Brew Your Own

July 1997, Vol.3, No.7
Niche Publications Inc.

2ND ANNIVERSARY

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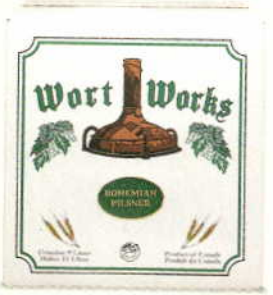

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CIRCLE 11 ON READER SERVICE CARD

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Cover photo: Kent Lacin

The Fuss About Cloning

Sure, I'm just as excited as the next guy that some scientist managed to clone a sheep. It's a genuine milestone, a real breakthrough. How soon until they come up with a wool suit I can put in the washing machine?

Most people seem to think that the ultimate will be cloning humans. I disagree. Although there are many people I'm fond of, I think for the vast majority of them, one is enough. And I don't care if you're Albert Einstein or Mother Theresa, two's the limit.

Then there's this whole thing about cloning yourself. People say, "Sure, I'd like to have a clone. I could be out playing golf while my clone was doing the grocery shopping." Yeah, right! Then you run into your clone on the golf course — remember, he's just like you — and he wonders why the heck you're not doing the shopping so he can keep his tee time.

The other thing is a lot of people seem to think if you clone somebody, you get a full-size replica. I think I saw a cartoon like this when I was a kid. The bad guy walks into the Clone-O-Matic and out walk 20 bad guys, all identical. Spiderman's in for it now!

But it doesn't work that way, so far anyway. That's why I think the ultimate is going to be cloning animals. Say your dog Max, a black lab, is the perfect family pet. Patient, loving, fetches the paper in the morning without leaving drool marks, doesn't mind when those unthinking toddlers pull his whiskers. A dog like that you want to keep around. So at age 12 or so, when Max seems ready to head off into the sunset — and just as the kids are heading into those troublesome teen years — you clone him. Boom. Another 12 years with your faithful friend. No watering down his genes with chromosomes from that nasty poodle down the street or, worse, that yappy Pekinese next door.

How about cloning the cat? You can have 15 more years to try to correct what you did wrong the first time.

Actually, cloning is a perfectly natural process, and it occurs all the time. In fact it happens in beer. I know what you're thinking. You open a nice bottle of Sierra Nevada Porter (good choice!). You drink it down. Then you open another one and fill your mug. That's it, cloning in a glass.

But wait! There's more to it. When yeast multiply, they do so by dividing. It's a process called mitosis. A single organism splits into two identical organisms. Sort of like creating identical twins, except by the time the yeast are done dividing, they've created identical bazillions. That's why scientists are able to keep yeast strains pure.

But not all "cloning" requires an electron microscope. This month's cover feature, "Clone Your Own," examines how to recreate your favorite commercial beer: yeast, hops, grain, water, brewing style. It suggests ways to find out just which grains and hops are used, and even includes recipes for clones of some classic beers. Believe me, this beats sheep any time. The story begins on page 32.

If you're in a partying mood, check out BYO's second anniversary barbecue, page 29. We cooked up some great food, all made with beer, we ate, we drank, and we took pictures of it so you could see what a great time we had! Oh, yeah, and we included all the recipes so you can clone your own anniversary party. Sound like fun? We thought so!

Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

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CIRCLE 25 ON READER SERVICE CARD

Hot BYO 7/97

Remember When . . .

John Higgins
Columbia, S.C.

The time was the 1930s, and the Depression was at its peak in the South.

My father, like many others, could not afford the price of beer, so he created his own homebrew. Using yeast and placing the mixture in bottles with corks, he let the homebrew ferment in closets in our home. For some reason he felt that the brew would ferment faster in the dark.

There was another reason why the homebrew was kept in closets; it was illegal to brew at that time, so he kept the brew hidden.

My brother and I slept in the room with a closet, and at times the homebrew would reach its fermenting peak and pop the corks off the bottles.

The sound of the exploding corks would jumpstart the two of us awake and as we looked toward the closet, we would see white foam flowing from under the door. The amount of the concoction lost in this way was minor, so enough was left in each bottle for drinking purposes.

Today when I see someone pull the cork out of a champagne bottle and the crisp sparkling liquid flows from the top, I am reminded of our bootlegging days in the 1930s.

During the Depression John Higgins awoke to the sound of exploding corks.

Peter Hirst
Bethesda, Md.

At 47 I do not exactly consider myself a senior, but I first learned to brew from one. Here's my story.

I first met my stepmother's father, Johnny Murphy, about 1965. I was 15, and he was somewhere in that range of incomprehensible agelessness beyond 65. That put him in his prime during Prohibition, and was he ever. When he got the hint I might be interested in homebrewing, he bestowed on me not only his ancient knowledge but some equally ancient equipment.

Into my basement went a small collection of equipment and attendant lore. A five-gallon wooden keg and a 15-gallon steel one were the main fermentation vessels. Johnny also supplied a complete tap system for the keg along with an explanation of the different systems. There were two keg systems in use: the Peerless and the Golden Gate. As I recall, the Peerless was a two-tap system, one tap (the beer end) at the bottom side of the keg and another (the pressurizing gas) in the center of the top. The Golden Gate was the one-holer used at frat parties, with a single-end tap supplying gas pressure (through a hand pump) and the beer tap. The system Johnny gave me — along with the information that it was preferred by every speakeasy he dealt with — was the two-tapper.

Bottling was done from the wooden keg through a rubber siphon hose fitted flush to a six-inch-by-six-inch block of pine, which floated on top of the brew. The block descended with the level of the brew, until it came to rest just above the lees (trub) on four little feet created by the heads of four nails driven part way into each corner on the underside of the block. That, a hydrometer, and an ancient cast-iron capper — which I still use — were about it.

