for winter. For most people, this means stocking up on firewood and food. For us, it means laying in a solid supply of homebrew. This month, we'll brew a classic oatmeal stout and a refreshing Dortmunder, a light but strong German pale lager. And after a long summer of lagering, our Oktoberfest will be ready on the 16th.

Dort: The German Export

Dortmunder, sometimes called Dort but more often known as "export," is a golden German lager. Export originated in Dortmund, an industrial city in the north of Germany. In medieval times, this local style was exported widely throughout the Westphalia region and across the border in the Netherlands, which is how it got the "export" nickname. Despite the implication, this style is not widely known or promoted. Once considered to be a blue-collar beer, its image has suffered in recent years. These days, it simply fills a niche — like schwarzbier, rauchbier and dunkel, styles all overshadowed by the nation's popular pilsner, Oktoberfest and wheat beers.

Export is heavier-bodied than a pilsner, with less hops, more alcohol and higher original and final gravities. It has a rich malt aroma, a firm malty body with a bittersweet finish, and a late burst of hops. The guidelines for Dort are as follows: The original gravity ranges from 1.048 to 1.056; the alcohol by volume is between 5 and 6 percent; the bitterness is at 29 IBUs; and the color is 3 to 5 SRM.

The best-known examples come from Dortmunder Actien Brauerei (DAB) and Dortmunder Union, both in Dortmund. Each of these beers is clean and flavorful. The alcohol is evident, more so than in a pilsner, but they finish smooth and malty.

Several American breweries produce the style as well, but two great beers always come to mind: Great Lakes Dortmund Gold (made by Great Lakes Brewing Company in Cleveland, Ohio) and Stoudt's Gold (by Stoudt Brewing Company in Allentown, Pennsylvania). The Great Lakes Gold has won multiple medals, including a gold from the GABF and four "world champion" titles from the World Beer Championships. It's grainy and dry with an aroma of newly mown hay. The alcohol by volume is 5.8 percent and the bitterness is 30 IBUs.

If you're brewing your Dort with extract, try to find a pilsner malt extract or something with a pilsner and light Munich combination, like Bierkeller Light. Why? Because we are essentially brewing a strong pilsner. We'll add some light caramel malt in a grain bag for more color and flavor, but the base needs to remain fairly light; remember, the color is only 3 to 5 SRM. Aside from that, you want the distinctive malt

THE YEAR IN BEER

JANUARY:
Barleywine & Roggenbier

FEBRUARY:
Cream Ale & Dublin Stout

MARCH:
Belgian Dubbel & Pilsner

APRIL:
Maibock & Scotch Ale

MAY:
IPA & Mild Ale

JUNE:
Golden Ale & Oktoberfest

SEPTEMBER:
Dort & Oatmeal Stout

OCTOBER:
ESB & Weizenbock

NOVEMBER:
Dunkel & Belgian Tripel

DECEMBER:
Christmas Ale & Spiced Ale

flavor that comes from good German extracts.

For mashing, we'll stick with our standard single-infusion technique, although decoction mashing may appeal to purists. Remember: Decoction mashing will yield more color and make your beer darker.

Typical hops for the Dortmund export style are Hallertau, Saaz, Tettnang or various combinations of them. Great Lakes Brewing uses a rather unique combination of Cascade and Hallertau. Other German hops like Spalt, Brewer's Gold or Hallertau Hersbruck will probably work, as well.

Since this is a lager, normal procedure should be followed. Use either the simplified lager schedule listed in this recipe (and often employed in this column) or the longer lagering schedule from the Oktoberfest we brewed in June *(see Brew Your Own, Summer 2000)*.

The yeast can vary a bit, but some of the best strains to use for this style are German and Munich lager yeast. Kolsch yeast can even be used to produce a good Dortmunder. I have used the Wyeast 2565 in my homebrew recipe with great results, although some people might find it a little dry for their taste. White Labs also sells a kolsch yeast (WLP-029), but I haven't had a chance to try it.

The grain bill is composed of American two-row, with carapils for body and Belgian cara-Vienne (40° Lovibond). The hops are Tettnang for bittering and Hallertau to finish.

One note of interest: If you'd like to see what Dort looks like under a microscope, go to http://micro.magnet.fsu.edu/beershots/beers/dortmunder.html. The "Beer Shots" site, sponsored by Florida State University, offers microscopic views of beers from around the world, from Budweiser to Tsing Tao.

Dortmunder (German Export)
(5 gallons, extract with grain)
OG = 1.052 FG = 1.012 IBU = 25

Ingredients
6 lb. Bierkeller pale malt extract syrup
1 lb. carapils or dextrin malt
0.5 lb. crystal malt (20° Lovibond)
5.6 AAU Tettnang hops (1.25 oz. at 4.5% alpha-acid)
1.75 AAU Hallertau hops (0.5 oz. at 3.5% alpha-acid)
2 pt. starter of Munich or German lager yeast (Wyeast 2308, White Labs WLP-830 or equivalent)
3/4 cup corn sugar for priming

Step by Step
Steep crushed grain in 5 gallons of 150° F water for 30 minutes. Sparge grains with enough 168° F water to make 5.5 gallons. Heat to

SeptEmbeR 2000

S	M	T	W	THURSDAY	F	SATURDAY
					1	2
3	4	5	6	**PREP DAY** • Assemble all ingredients for Dort • Soak equipment in sanitizer • Start yeast culture for brewing on Saturday 7	8	**BREW DAY** • Brew Dort • Primary fermentation starts at 50° F • Record original gravity • Rack and bottle Oktoberfest 9
10	11	12	13	**PREP DAY** • Assemble all ingredients for stout • Sanitize equipment • Start yeast culture for brewing on Saturday 14	15	**BREW AND TRANSFER DAY** • Brew oatmeal stout • Record original gravity, begin primary • Rack Dort to secondary • Continue fermenting 7 more days at 45° F • Oktoberfest is ready today! 16
17	18	19	20	21	22	**TRANSFER AND CRASH DAY** • Rack stout to secondary, record gravity • Continue fermenting seven more days • Cool Dort to 40° until Tuesday the 26th then bottle and age for 7 days 23
24	25	26	27	28	29	**BOTTLE** • Sanitize bottles and bottling vessel • Record final gravity • Rack, prime and bottle stout • Age 7 more days 30

boiling and add extract syrup. Total boil will be 60 minutes. At beginning of boil, add Tettnang hops and continue for 45 minutes. Add Hallertau and boil remaining 15 minutes. Whirlpool and cool to 50° F to pitch starter. Oxygenate-aerate well. Ferment at 50° F for 7 days, transfer to secondary and cool to 45° F. Ferment for 7 more days or until gravity is about 1.012 and fermentation stops. Cool to 40° F for 3 more days. Rack, prime and bottle condition at 50° F for another week before drinking.

All- grain option:

Omit the extract syrup and reduce first hop addition to 5.06 AAU (1.125 oz. at 4.5% alpha acid). Mash 8.5 lbs. pale pilsner malt (Ireks or Weyermann) along with the other grains in 3 gallons of 150° F water for 30 minutes. Sparge with enough 168° F water to collect 5.75 gallons of wort. Total boil time is 90 minutes. Add Tettnang at start of boil. In 75 minutes add Hallertau and boil final 15 minutes. Proceed as above for fermentation.

Oatmeal Stout: To your health

So far in this column, we've covered several different stouts. For a new twist, we decided to try the classic oatmeal stout.

Oatmeal stout is an ancient English tradition that began as a variation of sweet stout. Since stout was often marketed as a health drink, British brewers added oatmeal to their stouts to promote the healthy image and add fullness of body and flavor. This practice died out in the 1960s and '70s but was revived in the 1980s by Samuel Smith Old Brewery in Tadcaster, for the purpose of export to the U.S.

Oatmeal stout has a firm, smooth and silky body. It's rich and malty, with chocolate and coffee in the nose and a hint of nuts and roasted grains dominant in the finish. It should be full bodied and have moderate bitterness, although IBUs and hop rates may be fairly high to balance the malt bill and specialty grain flavors.

Oatmeal stouts fall within the following numbers: The original gravity is between 1.038 to 1.056 (9.5-14° Plato); final gravity ranges from 1.008 to 1.020 (2.0-5.0° Plato); the alcohol by volume is between 3.8 and 6 percent; the bitterness falls between 20 to 40 IBUs; and the color is at least 20 SRM.

Before you brew, you might want to sample some commercial oatmeal stouts. I recommend Samuel Smith's. It's a benchmark oatmeal stout in flavor, body and craft. There's also Young's Oatmeal Stout (made by Young's and Company in London), a solid and very English stout. Maclay Oat Malt Stout, brewed in Scotland, is also very good. It's smooth and chocolately, with the typical yeast charac-

ter you expect from beers brewed in the United Kingdom.

Oatmeal stouts in our country are also good, but are often stronger than those across the pond. Adler Brau of Appleton, Wisconsin, makes a medium-sweet oatmeal stout with a rooty, gingery aroma. Oasis Brewpub in Boulder, Colorado, makes one as well. Their version, "Zoser Stout," has a bitter-chocolate aroma and palate, firm body and a Scotch malt whiskey finish. It won a silver medal at the World Beer Cup 2000. (The first-place finisher in the category was Oscar's Chocolate Oatmeal Stout, by Pioneer Brewing Company in Black River Falls, Wisconsin.)

For extract brewers, this is one of the best styles to brew. You'll find that several good kits are available. The alternative is to find a dark, unhopped malt extract from your local homebrew supply shop. Ask which brand they'd recommend, but an extract made from good British malts would be the best choice. The specialty grains listed in the recipe can then be steeped for more body and flavor to enhance your extract brew. The specialty grains consist of carapils, caramel (80° Lovibond), chocolate malt, roasted barley and, most important, flaked oats.

The oats are like any adjunct I mention here: a flaked, pre-gelatinized product. It will not gum the mash as much as simple rolled oats and it's cleaner, with less dust. This is important if you're an all-grain brewer and want to avoid the dreaded "stuck mash." Our all-grain recipe contains 10 percent flaked oats by total grist weight, which is typical for the style.

There is no better beer for the novice brewer. Dark beers, particularly ones that use a lot of dark grains, are hard to ruin. The flavor always seems to work out, the color is dark so clarity isn't an issue, and the big body and specialty grain bill always produce a tall, lasting head.

For most stouts, the hop selections are English varieties like Fuggle or Kent Goldings. You can

use higher alpha bittering hops, as in this recipe, which employs Bullion. If you're sick of Bullion, try some other UK bittering hops like Target, Admiral or Progress.

Yeast selection is wide-open on this style. Any British ale, London, ESB or English ale yeast will do. White Labs, Wyeast and others make a wide variety. Use what you like best. And if you're not sure, use the Wyeast 1318 or WLP-002 listed in the recipe.

Oatmeal stout

(5 gallons, all grain)
OG = 1.052 FG = 1.012 IBU = 32

Ingredients

5.5 lbs. English two-row malt (Beeston or Hugh Baird)
1 lb. flaked oats
0.75 lbs. crystal malt (80° Lovibond)
1 lb. carapils or dextrin-type malt
0.50 lbs. chocolate malt
0.25 lbs. roasted barley
6.4 AAU Bullion hops (0.75 oz. of 8.5% alpha-acid)
4.5 AAU Kent Goldings hops (1 oz. of 4.5% alpha-acid)
1 pt. starter of English ale yeast (Wyeast 1318 or White Labs WLP-002)
2/3 cup corn sugar for priming

Step by Step

Mash grain in 3.25 gallons of water for 60 minutes at 150° degrees. Sparge with 168° F water to yield 5.75 gallons of wort. Total boil time is 90 minutes. At beginning of boil add Bullion hops and continue for 75 more minutes. Add Kent Goldings and boil for remaining 15 minutes. Whirlpool and cool to 69° F to pitch starter. Then oxygenate-aerate well.

Ferment at 68° F for 7 days then transfer to secondary. Continue fermentation at 69° F until gravity is about 1.012 (3° Plato), about another week. Prime and bottle. Age one more week before drinking.

Extract with grain option:

Substitute the pale malt for 5 lbs. dark, unhopped malt extract syrup made with British malts. Increase Bullion to 1 oz. (8.5 AAU).

Start with 5 gallons of water in boil kettle. Steep crushed grains at 150° F for 30 minutes. Remove bag and rinse with enough 168° F water to make 5.5 gallons. Add extract. Total boil time is 60 minutes.

At beginning of boil add Bullion hops and continue for 45 minutes. Add Kent Goldings hops and boil for remaining 15 minutes. Whirlpool and cool to 69° F to pitch starter. Ferment and condition as above. (For another extract oatmeal stout recipe, see page 31). ■

Style columnist Mikoli Weaver is professionally trained chef and a former professional brewer. He lives in Portland, Oregon and is a contributing writer to BYO.

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FIVE YEARS OF GREAT BEER

Since 1995, **BREW YOUR OWN** has been helping its readers make fine homebrew

Homebrewing is supposed to be a hobby. Judging by our readers, it's more like an obsession. Or, at the very least, a significant diversion.

In honor of the magazine's fifth anniversary, we looked at our subscriber studies, put our right brains to work and calculated that BYO readers have generated 16,005,000 gallons of homebrew since 1995. If you had the heart — or the bad taste — to mix this beer together, you'd fill 166 Olympic-size swimming pools before the kegs and carboys were empty. If you bottled this batch and laid it end to end, the line would stretch from Milwaukee to Cleveland. Another factoid: In the past five years, BYO readers have spent more than $106 million on homebrew equipment and supplies ... and some $204 million on commercial microbrews and imports.

Over the next twenty pages, we've put together an anniversary package with a numeric theme. (Hint: It's the number five. We are very clever.) Before you go forward, take a minute to look back at five years of BYO covers. Don't get all jazzed up about the bathtub guy again; we did *not* put the bottle there on purpose.

Cheers! And thanks for reading the magazine. — *The Editors*

5th ANNIVERSARY

5 TIPS

JOHN MAIER, the award-winning brewer at Rogue in Oregon, is legendary for big beers in big bottles. And he's still a homebrewer at heart. Here are his top tips for excellent ales.