Johnny's recipe was as simple as the setup. The soul of his brew was Blue Ribbon Malt Syrup, available at the store for about 79 cents for a three-pound can. It came in plain and hop-flavored, and there was no doubt which the true brewmaster would choose. One can of syrup and enough cane sugar to float the hydrometer at 12 — you heard me — 12 percent potential alcohol, made up five gallons of wort. The only recommended adjunct, for clarification, body, and anything else this fine brew could possibly lack, was something called "elixir gentian glycerinated." He assured me that any druggist worth his epsom salts could supply it, and I am sure that in the 1920s that was the case. I have searched for the stuff for 30 years, and the closest I have ever come to finding the elusive elixir was the far-off stare and a vague recollection from a retired pharmacist in Claremont, Calif.

The yeast, of course, was the finest culture available: Fleischmann's. Because the sugar was deliberately calculated to max out the yeast's alcohol tolerance — to say nothing of that of the beer drinker — it had to be

BREWING IN STYLE!

Do you have a favorite or lucky outfit you wear when brewing? Tell us about it and send us a picture. There's a cool BYO T-shirt in it for you. Send your story to Pot Shots, c/o Brew Your Own, 216 F Street, Suite 160, Davis, CA 95616. Or send us e-mail at edit@byo.com. Be sure to include your mailing address!

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slightly diluted at conditioning time. After fermentation a quart of water and a cup of sugar went into the vat and the brew went into the bottle. It was drinkable, if at all, within a week of the boil. Johnny instructed me on how to pour a homebrew so as to keep the lees out of the pour, and that it should be clear after chilling, especially with the elixir gentian working.

My first batch of this stuff was actually a success. As I recall I surprised my father — who was at the time into Heineken — with the first bottle, on Father's Day in 1966. His critical response was something like, "Oh my god, it's beer — my kid is brewing beer. It tastes just like the Japanese beer we used to get overseas right after the war." To my amazement, it actually did clarify on chilling, and for all I knew then, it looked and tasted like real beer.

Aside from the skull-popping alcohol content, the main attraction of this stuff was the price. I figure it ran me about 5 cents a bottle, including the bottle. Here's to you, Johnny Murphy!

Family Brewers

It all started on Christmas morning when our older son, who lives nearby, introduced a case of his own pumpkin beer to a gathering of the clan.

Unaccustomed as I am to the sipping of suds at that time of day, I hopped right to it. That concoction tasted so darn good. The whole family agreed.

When all the Christmas presents were opened, Brewmeister Charlie and daughter-in-law Rose had provided homebrewing starter kits to his parents, his brother, and his brother-in-law. Yep! We're all doing it; we're brewing it.

We can now report that everyone's first batch was a total success.

Lil and Milt Huntington head an entire family of homebrewers.

Understandably, the Huntington parents achieved highest honors (youth is no substitute for experience).

Milt Huntington
Augusta, Maine

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Brew Your Own

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Dishwasher Magic

Dear Brew Your Own,

I was struck by Greg Furlich's picture in "The Curse of Funky Beer" in Last Call (May '97 BYO). I then realized not everybody had heard the tip that I was given. It appears that Greg was bottling beside his dishwasher. And that's where his problem lies. It's easier to bottle on the open lid of the dishwasher. The bottles are at a more ergonomically efficient height for filling and capping (also try sitting on a kid's chair or a low stool).

Even better, any moisture from wet bottles or spilled beer is cleaned up by closing the dishwasher door. If you miss the lack of pressure you had from the countertop to the floor, you can put the bottling bucket on top of your upside-down kettle on the countertop.

Hal Davis
Plano, Texas

Sanitizing With Iodophor

Dear BYO,

In "Out, Out Damn (Iodophor) Spot" (April '97 BYO) it says that iodophor is designed "to be added in small quantities to hot water to create sanitizer solution." The instructions on my bottle and all of the references I can find on it indicate that it is to be used in water that is cool to room temperature, never hot. This may be a bit confusing to some readers.

Phred Petersen
San Antonio, Texas

Thanks for your correction. Iodophor should be used in water that is cool to room temperature, not hot.

Surprise!

Dear BYO,

We were in the process of moving when my husband, Greg, showed me the Gonzo Label Contest entry form in *Brew Your Own*. I quickly whipped up a few labels and sent them in. After what seemed like the move from hell (no phone for a month among other problems), I spaced the contest until just recently.

Upon opening the May issue of BYO, I was so surprised to see that my label had won Editor's Choice ("Label Contest Winners"). Being excited, I showed Greg my label in the magazine. His comment was, "It's understandable he would pick yours, by reading his articles, he seems to have an odd sense of humor." Should I take this as a compliment?

Jan Donley
Elkhart, Ind.

Definitely a compliment. We received many, many odd labels.

Dry Ice Carbonation

Dear BYO,

I just read about carbonating with dry ice in Mr. Wizard (May '97 BYO). Although Mr. Wizard advises against using dry ice, you know someone will try it. Here are some safety tips I learned from experience ("South Pole Brewer," Dec. '96 BYO).

When carbonating any beverage, chill the liquid first. The closer to freezing the better and faster the CO_2 will be absorbed, and the dry ice will not vaporize as quickly. Start with a small amount. Four grams of dry ice per 750 milliliters works well.

Avoid glass bottles. Use transparent amber plastic. You can tell if the CO_2 is being absorbed by feeling the bottle for excess pressure.

Use dry ice that is fresh and solid or your bottles could explode.

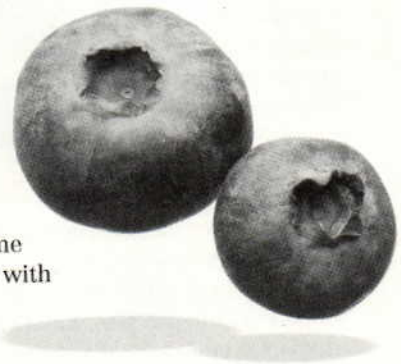
Jason Dorpinghaus
South Pole

Finding a Pump

In "Build a Beer Engine" (May '97 BYO), the main part for the beer engine is a Fyn-Spray sailboat galley pump, manufactured in New Zealand. Those who do not live near marine shops can order them from the national distributor of the pump through What's Brewing homebrew supply store. Contact John Fogarty at wbrewing@aol.com or call (609) 485-2021.