BY JOHN OLIVER

In the early 1980s, John Maier said something many longtime homebrewers can relate to: "I want to make beers with taste!" Like other craft-beer pioneers, Maier had a thirst for fine beer at a time when it was hard to find. This passion transformed him from an avid homebrewer (he won the "AHA Homebrewer of the Year" award in 1988) to a legendary pro (his beers have pulled down a slew of GABF and World Beer Cup medals).

Maier's first professional job was with the Alaskan Brewing Company; during his time in Juneau, he helped create Alaskan Smoked Porter, a beer now recognized as a microbrew classic. In 1989, he opened a brewpub in Ashland, Oregon and started making his now-legendary Rogue ales.

Today, Rogue is renowned for beers that are big in flavor and quality, made with generous amounts of the finest malts and hops. This philosophy even extends to the bottles. Maier likes huge 22-ounce "bombers" with brightly-colored labels silk-screened directly onto the glass. And on every bottle, you'll find the details that beer enthusiasts love: malts and hops, starting gravity, IBU and alcohol levels. Even the names — Mexicali Rogue, Dead Guy Ale, Old Crustacean — will grab your attention.

John is still an ardent supporter of the homebrewing hobby. So in honor of BYO's fifth anniversary, we asked him for five tips to help homebrewers recreate the big beers that made Rogue famous.

THE ROGUE SAYS: *Use Different Kinds of Specialty Malt ... and Lots of It!*

A look at the grist bill on a typical Rogue beer usually reveals a blend of four or more types of malt. And the proportion of specialty malts is sometimes more than 40 percent of the total grist bill! In most brews, specialty malts account for only 10 to 20 percent of the batch.

The Rogue rule means that, for a typical five-gallon batch and a beer of even modest gravity, you might use more than 3 pounds of specialty malt. This has several advantages. In beers where malt character predominates, it

builds depth and complexity into the flavor profile. "Our beers are made with single-infusion mashes," says John. "Creative blending of specialty malts can be used to adjust the sugar composition of the final wort."

An example: You could use large amounts of caramel malt to provide additional dextrins (unfermentable sugars) in a beer where the mash temperature and pale-malt base would otherwise create a highly fermentable wort. With this technique, you can make beers with highly fermentable worts (in other words, big beers!) while still maintaining body. And you can do it without the hassle of a step mash.

This even works for beers in the lighter color range, providing you use light-colored specialty malts. Rogue's MaierBock has a starting gravity of 1.066 yet maintains a golden color of 8 degrees Lovibond. To accomplish this, Maier uses a healthy dose of Munich and Hugh Baird Carastan malts. For beers like Rogue's Brutal Bitter or Saint Rogue Red, styles in which the hops are more predominant, Maier says that "Increased percentages of specialty malts also allow for increased amounts of hops. This helps create balance in the beer."

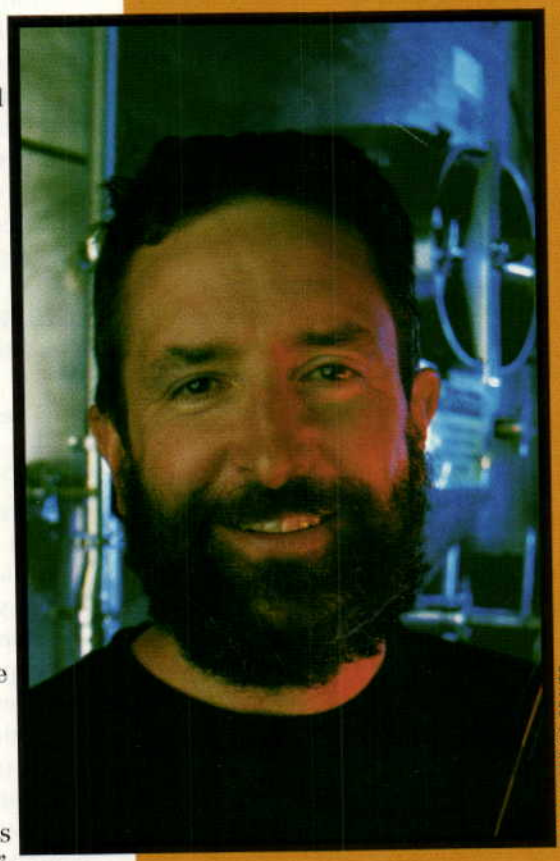


PHOTO BY TREVOR GRAVES

THE ROGUE SAYS: *If You Brew Big Beers, Then Use Big Hops!*

A look at the hops used in Rogue's characteristic ales reveal many newer, non-traditional varieties — like Columbus, Horizon, Crystal, Sterling and Amarillo — alongside such traditional varieties as Saaz, Cascade, Centennial and Kent Golding. "When in doubt, use more!" says John.

Higher gravities and healthy amounts of specialty grains create

FROM THE ROGUE

5 THE ROGUE: HOPS

Tired of Saaz, Hallertauer and Kent Goldings? Then check out John Maier's five favorite varieties of hops.

AMARILLO: "An accidental crossbreed good for bittering and finishing, Amarillo has a nice Northwest-type citrus character." This hop is used in Rogue's annual holiday beer, Santa's Private Reserve. Alpha acid: 7 to 7.5 percent.

CRYSTAL: "A straight Oregon hop that provides massive aroma." Crystal is used as the sole hop for Buckwheat Ale, Brutal Bitter and Honey Cream. Alpha acid: 4.5 to 5 percent.

HORIZON: "Tremendous bittering potential with the lowest co-humulone on the market, which gives good performance in a flavor or aroma role." Alpha acid: 12 to 14 percent.

STERLING: "A very delicate hop with lots of noble character, yet with a higher alpha than many true noble hops such as Saaz or Mittlefrüh." Sterling is a Northwest hop developed with more than 50 percent Saaz. Maier used it as the sole hop in the Imperial Pilsner he brewed for the 1999 Oregon Brewer's Festival. Alpha acid: 5.5 to 6 percent.

SOUTHERN CROSS: A high alpha hop with a low cohumulone fraction (23 to 24 percent). "This New Zealand triploid hop provides great bitterness without the edge associated with many high alpha varieties. This hop is somewhat rare due to the fact that it is imported from New Zealand, where many farmers follow organic growing practices." Alpha acid: 13 to 14 percent. — *J.O.*

a need for increased IBU levels — commonly 35 IBUs and occasionally in excess of 50 — to help maintain balance and prevent big beers from being cloying. That's true even in styles where the malt character is meant to dominate.

On the homebrew level, with a hop of 13 percent alpha acid (such as Southern Cross), this can mean using as much as 1.5 ounces in the boil to obtain IBU levels in the 50 to 60 range. "Freshness is key in hop selection," says John. "We rely heavily on pellet hops because they store better and retain the good characteristics of the variety."

When selecting a hop, John looks for varieties that have low co-humulone levels, such as Crystal, Horizon and traditional "noble-type" hops like Hallertauer and Saaz. Some research indicates that higher co-humulone levels (over 25 percent) can result in the harsh bitterness and edge associated with high-alpha hops. On beers where hop bitterness, flavor and aroma are more prominent, John feels that low co-humulone hops help ensure a mellow flavor and bitterness, even in highly hopped beers.

THE ROGUE SAYS: *A Hopback is the Best Way to Bitter*

Rogue's Brutal Bitter is a full-bodied, intensely hoppy brew that's anything but brutal, with a clean hop flavor and big hop aroma typical of an American IPA. Yet this beer is not dry-hopped — a technique that means adding hops into the fermenter after the primary to create additional aroma. "Crystal hops are the only hop used in Brutal and it provides a massive amount of aroma without dry-hopping," says John. The drawback with dry-hopping is that typical fermentation and conditioning temperatures will not extract the maximum character from the hops. Late hop additions in the brew kettle also have a substantial effect on aroma, but the essential oils responsible for hop aroma vaporize into the air.

With a device called a hopback *(see "Homemade Hopbacks," April 2000)*, hot wort runs through a vessel containing flavor and aroma hops at the end of the boil. Then it's immediately cooled to yeast-pitching temperature and sent to the fermenter. In this way, more essential oils stay in the wort. In addition, since hot wort is in contact with the hops, contamination — which can be an issue when hops are added into the fermenter cold — is not a problem.

A rule of thumb for dry-hopping: Depending on the gravity of the beer and the hop intensity you want, use from 0.5 to several ounces of the freshest hops you can get your hands on.

THE ROGUE SAYS: *Ferment and Condition at Cooler Temperatures*

"Yeast is a good thing, and cooler is better. Even with our proprietary 'Pacman' ale yeast, we ferment at temperatures as low as 60 degrees Fahrenheit," says John, adding that regardless of the yeast strain, constant temperature control will improve beer quality. With many strains, John suggests fermenting on the low side of the yeast's optimum temperature range. This will create a smoother profile, with reduced fermentation esters — compounds that make a finished beer smell "fruity."

Cooler fermentations will require slightly extended fermentation and conditioning periods, but this allows the flavors in big beers — styles with higher malt, alcohol and hop levels — to meld and mellow while remaining in contact with the yeast.

This philosophy extends to packaging. "By switching to Cornelius kegs and artificial carbonation, many homebrewers are missing out on the benefits of bottle conditioning," laments John.

Bottle conditioning is when the beer is carbonated by adding additional sugar at packaging time; the secondary fermentation occurs in the sealed bottle.

Many homebrewers feel the additional yeast in the bottle detracts from the finished beer. Wrong, says Maier: "With my homebrews, I would condition the bottles warm for five to seven days to build carbonation, then move the beer into refrigerated storage. After several weeks the beer would drop bright, and the extended cold storage in contact with the yeast allows the beer to maintain a positive flavor profile for a longer period of time."

THE ROGUE SAYS: *Start By Copying, Then Get Creative!*

"As a homebrewer, it's good to copy but it's also good to play around," says John. For starters, Maier says recreating commercial beers is a great way for homebrewers to learn beer styles and techniques. "Some of Rogue's ales are based on my homebrew recipes," says John.

By brewing repeat batches or splitting batches into multiple fermenters, homebrewers can make minor changes in ingredients and compare the results. That's a fast way to understand how individual ingredients change recipe design.

"Don't be afraid to try unusual methods and ingredients," adds Maier. "Alaskan Smoked Porter was a variation on a homebrew recipe; we added alder-smoked malt and it turned out great." At Rogue, ingredients like buckwheat (Buckwheat Ale), hazelnut extract (HazelNut Brown Nectar) and chipolte peppers (Mexicali Rogue) are examples of non-traditional ingredients being used to create new flavors in traditional beers. ■

John Oliver is a BJCP National Judge and head brewer for BJ's Brewery in Brea, California. He's also a contributing writer to BYO.

5 THE ROGUE: INGREDIENTS

Maier doesn't shy away from offbeat ingredients. Besides using hefty amounts of specialty grains and hops, he also experiments with adjuncts like molasses and roots like licorice.

HONEY: Used in Honey Cream Ale, it provides a dry, refreshing crispness because it ferments almost completely. In a five-gallon batch, use up to one pound to add character to the beer. Don't use more; it could lead to a stuck fermentation.

MOLASSES: Unsulphured molasses helps provide color, fermentable sugars and residual flavor to dark ales such as porters and stouts. Use up to one pound for 5 gallons.

BREWERS' LICORICE: Brewers' licorice is processed licorice root. It provides aroma, flavor and color. These 4-inch sticks can be broken up; any length from one inch to the full stick is suitable for five gallons, depending on the strength of the beer and the flavor desired.

BUCKWHEAT: "Buckwheat is a fruit related to the rhubarb plant; we use it in Buckwheat Ale. It has a wheat-like flavor and is nutty." The fruits of the buckwheat resemble small beechnuts, which are milled to separate the hulls. They are lightly roasted and used like a specialty grain.

SMOKED MALT: "In addition to beechwood-smoked malt made by Weyermann, we use our own malt, which is Munich smoked with alderwood. Alder is indigenous to the region; in the Rogue Smoke, it adds complexity to the flavor profile."

Use smoked malts sparingly; as little as one-eighth to one-quarter of a pound will provide a noticeable aroma and flavor in lighter beers. —*J.O.*

ST. ROGUE RED ALE (five gallons, all-grain)

OG = 1.052 IBU = 42 SRM = 26 ABV = 4.75 percent

Here's a homebrew recipe, straight from The Man.

Ingredients

5.75 lb. two-row pale malt
1.25 lb. crystal malt (40° L)
1 lb. crystal malt (75° L)
1 lb. crystal malt (15° L)
1 pound Munich malt
22 AAU Chinook hops
(2 oz. of 11% alpha acid)
9.5 AAU Centennial hops
(1 oz. of 9.5% alpha acid)
1 pt. starter of Wyeast 1056

Step by step:

Mash grain in 2.75 gal. of water at 155° F for 60 minutes. Sparge with enough 168-170° F water to collect 5.5 gal. of wort. Total boil time is 90 minutes.