Found My Thrill...

by Scott R. Russell



All right, maybe it's not as bad as a zucchini glut, but don't we all, every once in a while, um, overdo it picking blueberries? I know I do. We have friends and relatives who live in cities to the south of us who come up to Vermont to visit during the summer. They're looking for "country charm," of course, and one of the quaint "country" things by which they are adequately entertained is picking their own fresh fruit. Depending on the month of their arrival, we send visitors out to scavenge for wild alpine strawberries, black raspberries, and apples (no, we have not as yet sent them on a wild snipe hunt, but maybe someday).

One fruit we cannot seem to grow in abundance on our property is blueberries. We have a few straggling bushes, and we get a handful of berries every year, but seriously, they are much closer in stature to "ornamental" than to "food." Fortunately, there are a couple of berry farms nearby, and since it is a scenic drive to get there, off we go. A few hours later, home we come with buckets of berries. And naturally, the next day our friends protest that they don't have room for all those berries in their overloaded cars heading back to the city, so we're stuck.

Now, I like blueberry pancakes, muffins, and pies as much as

Blueberry Porter
(5 gallons, extract and grain)

Ingredients:

- 0.25 lb. chocolate malt
- 0.25 lb. black patent malt
- 0.5 lb. crystal malt, 60° Lovibond
- 5 lbs. unhopped dark dry malt extract
- 0.5 oz. Challenger hop plugs (4% alpha acid), for 60 min.
- 0.5 oz. Fuggle hop plugs (2.5% alpha acid), for 30 min.
- 0.5 oz. Mt. Hood hop plugs (2% alpha acid), for 10 min.
- 10 to 14 g. dry ale yeast or Wyeast 1742 (Swedish ale yeast)
- 4 lbs. whole fresh or frozen blueberries
- 2/3 cup dark dry malt for priming

Step by Step:

In 2.5 gals. cold water, steep chocolate, black patent, and crystal malts. Heat water slowly, remove grains near 160° F, and sparge with a quart of hot tap water. Add to kettle the unhopped dark dry malt extract. Stir carefully and bring to a boil. Add Challenger hops and boil 30 minutes. Add Fuggle hops and boil 20 minutes more. Add Mt. Hood hops and boil 10 minutes more. Cool and top off to 5.25 gals. with pre-boiled, chilled water. At 70° F, pitch yeast.

Ferment six to 10 days at about 65° F. Rack into secondary on blueberries. Condition at about 55° to 60° F for six to 10 days, then rerack into a third vessel to clarify for four to six days. Prime with dark dry malt, bottle, and age three weeks at 50° F.

All-grain brewers:

Mash 6 lbs. two-row pale malt, 0.5 lb. wheat malt, 0.5 lb. Munich malt, and 0.5 lb. brown malt in 12 qts. water at 149° F for two hours. Steep specialty grains from the regular recipe in runnings and sparge with an additional 15 qts. at 168° F. Continue with boil as above.

Yeast:

I really like this new Wyeast strain, 1742, for porters. It's clean and neutral, yet it seems to reinforce the dark malts without making them seem harsh. There's virtually no diacetyl and no other noticeable esters are produced. If you can't find it, the old standbys such as Wyeast 1968 or 1028 will do; if you can't use a liquid yeast culture, try using Coopers dry yeast.

Fruit:

Obviously, this brew is a seasonal one for me. Those of you not within fresh blueberry territory will have to make do with frozen or (shudder) canned blueberries. Four pounds of our local berries (the size of chick peas, roughly) give a noticeable blueberry flavor and aroma, even in a porter. I know of a Maine brewer who has used my recipe and only needed three pounds of the famous wild Maine berries (smaller than elderberries but oh so sweet and flavorful) to achieve the same degree of "blue."

If you do get fresh berries, my advice is to freeze them in bags for the length of the primary fermentation and then microwave them to thaw and partially sanitize them. The skins will break open and the juice will flow. Blueberry aroma will dissipate quickly if the berries are in the active fermentation, so you will always get a more aromatic brew by putting them into the secondary fermenter. Blueberry essences and blueberry juice concentrate could be used in a pinch, but they're not the same.

anyone. And it's always wonderful to put up a few jars of blueberry jam for the winter. Blueberry ice cream? Once a summer, okay, and even blueberry sauce for topping cakes or vanilla ice cream, sure, but eventually something very similar to cabin fever takes over. When visions of pickled blueberries, blueberry salad dressing, sun-dried blueberries, and blueberry milkshakes become more common than mosquitoes, there's bound to be trouble.

A point comes along when every brew I contemplate begs the question: "What would this be like with a little blueberry added?" One particularly fertile summer, seven brews in a row (plus one batch of wine and a small batch of cider that fall) got "blueberried": a cream ale, a weizen, a lambic, a mead, a brown ale, a Czech pils, and finally, out of desperation, a porter.

With the first six it was easy to tell at a glance that there were berries in the brew. Because, naturally, they were all purple. Even the brown ale. I got a secret satisfaction from the porter, however, because the blueberry snuck up on you.

It was almost black, slightly reddish in the right light, but not obviously blue. Until it was opened and sampled. And the crowd went wild. Blueberry aroma? Yessir. Dark, semi-dry but fruity-tart, slightly bitter, medium-bodied. This beer was gone before I realized how good it was.

Reader Recipes

New Bohemian Pilsner

(5 gallons, extract and specialty grains)

Pilsner, first brewed in Plzen in 1842, surprised everyone. No one had seen a bright, clear, golden beer before. Today it is probably the most copied beer in the world, although many of those copies are shamefully pale and bland. Packed with spicy Saaz hops, a good Czech Pils smells like fresh summer air, which is exactly when you'll be drinking yours. This recipe calls for dry hopping in the primary — yes, primary — to blow off some of the raw hop aroma because it uses hops not normally found in this type of beer.

Sean Saunders
Spagnol's Wine and Beer Making Supplies Ltd.
Vancouver, B.C.

Ingredients:

- 2.5 lbs. pale malt extract
- 2.5 lbs. maltose extract
- 2.2 lbs. pale dry malt extract
- 3.5 oz. crystal malt, 10° Lovibond
- 9.7 oz. cara-pils malt
- 5.75 oz. Saaz hops (10% alpha acid), 4 oz. for 45 min., 1.75 oz. for 5 min.