At beginning of boil, add 2 oz. Chinook and boil 90 minutes. At end of the boil, kill heat and do only one of the following options:

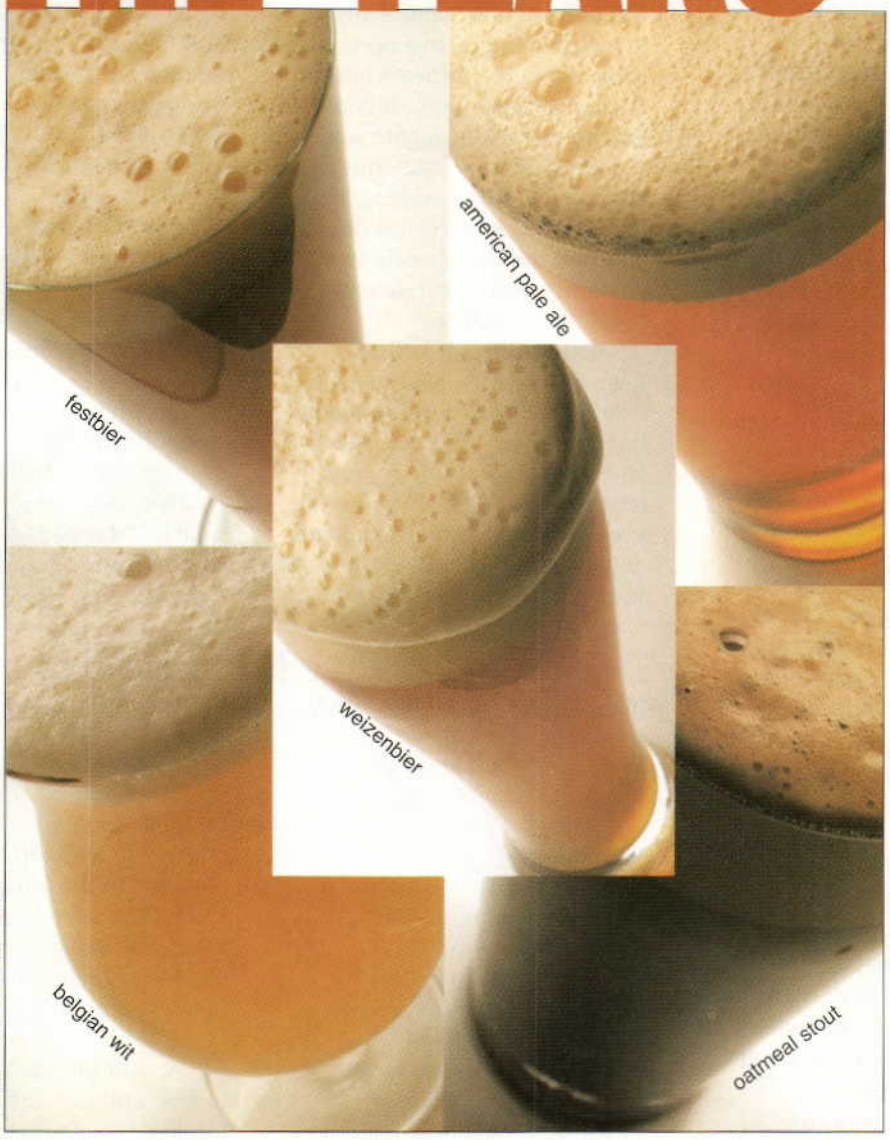
1. Add 1 oz. Centennial, whirlpool and cover pot. Cool to 68° F, oxygenate, transfer to fermenter and pitch yeast.

2. Whirlpool and cover pot. Allow trub to settle, then transfer to fermenter via hopback containing 1 oz. Centennial. Oxygenate and pitch yeast.

Ferment at 67° F for 7 days, transfer to secondary and condition at 63° to 65° F for 14 days. Prime and bottle. Allow bottles to sit for one week at 60° to 70° F, then move into cold storage.

FIVE BEERS THROUGH THE YEARS

by Scott Russell



PHOTOGRAPHY BY CHARLES PARKER

SINCE 1995, THESE STYLES HAVE BEEN ON THE RISE AT THE GREAT AMERICAN BEER FESTIVAL. HERE'S HOW TO MAKE THEM AT HOME.

oatmeal stout • american pale ale • weizenbier • belgian wit • festbier

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Which styles have been on the rise since 1995? We wanted to know, so we checked the entry archives for the Great American Beer Festival, held every fall in Denver. Last year, 400 microbreweries entered 1,700 beers in 54 categories, from Bohemian pilsner to Imperial stout. What better way to measure a beer's status than to see how many breweries are making versions good enough to enter in a national competition?

The five styles we selected — oatmeal stout, German weizbenbier, American Pale ale, Belgian wit and festbier (Oktoberfest and Märzen) — have each shown a marked increase in the number of entries since 1995. Below you'll find simple, extract-based recipes (plus an all-grain option) for making these crowd-pleasing beers. Have fun bringing the festival home!

OATMEAL STOUT

(five gallons, extract with grains)
OG = 1.046 FG = 1.014 IBU = 20

Smoother and sweeter, with less burnt and bitter edges, oatmeal stouts are more English than Irish. With a dark-brown to black color and a creamy head, they should have more body than a traditional dry stout. Ironically, oats are a fairly insignificant ingredient in most of these brews, comprising as little as 5 percent of the grain bill.

At the 1995 GABF, oatmeal stout fell under the broad "specialty stout" category. By 1999, it had its own category with 47 entries.

Good oatmeal stouts to try: Samuel Smith's (Tadcaster, England); St. Ambroise (Brasserie McAuslan, Montreal, Quebec); Gray's (Janesville, Wisconsin).

Ingredients

0.5 lb. dark crystal malt (120° Lovibond)
0.5 lb. roasted barley
1 lb. flaked oats
4 lbs. Munton's unhopped dark dried malt extract (DME)
4 AAU Fuggles hops (1 oz. of 4% alpha acid)
2 AAU East Kent Goldings hops (0.5 oz of 4% alpha acid)
English ale yeast (Wyeast 1098 or White Labs WLP-002)
1 cup Munton's dark DME

Step by Step

Steep the oats, crystal and roasted barley (in a grain bag) in 2.5 gallons water at 150° F for 45 minutes. Remove grains, rinse back into kettle (through a colander) with another quart of hot tap water.

Add DME to kettle, bring to a boil. Add Fuggles hops, boil 45 minutes. Add EKG hops, boil 15 minutes, remove from heat. Top up in fermenter to 5.25 gallons, cool to 68° F and pitch yeast. Ferment one week at 68° F, rack to secondary and condition two weeks at 55°F. Prime with DME, bottle and age three weeks at 50° F.

All-grain option: Heat 10 qts. water to 162° F. Crush together 6 lbs. pale malt, 0.5 lbs. roasted barley and 0.5 lbs. dark crystal malt. Add with 0.5 lb. flaked oats to water, hold at 151° F for 90 minutes. Runoff, sparge with 12 quarts at 168° F. Bring to boil, follow hop schedule as above. Final boil volume should be 5.25 gallons.

WEIZENBIER

(five gallons, extract with grain)
OG = 1046 FG = 1.010 IBU = 14

German in origin, weizenbiers — or weissbiers — are light and refreshing. Sometimes they're tart and slightly acidic, sometimes fruity and sweet. The best strains of German weizen yeast create esters reminiscent of banana, clove and bubblegum; American brewers have developed a milder, cleaner style.

In 1995, there were 41 German wheat beers at the GABF. In 1999, there were 77.

Good weissbiers to try: Ayinger, Tucher and Schneider from Germany; Tabernash Weissbier (Longmont, Colorado); Bert Grant's Hefeweizen (Yakima, Washington).

Ingredients

0.5 lb. carapils malt
0.5 lb. flaked wheat
1 lb. malted wheat
5 lbs. Briess unhopped weizen malt extract syrup
3 AAU Hallertau hops (1 oz. of 3% alpha acid)
2 AAU Tettnang hops (0.5 oz. of 4% alpha acid)
German Weizen yeast (Wyeast 3333 or White Labs WLP-320)
7/8 cup corn sugar (for priming)

Step by Step

Steep the carapils, malted wheat and flaked wheat (in a grain bag) in 2.5 gallons water at 150° F for 45 minutes. Remove grains, rinse back into kettle (through a colander) with another quart of hot tap water. Add malt extract syrup to kettle, bring to a boil.

Add Hallertau hops, boil 40 minutes. Add Tettnang hops, boil 5 minutes, remove from heat. Top up in fermenter to 5.25 gallons, cool to 68° F and pitch yeast. Ferment one week at 68° F, rack to secondary and condition two weeks at 50°F. Prime with corn sugar, bottle and age three weeks at 50°F.

CHARLES PARKER

Five styles on the rise (from left): German weizenbier (weissbier), oatmeal stout, American pale ale, festbier (Oktoberfest and Märzen) and Belgian wit.

All-grain option: Heat 11 qts. water to 164° F. Crush together 4 lbs. pilsner malt, 3 lbs. malted wheat and 0.5 lbs. carapils. Add with 0.5 lb. flaked wheat to water, hold at 153° F for 75 minutes. Runoff, sparge with 13 quarts at 169° F. Bring to a boil, follow hop schedule as above. Final boiling volume should be 5.25 gallons.

AMERICAN PALE ALE

(five gallons, extract with grains)
OG = 1.055 FG = 1.012 IBU = 48

With the rebirth of the craft brewing industry in the late 1980s, this style of ale became the flagship of every new microbrewery. Then the public got bored and turned to more exotic beers.

The APA made a comeback a few years ago, with new varieties of hops, new strains of yeast and better barley malt. It's not terribly different from English pale ales, just more of a good thing — higher OG, therefore a bit higher alcohol content; and higher hopping rates, using American varieties.

In 1995, there were 65 APAs featured at the GABF. In 1999, there were 108.

Good APAs to try: Sierra Nevada Pale Ale (Chico, California); Mirror Pond Pale Ale (Deschutes Brewery, Bend, Oregon); Clipper City Pale Ale (Baltimore, Maryland).

Ingredients

0.5 lb. medium crystal malt (60°Lovibond)
0.5 lb. toasted pale malt (350° F for 20 minutes)
1 lb. malted wheat
5 lbs. Munton's unhopped amber dried malt extract (DME)
8 AAU Cascade hops (2 oz. of 4% alpha acid)
4 AAU Willamette hops (1 oz. of 4% alpha acid)
3 AAU Cascade hops (0.75 oz. of 4% alpha acid)
American ale yeast (Wyeast 1056 or White Labs WLP-001)
1 cup Munton's light DME

Step by Step

Steep the crystal, toasted and wheat malts (in a grain bag) in 2.5 gallons water at 150° F for 45 minutes. Remove grains, rinse back into kettle (through a colander) with another quart of hot tap water.

Add DME to kettle, bring to a boil. Add first Cascade hops, boil 45 min. Add Willamette hops, boil 25 min. Add second dose of Cascade hops, boil 5 min, remove from heat. Top up in fermenter to 5.25 gallons, cool to 68° F and pitch yeast. Ferment one week at 68° F, rack to secondary and condition two weeks at 55° F. Prime with DME, bottle and age three weeks at 50° F.

All-grain option: Heat 13 qts. water to 164° F. Crush together 7 lbs. pale malt, 0.5 lb. toasted pale malt, 0.5 lb. medium crystal, 0.5 lb. dark crystal and 1 lb. malted wheat. Add to water, hold at 152° F for 90 minutes. Runoff, sparge with 16 qts. at 168° F. Bring to a boil, follow hop schedule as above. Final boiling volume should be 5.25 gal.

BELGIAN WIT

(five gallons, extract with grains)
OG = 1.049 FG = 1.010 IBU = 19

Belgian wit had all but disappeared when Pierre Celis began his brewing career in the 1950s. Celis is credited for reviving the style in Belgium during his stint at the Hoegaarden brewery; then he moved to Texas, launched his own Belgian brewery and kick-started the style in the United States.

This is a wheat beer. It's cloudy, tart and spiced with coriander, orange peel, cumin and sometimes ginger, lemon and anise. The best versions are bottle-conditioned, and have a soft, silky look and texture.

In 1995, there were 25 Belgian-style beers at the GABF. In 1999, there were 72.

Good Belgian wits to try: Hoegaarden (Belgium); Celis White (Austin, Texas); Allegash White (Portland, Maine); Blanche de Chambly (Unibroue Brewery, Chambly, Quebec).

Ingredients

0.5 lb. light crystal malt (20°L)
0.5 lb. flaked wheat

0.5 lb. flaked oats
0.5 lb. malted wheat
0.5 lb.Belgian pilsner malt
4 lbs. Laaglander unhopped weizen malt extract syrup
2 cups light honey
4 AAU Brewer's Gold hops (0.5 oz. of 8% alpha acid)
2 AAU Styrian Goldings hops (0.5 oz. of 4% alpha acid)
0.5 oz. crushed coriander seed
0.5 oz. grated dried bitter orange peel (curacáo)
Belgian witbier yeast (Wyeast 3944, White Labs WLP-400 or equivalent)
1 cup Munton's light DME (for priming)

Step by Step

Steep the crystal, wheat and pilsner malts, plus the oats and flaked wheat, in a grain bag in 2.5 gallons water at 150° F for 45 minutes. Remove the grains and rinse back into the brew kettle (through a colander) with an additional quart of hot tap water.

Add malt extract syrup and honey to kettle, bring to a boil. Add Brewer's Gold hops, boil 30 minutes. Add Styrian Goldings hops, boil 15 minutes, remove from heat. Add coriander and orange peel, steep 30 minutes. Top up in fermenter to 5.25 gallons, cool to 68° F and pitch yeast. Ferment one week at 68° F, rack to secondary and condition two weeks at 55° F. Prime with DME, bottle and age three weeks at 50° F.

All-grain option: Heat 12 qts. water to 161° F. Crush together 3 lbs. malted wheat, 4 lbs. Belgian pilsner malt and 0.5 lb. light crystal malt. Add with 0.5 lb. flaked oats and 0.5 lb. flaked wheat to water, hold at 150° F for 75 minutes. Runoff, sparge with 14 qts. at 167° F. Bring to a boil, follow hop and spice schedule as above. Final boiling volume should be 5.25 gal.

FESTBIER

(five gallons, extract with grains)
OG = 1.060 FG = 1.013 IBU = 30

Märzenbier was traditionally the last big brew of the spring, made in March and saved for fall as the first beer of the new season. Märzens were stored in cool cellars during the hot summer months in the days before modern refrigeration and other technologies, so they may have been the first true lagers. They also became known as Oktoberfests when they became the traditional beverage for fall harvest festivals.

They are generally malty, reddish-amber in color, spicy (hops only!) and rich. They are brewed a little stronger and hoppier than normal lagers, both because they are intended for celebrations and because they needed to survive several months of storage.

In 1995, there were 30 festbiers featured at the GABF. In 1999, there were 51 festbiers.

Good festbiers to try: Paulaner, Spaten and Hacker-Pschorr (Munich, Germany); Hübsch Märzen (Davis, California); Stoudt's Festbier (Adamstown, Pennsylvania).

Ingredients

0.5 lb. medium crystal malt (120° Lovibond)
0.5 lb. dark Munich malt
0.5 lb. biscuit malt
0.5 lb. Vienna malt
1 lb. pilsner malt
5 lbs. Briess unhopped amber DME
6 AAU Tettnang hops (1.5 oz. of 4% alpha acid)
3 AAU Spalt hops (1 oz. of 3% alpha acid)
Bavarian or Munich lager yeast (Wyeast 2308 or WLP-820)
1 cup Briess amber DME (for priming)

Step by Step

Steep the malts (in a grain bag) in 2.5 gallons water at 128° F for 30 minutes. Raise kettle temperature to 150° F, steep another 30 minutes. Remove grains, rinse back into kettle (through a colander) with another quart of hot tap water.

Add DME to kettle, bring to a boil. Add Tettnang hops, boil 60 min. Add Spalt, boil 30 min., remove from heat. Top up in fermenter to 5.25 gal., cool to 65°F and pitch yeast. Ferment one week at 50° to 55° F, rack to secondary, condition four weeks at 45°F. Prime with DME and then bottle and age for six weeks at 40°F.

All-grain option: Heat 9 qts. water to 146° F. Crush together 6.25 lbs. pilsner malt, 2 lbs. dark Munich malt (12 to 15° L), 1 lb. Vienna malt, 0.5 lb. medium crystal malt and 0.5 lb. biscuit malt. Hold at 135° F for 30 minutes. Add 5 qts. water at 180° F, raising mash temperature to about 150° F. Hold for 60 minutes. Runoff, sparge with 16 qts. at 168° F. Bring to a boil, follow hop schedule as above. Reduce kettle volume to 5.25 gallons. ■

Scott Russell is the author of several excellent homebrew books.

Wild 5's Ale (5 gallons, partial mash)

OG = 1.045 FG = 1.011 IBU = 43

by Scott Russell

JUST FOR GRINS, WE DECIDED to concoct a special beer to celebrate *Brew Your Own's* fifth anniversary. To tie it in with the theme of the issue, we figured it needed to have five different grains (barley, wheat, rye, oats and rice) and five different hops. It ended up being easier than it sounded. In fact, it was just like cleaning out the closet. A little of this, some of that, blow off the dust on the sack of malt, sweep up what got spilled, weigh out the leftover hops and bingo, ready to brew. Our Wild Five's Ale turned out to be a basically dry, hoppy light ale, blond in color, crisp and refreshing, with a really nice back-of-the-mouth bitterness that lingers.

INGREDIENTS

2 lbs. pale malt
1/2 lb. crystal malt (20° L)
1 lb. wheat malt
1/2 lb. malted rye
1/2 lb. flaked oats
1/2 lb. flaked rice
2 lbs. Munton's unhopped light dried malt extract (DME)
3 AAU Cluster hop pellets (1/2 oz. of 6.0% alpha acid)
3.5 AAU Fuggles hops plugs (1 oz. at 3.5% alpha acid)
2.1 AAU Target hop plugs (1/4 oz. at 8.4% alpha acid)
2 AAU Challenger hop plugs (1/4 oz. at 8% alpha acid)
5 AAU Kent Goldings whole hops (1 oz. at 5% alpha acid)
1 pt. White Labs British Ale yeast slurry (WLP-005)
1/3 cup brewers corn sugar
1/3 cup brown sugar

STEP BY STEP

Heat 7 quarts water to 165° F. Crush the pale, crystal, wheat and rye malts. Add to heated water with the rice and oats. Cover and hold at 153°F for 90 minutes. Begin runoff and sparge with 10 quarts at 168°F. Collect 14 quarts of wort. Add dry malt extract, bring to a boil. Add Cluster (loose), Fuggles and Target hops (in mesh bag), boil 45 minutes. Add Challenger hops (in mesh), boil 15 minutes and turn off the heat. Remove mesh bags of hops and add to fermenter along with enough chilled pre-boiled water to make up 5.25 gallons. When cooled to 70° F, pitch yeast. Ferment at 68° F for ten days. Rack to secondary, add Goldings hops (loose) to fermenter, condition at 53° F for two weeks. Rack to bottling bucket (avoid loose hops!), add corn sugar and brown sugar for priming, bottle and seal. Age in a dark, cool corner (50° F) for two weeks.

FIVE FAQS ANSWERED

by Mr. Wizard

The All-Wise Wiz expounds on a quintet of questions that just keep popping up

OVER THE PAST FIVE YEARS, I've answered a tremendous variety of homebrewing questions. Marijuana as a homebrewing ingredient. The health merits of beer. Beer judging, chocolate beer, brewing water. Beechwood aging, sanitizers and sanitation, beer dispense, sparging, hot-side aeration, light-beer brewing, beer foam ... the list of questions is long and often surprising! Yet some issues just keep popping up.

Times change, homebrewers enter and leave the hobby, breweries open and close, but the challenges brewers face remain constant. At an industry conference earlier this year, Dr. Charles Bamforth, a well-known professor at the University of California at Davis, said that very few, if any, ideas in brewing are truly novel. Brewing is simply too old for many new ideas to arise.

The same holds true for questions brewers have and the problems we face. Since I first started writing this column in 1995, the five hottest topics have been: yeast, fermentation, hops, mashing and the extract versus all-grain debate. With that in mind, here's some general advice on these common queries:

5

THE YEAST MYSTERY

Yeast is critical to making great beer. Every brewer knows that, which is probably why questions relating to yeast have exceeded all other topics.

Yeast strains: Today's homebrewers are lucky to have an incredible selection of yeast strains. Any wort can make the metamorphosis to a wide range of beers simply by using different yeast for fermentation. A wheat wort can produce a light American ale by using a yeast like that used for Sierra Nevada, or it can wind up with clove and banana aromas by choosing a German weizen strain. The same holds true for tweaking your favorite recipe; changing yeast strains may make the difference between a very good and an exceptional helles lager.

I've been surprised by how many questions I've received about using dried baker's yeast for beer. I always answer this question the same way: Use baking yeast for baking and brewing yeast for brewing. Dried baker's yeast is grown under special conditions to jam the yeast cell full of glycogen, which works like cellular rocket fuel. The byproduct is lots of carbon dioxide to leaven dough. Baker's yeast doesn't do much more than produce gas; it's not made for brewing.

My advice to brewers of all skill levels is to experiment with yeast. A wide variety of strains is found at most homebrew stores for a reasonable price. If you buy kits and want to add your personal touch, dump the packet of dried yeast taped to the lid and try something different. I'm not slamming the packet included with the kit, but if you've brewed the same kit a few times you can create a different beer by spending a few extra bucks on yeast.

Along these same lines, I strongly suggest using liquid yeast instead of dried yeast, simply because of the greater availability found in the liquid strains. When purchasing liquid yeast it's important to buy fresh yeast; check the date on the package. Although liquid yeast suppliers give guidelines on how to propagate their yeast based on how old the packet is, there's absolutely no question that fresh is best.

Propagation and Pitching: Very good beer can be made using dried or liquid yeast without propagation and without any knowledge about pitching rate. Brewers made beer like this for centuries. One ancient method of yeast storage and pitching was to use a porous stick to soak up yeast from a batch of fermenting beer. The yeast would dry on the stick, remain dormant but viable and the stick could be dunked into the next batch of wort to begin fermentation. This worked, but things have changed.

Modern yeast-propagation techniques allow brewers to grow

a yeast from a single cell and to supply a fermentation with enough yeast to get things vigorously going. The textbook pitching rate is 10 million cells per milliliter of wort. Ale brewers usually use less than this and lager brewers use a bit more, but it's a good rule of thumb. In macroscopic terms, this is one cup of thick yeast harvested from a fermenter or one quart propagation added to five gallons of wort. Homebrewers do not and should not consider calculating pitching rates of liquid yeast, but the subject is important because pitching rate has a large influence on beer flavor. The advice given by many of our writers — to start a one-quart propagation when using liquid yeast for the first time — is sound.

Re-Use: One practice that all commercial brewers but few homebrewers practice is yeast harvest. The advantage of re-using yeast is that it's free, abundant and ready to chew up another batch of wort. And in many cases, beer made with harvested yeast is better than beer made from "first generation" yeast (yeast used in a full-sized batch for the first time).

Most yeast will settle to the bottom of a carboy after fermentation. Ale yeast will often rise to the top of the beer after fermentation but will fall to the bottom when the beer is cooled. An easy way to harvest yeast is to cool your car-

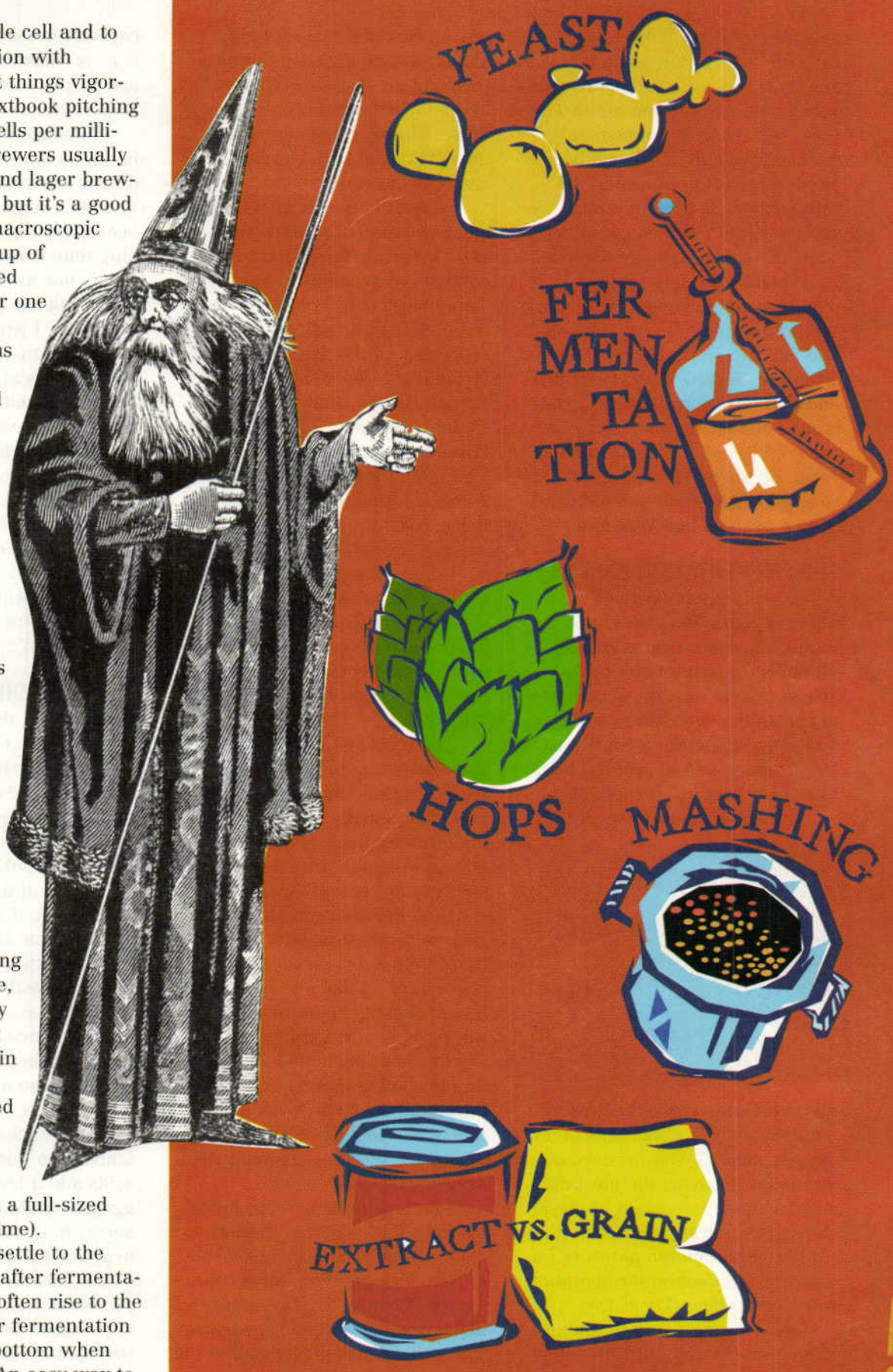


Illustration by Shawn Turner

boy after primary fermentation, rack the beer to the secondary and pour the yeast sediment into a sanitized storage container. The yeast solids can be immediately pitched (one cup per five gallons) into fresh wort or stored in the refrigerator. Be careful not to store yeast in a sealed container since the containers can explode!

When harvesting yeast, take a minute to judge its quality. I take a small sample of my yeast crop and feel it with my hands. A gritty or chunky feeling indicates trub and minimizing trub in the yeast crop is important *(see "Tips from the Pros," page 9)*. I also smell the yeast. Fresh yeast has a great yeasty-bready smell and old yeast begins to smell like Vegi-mite.

THE FERMENTATION ENIGMA

Given the popularity of yeast questions, it follows that fermentation is another common topic. The most important steps a brewer can take to ensure success are to aerate the wort after cooling, add yeast, maintain a constant temperature and to cool the beer after fermentation is complete.

Although there are several ways to aerate wort, the best methods involve direct injection of oxygen, such as Venturi devices or air stones. Perhaps the most difficult and most important of these steps is temperature control.

Most homebrewers are lax about ale fermentation and obsessive about lager fermentation. But both are equally important.

Fermentation temperature has a profound affect on fermentation rate and on beer flavor. I've noticed over the years that many homebrewers and craft brewers have a lackadaisical attitude about ale fermentation temperature and an obsessive attitude about lager fermentation temperature. They are both equally important and both can be a real challenge to control.

While it is true that some ales are fermented at room temperature, many ale fermentations are carried out around 65° F and sometimes cooler. I haven't been in many homes that are kept this cool. Most of the ales I brew are fermented at 66° F to minimize certain flavors, such as fruity esters like pineapple and banana. When I want assertive aromas, for example in weizen beers, I use a warmer fermentation but even in these cases the temperature rarely exceeds 72° F.

Oddly enough, many brewers are concerned when their fermentations seem short. An ale will finish primary fermentation in 3 to 5 days even at cooler temperatures. Lager fermentations typically run 7 to 10 days.

The most common causes of slow fermentation are proper wort aeration and yeast pitching rate. I personally get worried if my fermentations drag on too long because the potential for bacterial spoilage increases, especially if the time between pitching and noticeable yeast activity is delayed more than a day or so. Following a few days' of diacetyl reduction, I like to cool my beers to drop out the yeast. In a commercial brewery this is easily done by turning on the cooling jackets around the fermenter. Homebrewers can do the same thing by moving the carboy to a cooler environment, such as a brew-fridge.