- 2 packages Windsor yeast, liquid Wyeast 2278 Czech Pils (if you can lager), or Wyeast 1056 American
- 3/4 cup corn sugar or 3.5 oz. maltose for priming

Step by Step:

Place the crystal and cara-pils malts in a grain bag. Add 2 gals. of cold water to your brewpot and insert the grain bag. Bring to a boil and remove bag. Soften liquid malt by immersing container in hot water for 20 minutes. Add extracts and bittering hops. Boil for 45 minutes. Add finishing hops during last five minutes.

Add 2 gals. cold water to primary. Add hot malt extract liquid to fermenter. Top with cold water to make 5 gals. Pitch yeast at 78° F. Rehydrate in warm water first if using dry yeast. Stir vigorously. Cover and store at room temperature. When foam head develops and then drops (after three to five days), siphon beer into secondary vessel and attach airlock. Store at room temperature. Bottle after seven to 10 days. Drink after 14 days.

Belgian Abbey

(5 gallons, extract and specialty grains)

This is a recipe for a strong Abbey-style ale. It has a rich malt character and typical fruitiness.

Sharon Miller
Portland, Ore.

Ingredients:

- 9 lbs. pale light malt extract
- 0.5 lb. crystal malt, 60° Lovibond
- 2 oz. chocolate malt
- 1 oz. Kent Goldings hops, for 60 min.
- 2 oz. Hallertauer hops, for 60 min.
- 1 lb. dark brown sugar
- 1 package liquid abbey ale yeast such as Chimay or Wyeast 1214
- 3/4 cup corn sugar for priming

Step by Step:

Steep crystal and chocolate malt in 1.5 gals. of water. Remove grain when water begins to boil. Add malt extract, brown sugar, and hops. Boil for 60 minutes. Cool and add wort to 3.5 gals. of water to complete the 5-gal. batch. Pitch yeast at 75° F.

Ferment until finished. Transfer to secondary and store for two weeks. Bottle condition for about three months. ■

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How to Keep Your Head

Mr. Wizard

I have been using Irish moss for some time in my homebrew to help keep it clear. I recently read that Irish moss can improve a beer's head retention. I have been getting some pretty ordinary looking Irish moss from local homebrew shops and not worrying about how old it is getting. Does it get old? Is it worth trying to find high-quality or fresh moss? Do some shops have better selections? Is it worth increasing the dose? (I have been adding a large pinch per five gallons.) Have you noticed better head retention?

C.R. Williams
Yreka, Calif.

There are so many attributes present in beer to enjoy; the color, clarity, aroma, taste, name, and foam. It seems that of all of these fine features, foam gets disproportionate attention. It just so happens that I am also a great fan of a fine foam.

Beer foam is primarily stabilized by proteins and their degraded cohorts, polypeptides. Protein foams are very common in other foods. Examples include egg foams (meringues), milk protein foams (the creamy stuff on a cappuccino), and wheat protein foams that form when pasta is boiled.

Beer foam is more complex than these systems and is also affected by iso-alpha-acids from hops, beta-glucan gums from barley (and barley malt), ethanol, certain metal ions, lipids, and the type and amount of dissolved gas. All of these tend to make beer foam more stable except for the lipids and, in very high concentrations, ethanol.

The presence of lipids is particularly negative, and small quantities of these fats will quickly collapse a foam. Lipids can come from raw materials, such as malted barley and certain adjunct materials, and yeast if allowed to die and autolyze. Another problem with decaying yeast is the release of protein-degrading enzymes into the beer that can reduce protein size and reduce the foam stability. This is one reason to limit the contact time between beer and yeast.

Now that I have briefly indicated which compounds are known to affect foam, on to the question. Does Irish moss have a positive influence on foam? Logically, there are two ways it could happen. The first is that the Irish moss itself is a foam-promoting compound. This is not the case. Chemically, the structure of Irish moss does not have the features of other foam stabilizers and practically, Irish moss does not form any type of foam.

The second possible explanation is that Irish moss removes a foam-negative component from the wort. The most notable foam negative compound is lipid. The literature on beer foam and on Irish moss is extensive, and I cannot find any reference citing the removal of lipid by Irish moss; the only compound significantly removed from wort by Irish moss is proteinaceous material, such as proteins, polypeptides, and amino acids.

I also have not been able to find anything relating Irish moss to foam stability. The only common thread between Irish moss and foam is that Irish moss removes the sort of proteins implicated with haze but does not remove foam-positive proteins. The folks who sell Irish moss are always quick to make this point because brewers usually are leery of anything that removes protein; they assume it will damage foam.

Brewers who use Irish moss use it to aid in the formation of hot trub and to improve the clarity of the finished product. I think Irish moss works very well for these purposes. The amount typically used depends on the beer and is arrived at by trial and error, but your dose of a large pinch per five gallons sounds normal.

There are different configurations of carageenan, the carbohydrate extracted from Irish moss when it is boiled. But the preparation used in breweries is all more or less the same with kappa-carageenan, the dominant form of the active compound. Age does not affect its activity. Some Irish moss is a shredded leaf form, and some comes in tablets, some in pellets. As far as I know, they are all effective, but the powder and pellet versions dissolve into solution faster and may have a better yield of carageenan, hence require a slightly lower amount.

There is a well known positive effect on foam from isinglass, a yeast fining. Isinglass is primarily used to help sediment yeast from beer after fermentation and can be used in place of filtration for cask ales or can be used to make filtration easier. In any event, isinglass also removes lipids from beer and can improve beer foam if lipids are present in the pre-fined beer. Because lipids are derived from grain and from yeast, all beers are likely to have some lipid, and isinglass will most likely improve the foam of most beers.