One technique used by homebrewers that is quite different from commercial brewers is secondary fermentation. Most commercial brewers carry out secondary fermentation under pressure. This contributes most or all of the carbonation to the beer. After the beer is carbonated, long cold storage helps clarify the beer and to mature the beer flavor.

Homebrewers, on the other hand, do not carbonate their beer during secondary fermentation. They can run into problems when beer is held in the secondary for a long time because the yeast content is low at bottling. I part company with the advice of many on this issue. I would rather limit my secondary in the carboy to two or three weeks at cold temperatures and do the bulk of my aging in the bottle. This technique will provide enough yeast for bottle carbonation (one to two weeks at room temperature) and then the carbonated beer can mature in the bottle — preferably at cool temperatures, since yeast autolysis becomes a problem if bottle-conditioned beers are stored warm for too long.

THE HOPS DILEMMA

Hops are the spice of beer and generate lots of inquiries due to their obscure nature. I love hops because there aren't many rules. All brewers agree that hops lose their freshness with storage — prolonged storage results in a loss of alpha and the development of off-aromas. If hops are stored cold in a package and in compressed form, whether cones or pellets, they can easily retain quality for a year or more. This is good for brewers since hops are only harvested during the early fall. Most brewers also agree that dry hopping is not a big concern with regards to microbiological contamination and that iso-alpha acids add a level of protection against spoilage. All brewers also agree that hops contribute bitterness and aroma to beer.

My advice is to use hops as you would spices in food; that is, to please yourself. This advice is very general because that's how I

believe hopping should be approached — there is no right or wrong way to do it. If you know how to estimate bitterness levels, you can brew beers the way you like them.

Hop utilization is affected by the size of the kettle, the intensity of the boil, the use of hop bags (which can slightly decrease utilization), the specific gravity of the wort and the type of hops (pellets, cones or extracts). Unfortunately, utilization can only be precisely determined by using expensive laboratory equipment. So I usually figure about 30 percent utilization for hops boiled for 60 minutes or more, 15 percent utilization for hops boiled for 20 to 30 minutes and less than 5 percent for hops added during the last 10 minutes of the boil. When brewing higher gravity beers (1.075 and above) I tweak these numbers down a few percentage points.

Some brewers use elaborate formulas to predict utilization, but I believe there are simply too many variables to apply a general formula. I figure if my assumptions remain the same, then I can calculate a bitterness level that I understand — even if what I consistently calculate as 25 IBUs may actually be something different. Bitterness level is affected by the age of the hops, hop storage conditions and alpha-acid content. Additionally, different hop varieties can change the "quality of bitterness" (one of those great nebulous brewing terms). For example, most brewers agree that hop varieties with a low co-humulone content (less than 20 percent) have a "cleaner" bitterness. The "noble" varieties all have low co-humulone content.

Estimating bitterness (or sticking to the recipe with regards to bittering hops) is the one rule I strongly recommend following.

Experiment with all the other variables! Hop variety, dry hopping, pellets versus cones, using home-grown "green" or unkilned hops for dry-hopping and using aromatic high-alpha hops for late kettle hopping are some of things to play with. Unkilned hops from a backyard garden add a wonderful fresh hop aroma that you simply don't find when using kilned hops. Unkilned hops should be used immediately after picking.

As long as the bitterness level and the intensity of aroma are within your target area, it's hard to really screw up with hopping. Many brewers feel they need to use particular varieties for different beer styles. Some of the classic pairings are pilsner with Saaz, English-style pale ale with Kent Goldings and helles lager with Tettnanger, Hallertauer or Spalt. But many professional brewers

today are stepping outside of these traditional restraints and using the hop they like best, such as the use of the Cascade variety in Great Lakes Dortmunder *(see "Style Calendar," page 17).*

I am cautious and don't routinely practice radical experiments at work with hopping. I strive for consistency. But I think this message is sometimes over-emphasized when commercial brewers give homebrewers advice. Remember, homebrewing is a hobby and homebrewers have the great luxury of never having to make the same beer twice.

THE MASHING QUANDARY

Sweet wort production is the one technique some brewers use to separate "advanced brewers" from the rest of the pack. I don't agree with this delineation, but I do like mashing because of the freedom of using different malts and other ingredients like rice, corn, raw wheat and rye.

Mashing enables brewers to use any brewing grain imaginable and to control the conversion of starch into fermentable and unfermentable sugars. Translated into one of my most common messages, mashing is a powerful tool because of its effect on beer flavor.

I remember the first time I did an all-grain brew. I read up on as much mashing chemistry as possible. I wanted to make sure all of the key enzymes were happy and that I was going to end up with a wort that could be fermented. The more I read, the more fearful I became. I think I was more stressed out about my first mash than I was about my first kiss!

The fact is that mashing is not a huge deal. Hot water and cool malt are mixed to hit a desired temperature. If you're doing an infusion mash this temperature ranges between about 150° F and 162° F. Enzymes take over and convert starch to sugar.

As a brewer becomes comfortable with this technique it is natu-

ral to try "step" and "decoction" mashing. Decoction mashing and its American cousin, the double mash, allow for the use of undermodified malt, which was the historic norm in Europe, and unmalted cereal adjuncts like rice and corn that require boiling to release the starch.

Along the same progression, the concern about water chemistry and mash pH increases. The points to keep in mind are that pH influences enzyme activity; mash pH should be between 5.2 and 5.4 to optimize the amylase enzymes. If the pH is out of this range, starch conversion will take longer and yield will drop. If the pH rises above 5.8-6.0 during wort collection, then tannin extraction increases and can lead to astringency and beer clarity problems. The easiest way to measure pH is by using a handheld pH meter or test strips.

If you are currently an all-grain brewer and are looking for some ideas, try experimenting with the incredible range of malts on the market. Never before have homebrewers had better access to domestic and imported malts. This selection is largely due to the large number of microbrewers demanding more variety from malt suppliers. It's also fun to brew the same recipe with different mashing methods to understand how mashing affects flavor.

THE EXTRACT DEBATE

Very good beers can be made by using extracts, steeping specialty malts for additional flavors or by using partial-mashing methods. Some well-respected brewpubs use these methods for brewing. Sanitation, fermentation and yeast handling are every bit as important to these brewers as they are to all-grain brewers. If you are new to the hobby and want to progress to all-grain brewing, master extract brewing first. From this point you can add steeping grains, partial mashing and mashing to your techniques.

The beginner extract brewer is best advised to buy a kit and follow the instructions. This will help teach the basics of brewing, like boiling, cooling, racking, fermentation and bottling. It's a good experience because there are many great kits on the market.

The next step is to bring a beer together by combining various malts and hops. I suggest using a pale liquid or dry extract as the base and then steeping specialty malts to get the flavors and colors you desire. The real advantage to this method is that you can create your own recipes without having to buy additional brewing equipment.

The best special malts to use for steeping (as opposed to mashing, which requires enzymatic activity) are crystal and roasted malts, such as amber, brown, chocolate and black malt. The crystal malt family is broad and includes very light malts that contribute a delicate caramel note, darker crystals that contribute molasses and raisin flavors and very dark roasted crystal malts that have a burnt-toast dryness.

Many questions have come in over the years regarding what temperature to steep grains and for how long. I typically steep my specialty malts in a steeping bag in 160 to 170° F water for 30 minutes. After steeping is complete the grain bag is rinsed and the malt extract is added.

The last bit of advice I offer brewers is to stay cool. If you're an all-grain brewer, support your colleagues who'd rather use extract. All-grain or not, it's all beer and it's all good. ■

Mr. Wizard is a leading authority in homebrewing whose identity, like the identity of all superheroes, must be kept confidential. He has been writing his question-and-answer column since BYO was launched in 1995.

FIVE

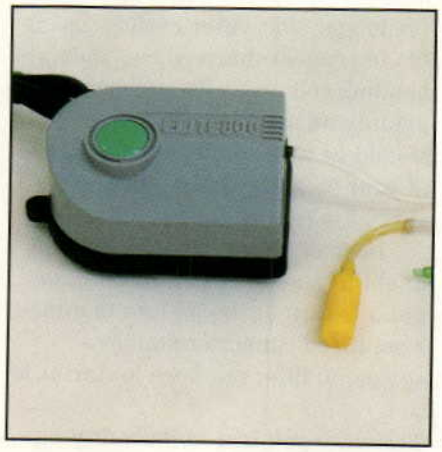
EASY HOMEBREW PROJECTS

By Thom Cannell

Looking for a Saturday-morning project? From a wort pump to a carboy cart, here are five brewing gadgets you can make yourself.

AQUARIUM PUMP

The fishy way to aerate your wort



Tired of shaking your carboy? Yes, you do have to oxygenate your wort to create healthy yeast that will prosper during the growth phase. And if you brew big beers (with a specific gravity of 1.060 and above), oxygenation is crucial to a proper attenuation.

One of the easiest ways to oxygenate is to borrow technology from the fishtank. In less than an hour, an ordinary aquarium pump ($10) will push enough air through your wort to insure sufficiently dissolved oxygen. (That doesn't include time spent waiting for foam to subside.) An aquarium air stone ($2 for several) provides bubbles; other plastic and stainless-steel air stones are available at most brew shops.

As always, there are tricks. My pump outlet is small, so I bought six feet of tiny tubing from an aquarium shop. Aquarium air stones (and all other stones I've seen) share the same inlet size. To prevent the lightweight air stone and tubing from floating on the wort surface, buy a 1/8-inch plastic tube long enough to reach the bottom of your fermenter. Include a sterile filter in the air line to filter out wild yeast and bacteria. I paid $2.50 for mine at the Yeast Culture Kit Company (http://members.aol.com/_ht_a/pgbabcock/yckco/yckcotbl.html). The assembled combination goes: pump, tubing, the in-line filter, more tube, the "wand" and just enough tube to connect to your air stone (see photo).

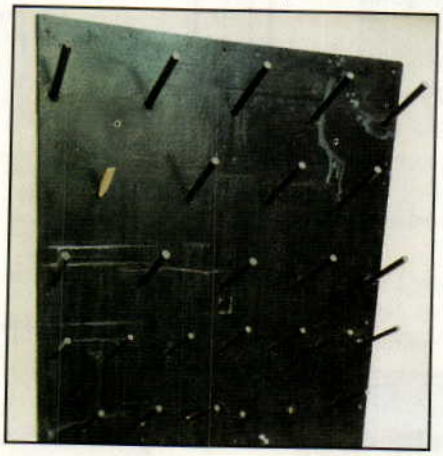
BOTTLE RACK

Out of the sink and onto a wall

After you've cleaned and sanitized your bottles, where do you put them? Housemates don't appreciate sinks full of upturned bottles, boxes of bombers and dishwashers crammed with sanitized bail-tops. A good solution to this problem is a bottle rack. If you're handy, you should be able to build a rack and keep all your glassware clean and stored for only $10 to $20.

Our example came from a university salvage yard (see photo). Familiar to all science students, this wooden glassware dryer provides the conceptual framework for your own. All you need is a sheet of plywood or MDF (medium density fiberboard). OSB (oriented strand board), press board or flake board will be too weak.

Drill staggered holes in the board at approximately 30 degrees to perpendicular. Size the dowels from 3/8-inch to 1/2-inch to accommodate different sizes of bottles. Then seal all of the surfaces with two thick coats of enamel paint. If you have glass labware like Erlenmeyer flasks, you might want to make a few special rows to accommodate them on your rack.



WORT CHILLER

A simple copper coil for cooling

You've most likely experienced the fears of infection along with the extreme boredom of waiting for wort to cool to pitching temperature. There is a relatively simple solution: Make a wort chiller.

Behold the cheapest, quickest reusable immersion chiller I have ever made. It's 20 feet of 1/4-inch copper tubing, six feet of plastic tubing, some clamps and an adapter to fit your garden hose.

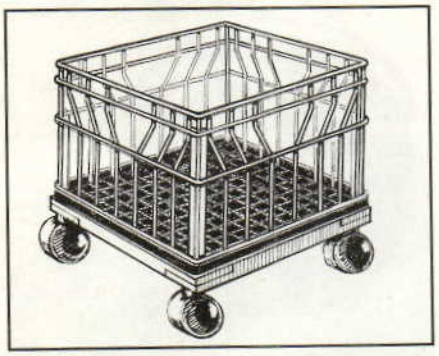
I chose 1/4-inch tubing because it's easy to bend and has lots of surface area to quickly cool the wort. To form the coil, I wound it around my plastic fermenter. This technique made a coil that fit easily inside my enamel boiling kettle.

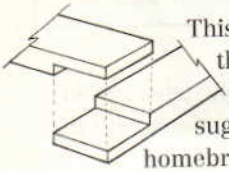
If you or a friend have access to a flare tool (most auto mechanics will have one), put a small flare at each end of the tube. The flare will increase the diameter of the copper tubing, which will help prevent the plastic tube from pushing off the water-in end. (Pressure pushes the plastic tubing off the copper tube; plus, the plastic "grows" and becomes very elastic from heat.)

All you need to do now is install the tubing (warming it first in hot water can help simplify the process) and clamp it with worm/gear clamps. Be sure that you buy the correct size clamps. And remember to sanitize the pipe exterior with strong soap or other cleaner, since it will be a little bit oily from the manufacturing process.

CARBOY CART

Hot fermenter on a roll





This was inspired by the janitor's mop bucket and was suggested by my homebrew group as an alternative to carrying heavy, hot, fragile fermenters. It takes four pieces of scrap wood, four inexpensive (less than $10) casters, and a $2.50 "milk crate." I suggest two fixed and two swiveling casters.

First decide if your fermenter will fit into a typical milk crate or one of the similar containers sold everywhere. Don't "find" a dairy milk crate behind the grocery store. Do get one with a flat bottom; self-draining is preferred.

To build the support, use half-lap joints (see illustration) to make a square base for the cart. Secure the milk crate with drywall screws, heavy duty staples, or nuts and bolts. Install casters and you're off and rolling.

COPPER RACKING CANE

Bend a tube to transfer brew

You can make an indestructible racking cane from 36-50 inches of copper tubing for about $2. You'll want malleable tubing with a 1/4-inch inside diameter; this size should accept the plastic foot from your old racking cane.

Cut the tube to a length of at least 6 inches longer than your deepest vessel. It's better to err on the longer side. After cutting, use a file to remove sharp edges. Slide a bending coil over one end (see photo) and start bending. You should be able to buy a bending coil at your local hardware store; it's very easy to use.

Instead of reusing the foot, you might fit a stainless mash filter, or put a U-turn at the bottom to attach a sanitized copper or stainless sponge to filter out hops and trub. ■

Thom Cannell is a contributing writer to Brew Your Own.

How to Make a Sour Mash

An offbeat way to lower pH or brew a pucker beer

by Chris Colby

ILLUSTRATED BY IAN MACKENZIE

What do beer, whiskey and yogurt all have in common? *Lactobacillus delbruckii*. Homebrewers can use this bacteria to make a sour mash.

AS ANY ALL-GRAIN BREWER knows, a mash is a mixture of hot water and grain. A "sour mash" is a mash that has acid-producing bacteria in it.

Most people associate the term with whiskey from the southern United States. But the technique can also be used in homebrewing. A brewer can make a small sour mash to lower the pH of his main mash when brewing ordinary beers. Or he can make a large sour mash and brew a sour beer.

Using a small sour mash to lower your mash pH should not affect the taste of your finished beer any more than adding a small amount of lactic acid. Using a large sour mash will add a definite crisp tang to the beer.

For most beers, the pH of the main mash should be between 5.2 to 5.4. The pH scale measures the acidity of a solution and ranges from 0 to 14. A solution with a pH of 0 is very acidic; a solution with a pH of 14 is very basic. Measuring mash pH is easy. You simply use a hand-held digital pH meter or use pH test strips, which are available at homebrew shops.

If your brewing water is low in carbonates and has enough calcium, the mash pH should establish itself within this range. But using water with high carbonate levels will result in a high mash pH. A pH over 5.6 can decrease extraction efficiency and allow tannins to leach into the wort during the sparge.

There are many ways to lower the pH of a mash. The most straightforward solution is to add lactic acid, calcium sulfate (gypsum) or calcium chloride. Sour mashing takes a bit more time and effort, but there are a variety of reasons to try it. Sour mashing is a traditional way of lowering mash pH; if you're a purist, it complies with the Reinheitsgebot. Some brewers feel it's more "natural" than adding straight acid.

Personally, I don't worry about the Reinheitsgebot or about being "natural." There's no such thing as unnatural lactic acid. Chemical companies produce lactic acid from bacteria just as sour mashers do. Homebrewers should try a sour mash simply because it's a fun, new brewing experience.

There are some disadvantages to making a sour mash. First, it requires extra time and energy. You'll need at least a two days for the bacteria to produce enough lactic acid to be valuable. More importantly, you'll be actively growing a "harmful" bacteria. *Lactobacillus* species are unwanted contaminants for almost all styles of beer. But if you clean and sterilize your brewing equipment as usual, you should not encounter any problems.

First, the Basics

Sour mashes are a source of lactic acid. The acid is produced by the bacteria *Lactobacillus delbruckii*. The brewer introduces *L. delbruckii* by adding malt to a small mash and allowing it to grow at a high temperature in a sealed container for a few days. These conditions favor the growth of *L. delbruckii* while inhibiting the growth of other, unwanted organisms. *L. delbruckii* ferments sugars from the malt, producing lactic acid.

Beers made with sour mash do not have bacteria in the final product. This is because *L. delbruckii* can't survive the heat of the main mash (often between 150-158° F).

L. delbruckii is homofermentative, thermophilic and anaerobic. Homofermentative means that *L. delbruckii* produces only a single product — lactic acid — when they

ferment. Hetero-fermentative species in the genus *Lactobacillus* produce acetic acid, ethanol and carbon dioxide, along with lactic acid, during fermentation. They may also produce diacetyl. Thermophilic means heat-loving; *L. delbruckii* survives at temperatures as high as 131° F and thrives at temperatures between 95 to 120° F. Anaerobic means without oxygen; *L. delbruckii* can live and reproduce in the absence of oxygen.

Lactobacillus species are used in the manufacture of many types of foods. *L. acidophilus* and other bacteria are used to make yogurt. Other species of *Lactobacillus* are used in sauerkraut and pickles.

The most common contaminant of a sour mash is *Clostridium butyricum*. This anaerobic bacteria produces butyric acid, a foul-smelling compound that turns the mash rancid. Sour mashes infected with *Clostridium* should be thrown out. Luckily, these bugs are inactive above 112° F. Keeping the sour mash above this temperature will inhibit *Clostridium*.

Acetobacter, an acetic acid-producing bacteria, can also infect sour mashes. These aerobic bacteria grow on the surface of the mash if oxygen is present and can convert alcohol to acetic acid at pH values as low as 4.5. Keeping the sour mash tun tightly closed to seal out oxygen will inhibit the growth of *Acetobacter*. It can also be inhibited by raising the temperature above 122° F. (Temperatures above 120° F will stun *L. delbruckii*, but they will survive unless temperature exceeds a high of 131° F.)

Some heterofermentative *Lactobacillus* species grow in the same conditions as *L. delbruckii*. The presence of these bacteria may be detected by the buttery smell of diacetyl. Heating the sour mash above 140° F should kill them, but then you will need to re-inoculate the mash with more *L. delbruckii*.

How to Make a Sour Mash

To make a sour mash you'll need malt, water, a spoon, a thermometer, a pot and a vessel to hold the sour mash (a sour mash tun). An insulated cooler will work as a sour mash tun. It should be just big enough to hold the sour mash and have as little extra headspace as possible. *L. delbruckii* naturally resides in malt, so you don't need a culture of the bacteria (although cultures are available from Wyeast).

Making a sour mash is simple. You'll need to start two to four days before brewing day. A small sour mash should be between 5 to 15 percent the size of the main mash. (For example, if your recipe calls for 10 pounds of grain, you should make your sour mash with 0.5–1.5 pounds of malt.) For a sour beer,

your sour mash should be at least 20 percent the size of the main mash or larger.

Step One: MASHING

Crush the pale malt and mash it in the normal fashion. A single infusion mash held at 150–158° F for one hour will suffice. More elaborate mash regimes are not necessary. The mash will produce sugars for the bacteria to ferment.

Step Two: INOCULATING

Cool the mash to about 122° F and add a handful of crushed (unmashed) malt. This malt will contain any surviving *L. delbruckii*. The "cold" malt should also drop the temperature to 120° F.

Step Three: INCUBATING

Keep the mash in a sealed container and hold it between 95 and 120° F for two to four days. The mash temperature will drop over time, so you will likely need to boost the temperature once a day.

To boost the temperature of your sour mash, boil some water for 15 minutes to de-aereate it. Stir this water into the sour mash until the temperature is about 120° F. When stirring, try not introduce any air into the mash. Seal the container again as quickly as possible. (You may lose some liquid from overflow when adding water. This is fine.) Don't peek at the mash other than when you are boosting the temperature. Each time you open the lid, oxygen gets in.

Step Four: MONITORING

The mash should smell sour, but clean. *L. delbruckii* does not produce any smelly by-products. You should never use a sour mash that smells off in any way.

If you do notice rancid smells, diacetyl smells or growth on the surface of the sour mash, skim it and heat to 140° F. Cool the sour mash back down to 120° F and re-inoculate with a handful of crushed malt. If the smell persists, discard the sour mash. Even if the sour mash does not smell, it is a good idea to skim the top layer, which often contains any aerobic contaminants present, before using it.

Step Five: ON BREWING DAY

Stir the sour mash into the main mash. The pH of the sour mash should be around 4. Add half of the sour mash, then check pH. Keep adding until pH is 5.2. (Follow pH meter instructions with care. You might have to cool down the mash to get specific readings).

If you are making a sour beer, add only a small amount of the sour mash — 5 to 15 percent of the main mash — to the main mash. Keep the remainder of the sour mash separate until after starch conversion is complete. Adding the whole large

MAKE A PUCKER BEER

You can use sour mash to make a tangy beer. If you'd like to give it a whirl, here's a recipe.

Sour Cherry Beer
(five gallons, all grain)
OG= 1.048 FG = 1.010 IBU = 20

Ingredients
6 lbs. pale malt [2° Lovibond]
3.5 lbs. wheat malt
5 lbs. sour or Bing cherries (optional)
6 AAU of Mt. Hood hops (1.5 oz. at 4% alpha-acid)
1 smack pack of Wyeast 2112 (California Lager)
2/3 cup priming sugar

Step by Step:

Two to four days in advance, make a sour mash with 2 lbs. of pale malt. On brewing day, mash the remaining grains, along with half of the sour mash, at 152° F for 1 hour. Combine remaining sour mash and main mash, then sparge with enough 168° water to collect 5.75 gallons of wort.

Boil for 1 hour. Add 1.5 oz. of Mt. Hood hops at beginning of boil. Ferment for 7 to10 days at 60° F. When primary fermentation is complete, rack beer to secondary fermenter and add sour or Bing cherries (optional).

Keep beer at 60° F for an additional 5 days. Rack to bottling bucket, add priming sugar and bottle. Before chilling, store beer at room temperature for one week. Note: Keep the hop contribution low or it will compete with the acidity of the beer.

sour mash to the main mash will lower the pH below 5.2. and result in lower yields. Once the main mash is finished, add the rest of the sour mash. After mashing, proceed with recirculation, run-off and sparging as you normally would.

If you are experimenting for the first time, make a larger sour mash than you need and hold it for just two days. It's easier to maintain a larger sour mash for two days than managing a smaller sour mash for four days. There is less work involved and less opportunity for contaminants to grow. A sour mash that is infected with unwanted organisms could taint your beer with off flavors. The smell and appearance of the sour mash should indicate the presence of any growth. When in doubt, throw it out! ■

Chris Colby is a contributing writer for Brew Your Own. He lives in Bastrop, Texas.

From Keg to Brew Kettle

Converting a keg to the brewing tool of your choice

by Thom Cannell

If you're the do-it-yourself type, there's nothing cooler than a keg you've turned into a kettle. This model has a sight gauge, thermometer and ball valve.

YOU CAN USE GRANDMA'S canning kettle. You can shell out $300 for a ready-made model with all the bells and whistles. Either will work, but for many homebrewers, there's nothing cooler than boiling wort in a converted beer keg. Especially if they made it themselves. If you want to save some money and make your own kettle, converting a keg is viable option for the "do it yourselfer."

So you've bought a keg from RCB, Sabco or the junkyard with the intent of converting it into a brew kettle. Now what? First, if everything looks intact, you'll need to release any residual pressure and dump whatever remains in the keg.

A note of caution: If the keg contains residual pressure, the valve could explode from it at life-threatening velocity. There are two safe ways to release pressure: Visit a brewery and use their special (and expensive) valve-removing tool, or drill a tiny hole in the top and let the pressure drop slowly.

Now that you've safely vented your keg, it's time to convert it. It's important to have your objectives clearly in mind. Do you want to use your kettle for mashing, wort boiling or sparge water? Each objective can be optimized and a compromise can be made if your boil kettle is also your mash-lauter tun. Try to plan your design with easy changeover in mind.

We called William Stewart of Moving Brews in College Park, Maryland (301-779-8609; www.movingbrews.com) for advice on parts and construction. Moving Brews is a respected provider of stainless-steel fittings and other RIMS supplies. Stewart said, "If you have to accommodate a false bottom and a drain pipe for mashing or boiling, obviously that's more complicated than just installing a drain pipe for sparge water." A basic installation kit from Moving Brews (and many other homebrew suppliers) includes a coupling, a two or three-inch pipe nipple, a ball valve, and a hose barb.

Keg conversion also depends on what tools you have and what local resources are available. If you know a sanitary welder, you can have all the cutting and fitting done for under $100. (Some sanitary welders may even work for homebrew!) If you prefer to do it yourself, read on.

Taking the top off

The first issue is removing the top of the keg and cutting to fit a lid. Buy the lid first. You can find them at restaurant supply stores. (Using the top as a lid is not a good option since experts say it will never fit tightly enough). The pros at RCB recommend using a plasma arc cutter, cutting a hole slightly smaller than the lid and grinding to fit. Common oxygen-acetylene torches should never be used since they will ruin the keg. The alternative is a "Sawzall" and a carbide grit-coated blade, not a high-speed steel blade.

After cutting the hole you need to smooth the edge. Use an electric or air die grinder, preferably with a carbide grinding tool, to shape the hole to the final size. Plasma cutting leaves a film on the inside of the keg that must be removed, but you might want to postpone cleaning until all welding is finished.

Adding the fittings

With the main opening cut, you'll want to add your fittings: a drain, maybe a thermometer coupling and a sight gauge. Where you put these is up to you, but the consensus is that the drain hole goes close to the keg's chine, the half-coupling for a thermometer should be installed offset near the midpoint of your normal liquid volume, and the sight gauge should measure minimum and near-maximum liquid volumes. The sight gauge should also be offset. Don't reinvent the wheel; visit every homebrewer you know and look at their equipment. Ask them what they like, what

they'd do differently.

If you have trouble monitoring your sparge water levels, we'd heartily recommend installing a sight gauge. Fermentap, Moving Brews, Granger and other companies sell "weldless" kits — which only require drilling a hole — for under $45. Kits consist of a right-angle fitting into the kettle and a glass tube with protective wrapper that echoes liquid level. The downside to sight glasses is that they've definitely been known to break.

An alternative is to have a welder install two short quarter-inch (inside diameter) stainless tubes, bent to a right angle, in the same vertical plane. Connect the two with flexible plastic tubing. It's not rated for this heat, but you can use it for a couple of brews and throw it out. You'll see this version in our photos.

Depending on what kind of kettle are you building — sparge, mash or boil — each will have a different siphon tube (drain tube) location. A siphon tube reaches from the coupling to nearly the bottom curve of the kettle. If you use this kettle for boiling wort, you can install the fitting very close to the chine and use a stainless steel or copper "chore boy" metal sponge as a hop filter. In addition, sturdy metal false bottoms are available from Sabco, Moving Brews and other suppliers to remove hops. For a boil kettle, almost any size false bottom and siphon tube would do. Or you could pull the siphon tube out and simply whirlpool your wort and drain from the coupling ball valve.