Mr. Wizard

Nobody appreciates a good stout as much as members of my homebrew club, and we frequently make a batch at our meetings. Although the results have been very tasty, there always seems to be a

smoky flavor to it. This smoke flavor has cost us big points in competitions with judges, who even suggest that we enter the smoked beer category. Recently, while touring a local microbrewery we were told that we should not be crushing our dark malts prior to adding them to the mash, that the crushed husks were the culprit for our smoky stout. Should we be crushing our specialty malts? If not, does this apply to all specialty malts or just the darker ones such as chocolate and black patent?

Kelly Underwood
Gales Ferry, Conn.

I must admit this advice (not milling your specialty malt) is strange if not directly contrary to the milling practices used by commercial breweries throughout the world. It is common to completely pulverize very dark malts such as chocolate, roast barley, and black malt prior to mashing. Unlike pale malt, these grains do not have the type of husks that benefit lautering. They are very brittle and usually turn to powder when milled. In fact many malting companies sell roasted products that are pre-pulverized. The rationale behind the practice is to maximize the yield of color and flavor compounds in order to use less of the stuff per unit volume. The method you mention would do just the opposite.

The real question here is not how to mill the malt but why the beer smells and tastes smoky. The smoky smell associated with smoked beers comes from phenols that arise during malt kilning. The phenols found in smoked malts are derived from either peat or beechwood, but phenols can also be derived from phenolic acids present in malt. Phenolic acids are not aromatic, but when chemically modified into phenols they are very aromatic. Certain yeast strains can convert phenolic acids found in wort into phenols and impart a phenolic character to beer. Most beers with a phenolic character have been contaminated with wild yeast strains, which are well known to convert phenolic acids to phenols. The phenolic character is a clear indicator of improper yeast handling.

Some beers, such as Bavarian weizens and Belgian ales, intentionally use yeast strains that are able to convert phenolic acids to phenols. These beers are considered normal when they have this particular aroma.

Another way that phenols can make it into beer is through intense roasting. During malt roasting, and coffee roasting for that matter, intense heat can and does convert phenolic acids to phenols, and very dark malts and coffees can take on a smoky aroma. I have made stouts that have the same aroma profile you are describing and, like the judges critiquing your stouts, do not like the aroma. I have also consumed coffees of very dark roast that smell like a heavily peated Scotch. The easiest way to solve the problem is to switch your roasted malt supply or to decrease the amount used. I have found more of these smoky aromas in roasted barley and black malt than other dark malts, such as chocolate.

If you really want to eradicate this flavor, I would really focus on selecting dark malts that do not have it. Tasting malt and making hot water extracts ("teas") of the malts you want to use will help to identify this flavor before using the smoky malt in your stout. Most likely you will be able to smell the smokiness in the malt if the malt is indeed the source.

Because yeast can also lead to phenolic flavors, you may want to evaluate your yeast by switching to a different strain for comparison. Many people describe the clovey, spicy character in weizen as smoky. If you have a yeast strain capable of producing these flavors (some ale strains produce the same compounds, only less), the yeast may be the culprit.

If all else fails, the milling advice may work. To be honest, I have never heard of such advice and would be very surprised if it did anything other than increase the cost of your beer.

Mr. Wizard

I keg all my beers but sometimes run out of refrigerator space. When this happens I leave my keg outside the refrigerator. My beer is not pasteurized, so how long can I safely store my kegs at room or refrigeration temperature before the flavor is affected?

Ray Nelson
Honolulu

They call me the Wizard, but a crystal ball I have not. The answer to your question has plagued brewers since beer was first conceived or however it came into being. Many famous scientists studied the spoilage of beer and wine, and Louis Pasteur developed the heat preservation technique now called pasteurization for beer, not milk. If brewers only knew how long their beer would last after packaging, distribution and packaged beer control would be so much easier.

The homebrewer and the pub brewer do have it pretty simple, however, because the palate can tell when the beer no longer tastes as it should. So the simple answer to your question is that your beer's flavor will remain unaffected by storage until your palate is able to detect that it has changed! At this point you may want to have a party and drink the rest of the beer before it becomes bad. Or if you detect the change in flavor at the same time it becomes bad, then you probably will want to dump the beer. This advice sounds crude because it is crude. However, it works and most pub brewers use their palate as the best indicator of freshness.

Professional brewers who choose to bottle, can, or keg their beer cannot use this simple method because distribution prevents it. When beer leaves the brewery, the brewer loses control over his beer's fate. Some distributors try to torture the beer in hot warehouses, others move it from hot to cold and back to hot to try to see if the "cold-filtered" thing really worked, and others place it in tall stacks at the end of the grocery store aisle like little kids playing with building blocks. I'm sure if these distributors knew what they were doing to the beer, they wouldn't do it unless, of course, they

are just plain mean and nasty!

This is where the brewer really wants a crystal ball. They measure dissolved oxygen in package, use predictive microbiological tests, conduct simulated aging studies, and look at historical data to attempt to predict how long their beer will last in the hands of the distributor. Some distributors and beer retailers are very kind to beer and provide a cold, dark place for the beer to reside. In this sort of environment, beer can last for more than a year and sometimes several years before "going bad," whatever that really means. The same beer may last only a couple of days in a less hospitable environment, such as a truck with no cooling stranded in Death Valley in July.

Based on all of these methods and a bit of guessing, some brewers put "Best Before" dates on their beers and others use "Born On" dates. These codes allow the consumer to judge freshness before making a purchase. If everything goes as planned, the distributor will remove any old product before the consumer ever buys it and the date can be used as a guide at home.

Other brewers use coded labels that are meant for the distributor's eyes only. This way, the distributor keeps the old beer off the shelf and the consumer can go about life being ignorant. These brewers figure it is their job to keep the beer tasting right, the distributor's job to keep the old stuff off the shelf, and the consumer's job to drink the damn stuff soon after they buy it! All of these methods have their merits and weaknesses.

In your case you are the brewer, the distributor, the retailer, and the consumer. If the beer gets old and starts to taste bad I would return it to the retailer and complain like mad. The retailer will trade the old stuff for new stuff with the distributor, the distributor will exchange it for new product with the brewer, the brewer will destroy the old product and, just like a commercial brewer, brew more beer to deliver into the consumer's mug.