Making a mash tun

If you are making a mash tun, other decisions must be made. A mash tun needs as much drain volume (surface area of the false bottom) as possible to minimize stuck mashes. So the false bottom needs to be equal to the kettle diameter and fit tightly. You may want to mount the drain a couple of inches higher on the side of the kettle. Of course, this interferes with stirring

the mash, as would positioning a thermometer probe in the middle of the mash. So you'll have to reach a compromise, like having the siphon tube turn a right angle as it enters the center of the false bottom instead of a gentle (and high into the mash tun) arc. Whatever you do, we'd suggest a very bold mark on your mash paddle so you don't hit the thermometer probe, smash the siphon tube, or disturb the mash within a few inches of the false bottom.

Kegs are of uniform size and appropriately sized false bottoms are widely available for mashing or holding hops back ($30 and up). Many mash-tun false bottoms come in two pieces, attached by hinges. Most have a hole drilled in the center to fit your siphon tube. You'll have to discuss this with the vendor.

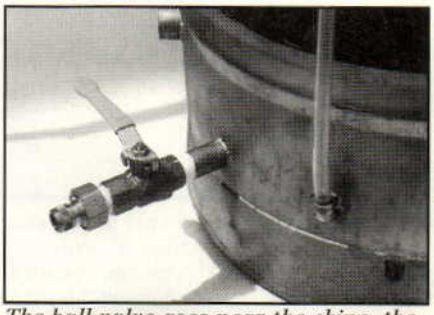
The size and shape of the holes in the false bottom of mash tuns is a highly debated issue. Some insist that slitted stainless steel should be used, while others assert that holes of a particular size and frequency work best. Like "dry yeast versus liquid yeast" debates, the decision is up to you. Just be sure to support the metal; it isn't meant to carry 40 pounds of grain without flexing.

Once you've made all your decisions, it's time to drill holes for your nipples or couplings and weld or braze them into your keg. If you are TIG (tungsten inert gas) welding your couplings you'll get a cleaner weld if you attach the kettle lid and flood the vessel with inert gas. Any welder familiar with sanitary welding will know this.

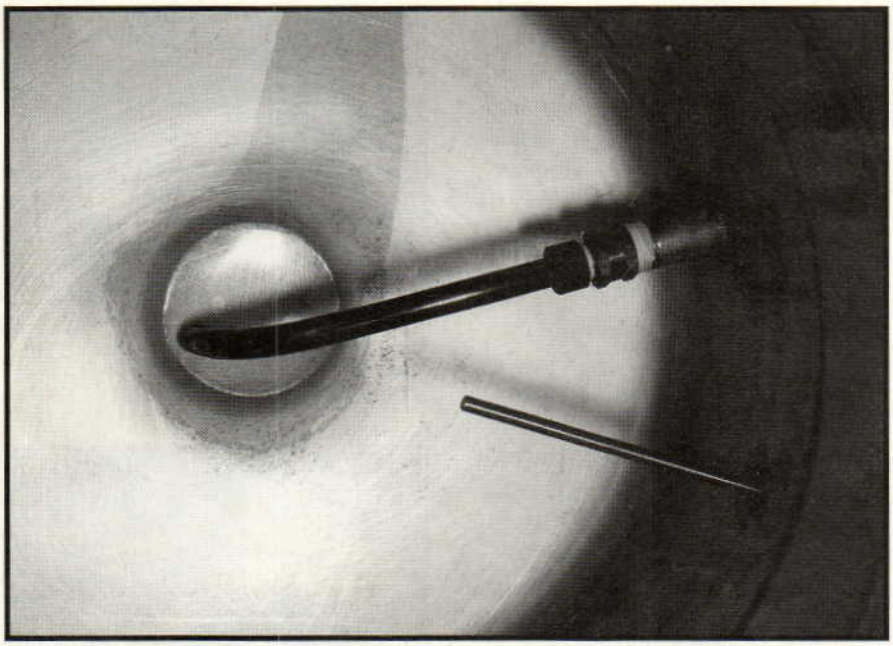
Some more advice from Stewart at Moving Brews: "Before you leave the welder, make sure the piece is watertight and that you can thread things into the threaded nipples or couplings. It's no fun to find a pinhole leak or victimized thread."

Now it's time to clean your ket-

First release any residual pressure in the keg (careful; it can be dangerous). Then cut the top off, sizing the hole slightly smaller than your lid.



The ball valve goes near the chine, the place where the keg's bottom, side and support ring all meet.



Bend the copper siphon tube in a nice soft arc that reaches to the bottom of the kettle. I used a flare fitting to attach it to the ball valve coupling. If you're using the kettle to boil wort, you can install the valve low, very close to the chine, and use a stainless steel or copper "chore boy" as a hop filter. You can also see the temperature probe. This should be installed about midpoint near your normal liquid volume, above and offset from the ball valve.

tle with strong cleaner. Some welders will have caustic and acid tanks for cleaning. You need to get the grunge out of the kettle and fittings. I recommend a cleaner called PBW from Five Star (800-782-7019; www.fivestarchemicals.com).

The siphon tube

Finally we come to the siphon tube and its construction. Most of the siphons we've seen are made with a compression-fitting at one end and a curved copper tube reaching to the kettle bottom.

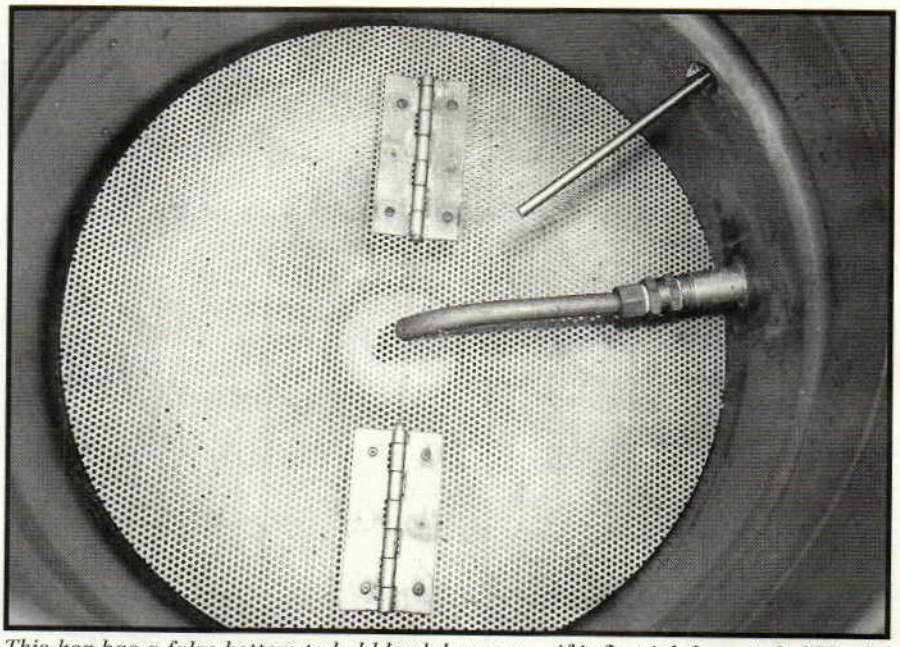
We think a flare fitting would be a better choice. Compression fittings are meant to be tightened once and seldom taken apart. Flare fittings are removable and may leak. But — what the heck — who cares if the fitting leaks inside the kettle? Also, I built a flare-fitting siphon tube because I have flare tools.

Either way, start by deciding

where you want the suction end of the tube. Bend the tubing (soft tubing, not regular copper pipe for water lines) in a nice soft arc and 1 to 2 inches overly long. Then place the tube inside the kettle, screw the flare (compression) fitting into the coupling and measure precisely where the siphon belongs. If you have a false bottom, you'll have to install it as well. You can always bend the pipe a little more and remove a little extra metal.

Wrapping it up

You're finished. The kettle is atop your burner, happily heating gallons of liquid. What did it cost you? Keg: anywhere from zero to $80 *(see "Obtain the Keg" on next page)*. Welding or brazing will cost at least $10 (for brazing supplies) to $100 for a multi-fitting keg (cutting and shaping the opening, a siphon, sight gauge and thermometer).



This keg has a false bottom to hold back hops or — if it fits tightly — to hold back grains during the mash. (You can buy false bottoms from homebrew suppliers; many are sized to fit standard kegs). The siphon tube passes through the false bottom on its way to the bottom of the keg. With this design, you have to be careful when stirring the mash. We suggest a mark on your paddle so you don't hit the probe, smash the tube or disturb the mash within a few inches of the bottom.

Parts from Moving Brews or other supplier will cost $38 ($28 stainless ball valve, $4 coupling, $3 3-inch nipple, $3 half-coupling) plus $25 to $40 for an optional thermometer and $5 for the homemade siphon. A false bottom will add another $20 to $90 to your expense list.

By way of contrast, a readymade deluxe mash-and-boil kettle from Sabco that includes a new keg, siphon, stainless steel ball valve, thermometer, false bottom and lid is $365 plus shipping.

At $55, the total cost for the cheapest do-it-yourself option we described, the attraction of a homemade converted keg kettle is obvious. At $290 or more, plus time and labor, store-bought might be a better deal. In any event, have fun with your project and be safe. ■

Thom Cannell is a longtime homebrewer and a veteran freelance automotive writer and editor.

OBTAINING THE KEG

THERE'S NO WAY THE deposit on a keg of your favorite microbrew is equal to the keg's commercial value of $80 to $120. Here's the bottom line: Keeping a keg is theft.

There are several well-known distributors of used and reconditioned beer kegs. The list includes:

- Sabco: (419) 531-5347; www.kegs.com
- BCI: (800) 284-9410
- Tosca: (920) 465-8534; www.toscaltd.com
- RCB: (888) 449-8859; www.rcbequip.com

Just to give you an idea, RCB's current price for a 15.5-gallon keg, with a straight side and a handle at the top, is $60 plus shipping. The price can be as low as $40 during RCB's frequent sales.

Some companies recondition, burnish and de-dent kegs, some do not. Some will cut the top opening. Sabco can provide a completely converted keg with all the fittings welded in.

Local breweries and salvage yards can also provide legal beer containers. One note: Terry Caffery of RCB warns that any keg bad enough to end up in a salvage yard might be more trouble than it's worth. Legal kegs also come from out-of-business breweries. These kegs are usually damaged (the Sankey valve is misaligned) or near the end of their life. —*T.C.*

Fresh Grape Wine

A step-by-step guide to making your first gallon

by Alison Crowe

BASIC WINEMAKING EQUIPMENT

HERE'S EVERYTHING YOU need to make your first one-gallon batch of wine from fresh grapes. You can find this equipment at any well-stocked homebrewing or home winemaking supply store.

- Large nylon straining bag (boil bag)
- Food-grade pail with lid (2 to 4 gallons)
- Cheesecloth
- Hydrometer
- Thermometer
- Acid titration kit
- Clear, flexible half-inch diameter plastic tubing
- Two one-gallon glass jugs
- Fermentation lock and bung
- Five 750-ml wine bottles
- Corks
- Hand corker

NOTHING FEELS AS satisfying and authentic as making your first batch of wine from fresh grapes. And there's no better time to try it than September, when grapes all over the country are ripening in commercial vineyards and backyard gardens.

There are many kinds of grapes to choose from, depending on where you live. *Vitis vinifera* is the classic choice for flavor, varietal character and historic authenticity. This famous wine-grape family includes such renowned varieties as Chardonnay, Merlot, Zinfandel and Cabernet Sauvignon. In the United States, *v. vinifera* grapes thrive in California and the Pacific Northwest, but they also grow in microclimates ranging from New York to the Great Lakes and beyond. If you can't find *v. vinifera* grapes, hybrids and *Vitis labrusca* grapes may grow near your home.

You can also order grapes through some winemaking shops or from a vineyard that ships fresh fruit. Wild Rose Vineyards in Lodi, California recently launched a direct-mail program for home winemakers. A 45-pound box of grapes costs about $50, including shipping (call 877-339-0102).

Whatever grapes you use, the basic techniques, equipment and ingredients are the same. Here's an overview explaining some key steps we'll take along the way.

Inspecting the Fruit

Make sure your grapes are ripe by squishing up a double handful, straining the juice and measuring the sugar level with a hydrometer, a handy device you can buy at a supply shop. The sugar density should be around 24° Brix (1.098 SG) and the fruit should taste sweet and slightly tart. The grapes must be clean, sound and relatively free of insects and other debris. Remove the stems; they could make your wine bitter.

Keeping it Clean

Winemaking demands a sanitary environment. Wash all of your equipment thoroughly with hot water, boiling what you can. Arm yourself with a strong sulfite solution for rinsing any equipment that comes in contact with your wine (add 3 tablespoons of sulfite powder to a gallon of water and mix together well).

Adjusting the Juice

Adjusting the juice or "must" of your wine is critical. Acid content is measured with a simple titration kit; you can buy one at a supply shop. The ideal acid level to shoot for is 6 to 7 grams per liter for dry reds and 6.5 to 7.5 grams per liter for dry whites.

Here's an example: If your must measures 5.5 grams per liter, then you need to add 1 gram per liter of tartaric acid to bring it up to 6.5 g/L. Since 0.2642 gallons equals 1 liter, 1 g/L is equivalent to adding 3.8 grams of tartaric acid to your one-gallon batch. Add this powder in 1/8-teaspoon intervals until the desired acidity is reached.

You also need to monitor the sugar level with your hydrometer. The must should be about 22° Brix for both reds and whites. To bring the concentration up, make a sugar syrup by dissolving one cup sugar into 1/3 cup of water. Bring to a boil in a saucepan and immediately remove from heat. Cool before adding to must in small amounts, one tablespoon at a time, until desired degrees Brix and specific gravity is reached. To lower the sugar level, simply dilute your must or juice with water.

The temperature of your must can also be adjusted to provide the perfect environment for yeast cells.

Warming up the juice gently is an easy way to bring it to pitching temperature without damaging the quality of the wine. Fermentation can sometimes reach into the 80° to 90° F range, though the 70° F range is about standard.

If your grapes are cold, use this unorthodox but quick trick: Heat up a small portion of the juice in the microwave, mix it back into the fermentation pail and re-test the temperature. An electric blanket wrapped around the fermentation pail also works, but takes longer. For cooling, add a re-usable ice pack to your pail and stir it around for a few minutes. Pitch the yeast when the temperature reaches 70° to 75° F for reds and 55° to 65° F for whites.

Racking the Wine

As in homebrewing, racking means transferring the fermenting wine away from the sediment. Insert a clear, half-inch plastic hose into the fermenter and siphon the clear wine into another sanitized jug. Then top it off and fit with a sanitized bung and fermentation lock. This is a delicate operation and it's important to go slowly. Avoid stirring up the sediment, but don't lose your siphon suction.

Bottling the Batch

Bottling seems like a complex process, but it's really not. To bottle your wine, you simply siphon your finished product into the bottles (leaving about 2 inches of headspace under the rim), insert a cork into the hand corker, position the bottle under the corker and pull the lever. It's wise to buy some extra corks and practice with an empty bottle before you do it for real.

Wine bottles can be purchased at home winemaking stores, or you can wash and recycle your own. Supply stores also rent hand-corkers and sell corks. You should only buy corks that are tightly sealed in plastic bags because exposure to dust, air and microbes can spoil your wine. Corks can be sterilized just before bottling, with hot water and a teaspoon of sulfite crystals.

A one-gallon batch will yield about five 750-ml bottles of wine. If the fifth bottle isn't quite full, then either drink that bottle or use smaller bottles to keep the wine. It's key to have full containers.

Now you're ready to make your first batch of fresh-grape wine. Below you'll find step-by-step recipes for a dry red table wine and a dry white table wine. Both recipes have similar steps and techniques, with one important difference. Red wines are fermented with the grape skins, seeds and pulp in the pail; the solids are pressed after fermentation. White wines are pressed before fermentation, so only the juice remains.

DRY RED TABLE WINE

Ingredients

18 lbs. ripe red grapes
1 campden tablet or 1 tsp sulfite crystals
Tartaric acid, if necessary
Table sugar, if necessary
1 packet wine yeast (like Prise de Mousse or Montrachet)

1. Harvest grapes once they have reached 22 percent sugar (that's 22° Brix or 1.0982 SG).
2. Sanitize all equipment. Place the grape clusters into the nylon straining bag and deposit the bag into the bottom of the pail. Use clean hands or a sanitized tool like a potato masher, to firmly crush the grapes inside the bag. Crush the campden tablet (or measure out 1 teaspoon of sulfite crystals) and sprinkle over the must in the bag.
3. Measure the temperature of the must. It should be between 70° and 75 ° F. Take a sample of the juice and measure the acid with your titration kit. If it's not between 6 to 7 grams per liter then adjust with tartaric acid as earlier described.
4. Check the degrees Brix or specific gravity of the must. If it isn't around 22° Brix (1.0982 SG), add a little bit of sugar dissolved in water.
5. Dissolve the yeast in 1/2 cup warm (80° to 90° F) water and let stand until bubbly (approximately 10 minutes). When it's bubbling, pour yeast solution on must inside the nylon bag. Agitate bag up and down a few times to mix yeast. Cover pail with cheesecloth, set in a warm (65° to 75° F) area and check that fermentation has begun in at least 24 hours. Monitor fermentation and temperature regularly. Keep the skins under the juice at all times and mix twice daily.
6. Once the must has reached "dryness" (0.5° Brix or 0.998 SG), lift the nylon straining bag out of the pail and squeeze any remaining liquid into the pail.
7. Cover the pail loosely and let the wine settle for 24 hours. Rack off the sediment into a sanitized one-gallon jug, topping up with a little dry red wine to fill the container. Fit with a sanitized bung and fermentation lock. Keep the container topped with grape juice or any dry red wine of a similar style. After 10 days, rack the wine into another sanitized one-gallon jug. Top up with wine again.
8. After six months, siphon the clarified wine into clean, sanitized bottles and cork.
9. Store bottles in cool, dark place. Wait at least six months before drinking.

DRY WHITE TABLE WINE

Ingredients

18 lbs. ripe white grapes
1 campden tablet or 1 tsp. sulfite crystals

Tartaric acid, if necessary
Table sugar, if necessary
1 packet wine yeast (like Champagne or Montrachet)

1. Harvest grapes once they have reached 22 percent sugar (that's 22 degrees Brix or 1.0982 SG). Inspect and remove any moldy clusters, insects, leaves or stems.
2. Place grapes into the nylon straining bag and put into the bottom of the pail. Using very clean hands or a sanitized tool like a potato masher, firmly crush up the grapes inside the bag.
3. Crush the campden tablet (or measure out one teaspoon of sulfite crystals) and sprinkle over the crushed fruit in the bag. Cover pail and bag with cheesecloth and let sit for one hour.
4. Lift the nylon straining bag out of the pail. Wring to extract as much juice as possible. You should have about one gallon of juice in the pail.
5. Measure the temperature of the juice. It should be between 55° to 65° F. Adjust temperature as necessary. Take a sample of the juice and measure the acid level. If it's not between 6.5 to 7.5 g/L then adjust with tartaric acid.
6. Check the degrees Brix or specific gravity of the juice. If it isn't around 22° Brix (1.0982 SG) then adjust accordingly.
7. Dissolve the packet of yeast in 1/2-cup warm (80° to 90° F) water and let stand until bubbly. When it's bubbling, pour yeast solution into the juice. Cover pail with cheesecloth, set in a cool (55° to 65° F) area and check that fermentation has begun in at least 24 hours. Monitor fermentation progression and temperature at least once daily.
7. Once the must reaches "dryness" (at least 0.5 degrees Brix or 0.998 SG), move pail to a cool place (below 65 ° F if possible), cover the pail loosely and let the settle for 24 hours. Rack the wine off the sediment into a sanitized one-gallon jug, topping up with dry white wine. Fit with a sanitized bung and fermentation lock. Keep the container topped with white wine. For the sake of sanitation, be sure the fermentation lock always has sulfite solution in it.

After 10 days, rack the wine into another sanitized one-gallon jug. Top up with wine. (For ideal white wine fermentation temperatures, store in cool cellar or temperature-controlled refrigerator).
8. After three months, siphon the clarified wine off the sediment and into clean, sanitized bottles and cork with hand-corker.
9. Store in cool, dark place. Wait three months before drinking. ■

Alison Crowe is a professional enologist at the Bonny Doon Vineyard in Santa Cruz, California and a graduate of the University of California at Davis.

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Last Call

Of Fruit And Men

My fear of brewing blueberry beer

by Blair Dils

Dils: A manly hunter-gatherer braving the wilds to capture some blueberries.

I should have seen it coming. Things were going far too well. It was the height of the Golden Era; brewpubs and micros were popping up everywhere. My friends and I were prolific brewers, making stouts, scotch ales, IPA and even rice ale. On Saturdays we often made pilgrimages to the temple — the homebrew supply store thirty minutes away — where we drooled over new equipment and stood around and talked beer. God, was it great. We were brewers — self-sufficient, rugged individualists — men of the early 1990s.

How things have changed. I'm not sure why, but somehow my wife, who'd been a cautious observer of my new "hobby," suddenly started saying the F-word.

"Honey," she called to me one evening when I was doing the dishes. "I really liked that strawberry or raspberry beer or whatever it was I had last night. You should make that kind." I shuddered. She had come right out with it—the dreaded F-word, F as in fruit, as in fruit beer. As in, according to my friend Bill, "a marketing ploy to get women to buy microbrews." As in, added Jon, "the wine coolers of the 90s: a chick drink all the way." As in, according to Tom, "no self-respecting man buys a beer named after a hair color."

It was a classic conundrum. I couldn't turn my wife down and my buddies would never let me hear the end of it. My only way out, I decided, was to keep it secret.

In order to save face, I decided to shun the fruit extract and take on the rugged task of laboring for my fruit. I would brave the Maine woods near where I lived, stare black flies in the face and capture the wild blueberries!

I began my quest the following morning at the manly hour of 5 AM. I armored myself against the vicious insects with my Bean boots and a raincoat that only left my face and hands exposed and headed into the wilds. I looked more like I was ready to handle toxic waste than pick blueberries.

Hours later, I returned home with five quarts of berries and only a few black fly bites. I immediately broke the yeast smack pack, planned out the rest of the recipe and prayed that none of my brewing compatriots would drop in.

I was dizzied by the options in the recipe books — use just the berry juice, boil the berries, put the berries in the secondary fermenter. Worried about bacteria on the blueberries, I finally decided to put them in at the end of the boil. Into the brew kettle went four quarts of blueberries; a half-hour later another quart went into the fermenter.

I should have been wearing my toxic-waste disposal suit when I popped the first bottle of blueberry beer four weeks later. Before I even tasted it, I knew I had made a terrible mistake. To this day I'm still not sure what went wrong. It didn't smell right. It tasted like poison, like some kind of blueberry champagne gone bad. (But I'll admit I was impressed with the beer's gorgeous purple-amber color.)

I stopped my wife before she could drink any. "That's too bad," she said. "All those blueberries!" My first real brewing failure, and she was worried about the blueberries.

Significantly humbled, the next week I brewed a batch of apricot wheat — with fruit extract, of course. The batch was so successful that apricot wheat has become a summer staple in our house. Now that we're all married with children, my friends and I have had to soften our stance on fruit beer. Brewing it no longer threatens our masculinity. Sometimes the F-word isn't quite as bad as it sounds. ■

Blair Dils has been homebrewing for eight years. He lives in the Berkshire Mountains of Massachusetts, where he works as a high school English teacher, freelance writer and soccer coach.

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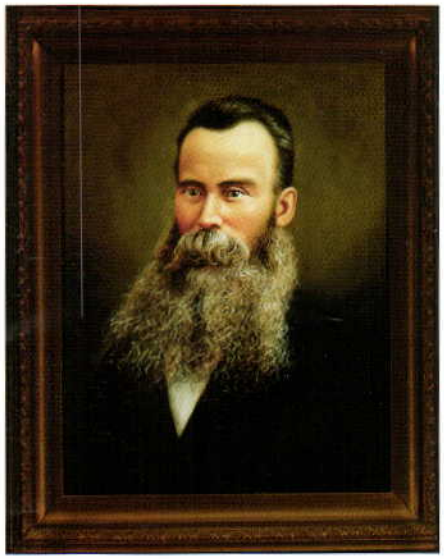

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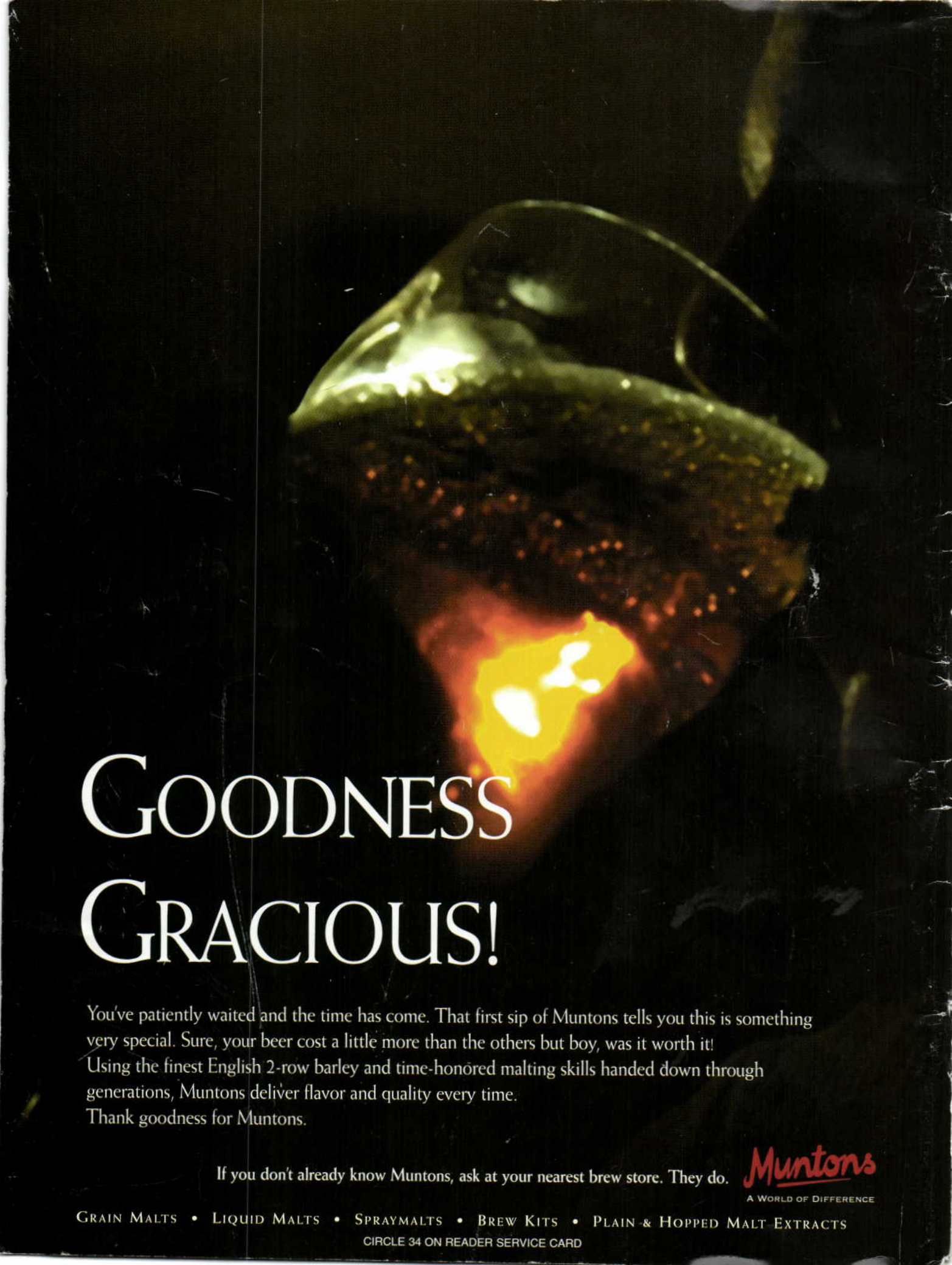

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Using the finest English 2-row barley and time-honored malting skills handed down through generations, Muntons deliver flavor and quality every time.
Thank goodness for Muntons.

If you don't already know Muntons, ask at your nearest brew store. They do.

Muntons
A World of Difference

Grain Malts • Liquid Malts • Spraymalts • Brew Kits • Plain & Hopped Malt Extracts

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