Mr. Wizard

I was enjoying my favorite breakfast cereal one morning when I somewhat recognized the ingredients printed on the side of the box. These nuggets of natural goodness contained wheat, malted barley, salt and yeast. The ingredient list went on to list many B vitamins, zinc, and iron. I am seriously considering this as an adjunct for my next brewing. Chlorinated city water has been one of my problems, so I have been using distilled water with gypsum and salt. Could this be a great additive?

Chris Dowsett
Walla Walla, Wash.

Hobbyists, no matter what type, can always see the obvious application of anything to their hobbies. I suppose any homebrewer who has ever read the ingredients of Grape-Nuts has thought "mmmm.....beer." Sal Emma wrote "Confessions of a Cereal Brewer" (August '96 BYO) in which he described brewing with, among other

breakfast cereals, Grape-Nuts. So yes, Grape-Nuts can be used as an adjunct material in brewing.

As far as doing anything miraculous, I wouldn't hold my breath. My guess is that brewing with Grape-Nuts will give no unique flavors because the main ingredients are wheat and malted barley; sounds like the grist bill for a traditional weizen. I do have some doubts about three of the ingredients, namely iron, salt, and yeast.

Iron is a well-known oxidant that commercial brewers specifically avoid. Not only can iron oxidize beer flavor, but it also lends a flavor to beer that can be described as blood-like or the flavor of iron; yuk! Humans need iron so that we can synthesize hemoglobin, but yeast cells don't have much need for it.

Salt is not normally added to brewing water, although some brewers use it to provide some palate fullness to their beers. Breakfast cereals contain a pretty good dose of salt to make them more palatable, and this could add some fullness to your beer or make your beer taste salty if you used enough Grape-Nuts in your mash.

The last questionable ingredient is yeast. The yeast in Grape-Nuts is dead and is added as a source of vitamins, especially the B vitamins. In addition to the B vitamins, the yeast may lend a yeasty flavor to the beer, although this is unlikely.

I've never been one to discourage innovation and strongly recommend that you brew some beer with your beloved breakfast cereal. I do suggest starting off with a cautious addition of the tiny nuggets and adding more or less as your experience with the ingredient grows.

On a more pragmatic note, I, being an anal-retentive prude, could never justify the cost of adding breakfast cereal to a mash if the volume exceeded about one barrel (31 gallons). Next time you're in the store, read some cereal ingredient labels, look at the price of breakfast cereal per ounce, and source the price of the raw ingredients per ounce. Considering the raw material cost, the time these ingredients spend in production (a few minutes), the tax levied after production at the factory level (none), and the packaging cost (nowhere near the cost of a beer bottle), you will soon discover that breakfast cereals are some of the most inflated items in the grocery store. Instead of that microbrewery you have been dreaming of, consider a microcerealry! ■

Mr. Wizard's Address

Do you have a question for Mr. Wizard? Write to him c/o *Brew Your Own*, 216 F St., #160, Davis, CA 95616. Or send e-mail to wiz@byo.com.

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

Brewing Wheat Beer

by Suzanne Berens

Brewer: Greg Zaccardi
Brewery: High Point Wheat Beer Co., Butler, N.J.
Years of experience: 2.5
Education: Bachelor's degree in chemistry from University of California, Santa Cruz
House Beers: Kristall, Winter Wheat, Blonde, and Dark

From milling through every other stage, brewing wheat beer is different than brewing any other beer. You need to mill with a finer setting for wheat. But make sure your mill setting is not too fine, otherwise you can really stick your mash. Wheat is a little denser and harder to crack because the kernels are smaller. Make the mill setting tighter than for barley or the wheat will go right through without cracking.

Typically, Bavarian wheat beers, like those we make, consist of 50 percent wheat and 50 percent barley. American wheat beers usually contain 20 to 30 percent wheat. But the real difference is the yeast. We use a traditional Bavarian-style yeast strain that can only be found in Germany. It gives our beer an incredibly rich and complex flavor and aroma. In the United States brewers use a standard ale yeast for American wheat beers. That gives the beer a light, almost bland flavor.

For homebrewers the availability of yeast is a little more restricted. If you use a classic American ale yeast, such as Chico ale or American ale yeast, and you are using some wheat, that yeast will just make it a light-tasting beer, not flavorful or aromatic. Even an English-style ale yeast will not give wheat beer a real rich clove and banana aroma or flavor. The closest thing homebrewers can get to a traditional Bavarian yeast is Weihenstephan, or Wyeast 3068. It gives beer more banana and bubblegum aromas.

Yeast management for this strain is involved. You need a good, healthy yeast strain. I recommend making a substantial starter. Make sure it's vibrant and has the right population of yeast cells. If you want consistency, it has to be clean and active. A starter

High Point Wheat Beer Co.

Ramstein

"Everything you know about brewing a barley beer you should just erase when brewing wheat. You're really dealing with different grain altogether with a different flavor profile and handling."

Brewer: Greg Zaccardi

The Tips

- **Use a good, healthy yeast strain and make a good starter using vibrant yeast with the proper cell count.**
- **Oxygenate your wort as best you can and ferment between 68° and 72° F.**
- **Hydrate the grain, mash in thoroughly, and prepare a method for cutting the grain bed.**
- **Mill wheat using a finer setting than you would for barley. But make sure the milled wheat is large enough to avoid a stuck mash.**

should be pitched at high kraeusen. It's not a yeast that can lie dormant for a while and then be pitched.

Oxygenate your wort as best you can. The temperature for fermenting should be 70° F; from 68° to 72° F is a good range. The warmer the beer is fermented, the more esters you will get. If you're looking for heavy-duty banana aroma or bubble gum, ferment at 72° F. If you oxygenate correctly, the starter is good, and the pitching amount is right, expect the wort to be fully fermented in three to five days. This yeast is not highly flocculent. Some US pale-ale yeasts will drop right out, but this Bavarian strain will give you cloudiness.

The difference in texture between barley and wheat affects lautering. The more wheat a recipe has above 50 percent, the slower your lautering will be. For all-grain brewing you want to: 1) Dough in very thoroughly. First hydrate the grain as best you can, so the grain does not ball up into clumps. The grain and water should be evenly blended for mash in. 2) During lautering be prepared to use some method of cutting the grain bed very delicately. Use a stick, canoe oar, or a long stainless steel serving spoon to cut through the grain bed to ensure no channeling or the "concrete effect." Begin lautering slower than with an all-barley brew so you don't draw the grain right into the screen.

The components of wheat are different than barley. Wheat has more protein. That's the number one reason for a slow run-off. But that liability is also an asset once you open and pour the beer, because it gives it a nicer head. Look for a good boil to get a hot break and coagulated protein.

The only beer we brew that is filtered is Kristall, a malty wheat bouquet with hints of clove and apple. It has a creamy head and is balanced and crisp. Not filtering increases the stability of the beer because yeast remains in the beer. Yeast consumes oxygen, therefore you don't have oxidation. It also acts as a natural guardian against bacteria.

About 12 to 15 hours after brewing, once you've added yeast, rack the beer off of the cold break to another fermenter. ■

Branching Out With Brown Ale

by Alex Fodor

Brown ale originated in London and probably evolved from porter at a time when consumers demanded a less hoppy brew at a more affordable price.

Today many view brown ale as the bottled version of mild, the low-alcohol draft beer still popular in the midlands of England (see "Mild Ale: Low Alcohol Meets Full Flavor," December '96 BYO). Southern brown ale, while darker and sweeter than its northern cousin in Newcastle, is also less hoppy and alcoholic. Few commercial examples of the southern style are available in the United States. Alas, we are forced to reproduce this beer in our own homes.

The beer should be refreshing as well as fruity and malty. The hop level falls somewhere around 20 IBUs and contributes little aromatic character. Hops with harsh flavors, as many with high alpha varieties have, do not lend themselves to the mellow flavor of brown ale. Whenever possible use traditional British-style hops such as Fuggle, Goldings, or Willamette.

The original gravity varies but may be as low as 1.031 and as high as 1.035. The extract is primarily from pale ale malt and sugar. Molasses may contribute a rum-like character to the beer. For extra color and flavor a modest amount of crystal malt may be used along with a lesser amount of roasted specialty malts. Many commercial brewers add caramel to darken this brew, although there is no reason for homebrewers to do so.

The yeast used should not be over-attenuative (drying) and should have a fruity profile. A low amount of diacetyl is acceptable and will lend a butterscotch note to the beer. Add 14 grams of dried British ale yeast or yeast cultured from a Wyeast or other brand of liquid packet. Try 1968 New London yeast or 1318 London III ale yeast from Wyeast, because they will produce a sweeter beer. The beer can be fermented at temperatures from 60° to 72° F.

The best examples of northern brown ale available for the North American homebrewer are Newcastle Brown Ale and Samuel Smith's Nut Brown Ale. The northern style tends toward a fruity maltiness, slight diacetyl, medium carbonation, and little hop character. Because of its higher alcohol, it may go by the name of strong brown in Britain.

Newcastle is traditionally a blue-collar beer meant to refresh after a hard day's work. Again, use pale ale malt to make up the bulk of the grist along with a modest amount of crystal and less roasted malt than

Dark Streets of London Brown Ale
(5 gallons, all-grain)

A high mash temperature and a less attenuative yeast make this dark and drinkable brew sweeter than its northern counterpart. Use an extra pound of pale malt if you do not have a high extraction rate.

Ingredients:
- **5 lbs. pale ale malt**
- **8 oz. British crystal malt, 40° to 60° Lovibond**
- **8 oz. chocolate malt**
- **8 oz. dark molasses**
- **6 oz. Northern Brewer hops (7% alpha acid), for 60 min.**
- **0.5 oz. Kent Goldings hops (5% alpha acid), for 30 min.**
- **1/2 tsp. Irish moss**
- **3/4 cup corn sugar for priming**

Step by Step:

In an infusion mash tun, mash grains into 2 gals. of hot water, reaching a mash temperature of 153° to 155° F. Hold at this temperature for one hour. Sparge with 5 gals. at 168° F. Boil for 30 minutes and then add Northern Brewer hops. Boil 30 minutes more and add Kent Goldings hops. Boil 15 minutes more and add Irish moss. Boil 15 minutes. Total boil is 90 minutes. Cool and aerate wort. Pitch yeast at 75° to 60° F. Ferment at 60° to 72° F. After fermentation and aging, prime the beer with corn sugar or force carbonate in a keg.

OG = 1.035
FG = 1.010 to 1.014

Dark Streets of London Brown Ale
(5 gallons, extract)

Ingredients:
- **4 lbs. pale malt extract syrup**
- **8 oz. British crystal malt, 40° to 60° Lovibond**
- **8 oz. chocolate malt**
- **8 oz. dark molasses**
- **0.6 oz. Northern Brewer hops (7% alpha acid), for 60 min.**
- **0.5 oz. Kent Goldings hops (5% alpha acid), for 30 min.**
- **1/2 tsp. Irish moss for 15 min.**
- **3/4 cup sugar for priming**

Step by Step:

Prior to the boil, steep crushed grains in a nylon mesh bag in 2 gals. of water at 160° F for 30 minutes. Some agitation will help extract the flavors from these grains. Remove the bag and squeeze out liquid. Add 3.5 gals. of water to bring the total volume to 5.5 gals.

Dissolve the malt syrup and the dark molasses in the water. Bring the mixture to a boil. Add Northern Brewer hops. After 30 minutes add the Kent Goldings hops. Boil 15 minutes more and add Irish moss. Boil an additional 15 minutes. When the wort has boiled for 60 minutes, shut off the heat and cool the wort. Aerate wort and add yeast at 75° to 60° F. Ferment at 60° to 72° F. Bottle with priming sugar.

OG = 1.035
FG = 1.010 to 1.113

Geordie's Tipple Brown Ale
(5 gallons, all-grain)

The northern version while higher in alcohol has a dry, refreshing finish. For less efficient systems add an extra pound of pale malt.

Ingredients:
- **6.5 lbs. pale ale malt**
- **8 oz. British crystal malt, 40° to 60° Lovibond**
- **4 oz. chocolate malt**
- **1 lb. brown sugar**
- **0.6 oz. Northern Brewer hops (7% alpha acid), for 60 min.**
- **1.2 oz. Kent Goldings (5% alpha acid), 0.7 oz. for 30 min., 0.5 oz. for 15 min.**
- **1/2 tsp. Irish moss**
- **3/4 cup sugar for priming**

Step by Step:

Follow Dark Streets Brown Ale directions with the following changes. Use 2.5 gals. mash water and aim for a conversion temperature between 150° and 152° F. Add hops at 15 minutes prior to the end of the boil as well as additions at 60 and 30 minutes.

OG = 1.048
FG = 1.010 to 1.014

in the southern style. Although the beer is called nut brown, the color is closer to ruby red. Use a more attenuative yeast than in the southern brew and cut the mash temperature down a notch to give the beer a drier finish. Most British-style dried ale yeast should work well. If liquid strains are used, try 1275 Thames Valley or 1098 British ale yeast from Wyeast. Shoot for a gravity between 1.047 and 1.050. ■

Alex Fodor is a graduate of the master-brewer's program at the University of California, Davis.

Geordie's Tipple Brown Ale
(5 gallons, extract)

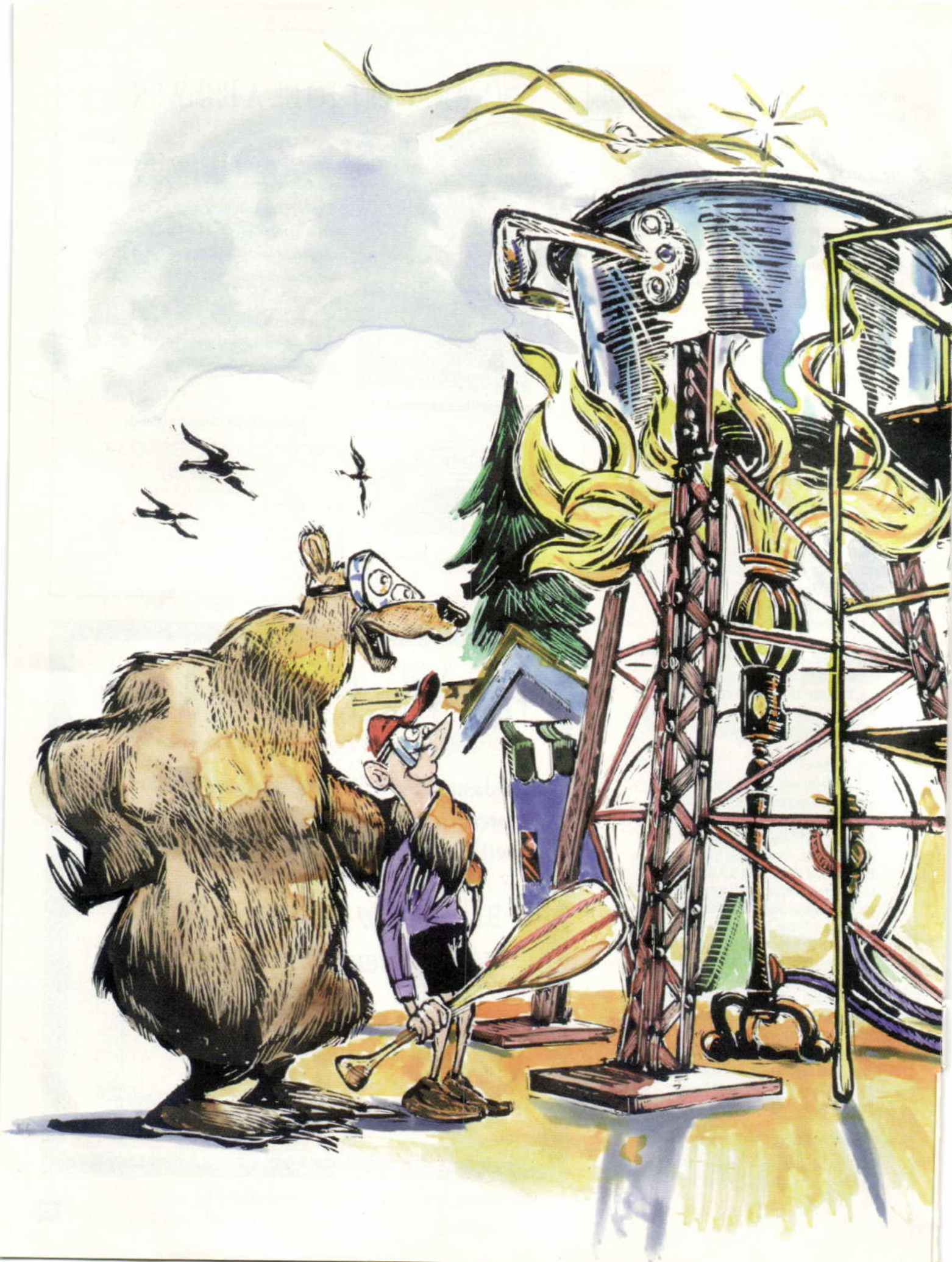
Ingredients:

- **5 lbs. pale malt extract syrup**
- **8 oz. British crystal malt, 40° to 60° Lovibond**
- **4 oz. chocolate malt**
- **1 lb. brown sugar**
- **0.6 oz. Northern Brewer hops (7% alpha acid), for 60 min.**
- **1.2 oz. Kent Goldings (5% alpha acid), 0.7 oz. for 30 min., 0.5 oz. for 15 min.**
- **1/2 tsp. Irish moss**
- **3/4 cup sugar for priming**

Step by Step:

Prior to boil, steep crushed grains in nylon mesh bag in 2 gals. of water at 160° F for 30 minutes. Some agitation will help extract flavors from these grains. Remove the bag and squeeze out liquid. Add 3.5 gals. to bring total volume to 5.5 gals. Dissolve the malt syrup and the brown sugar in the water. Bring mixture to a boil. When the boil starts, add Northern Brewer hops. After 30 minutes add 0.7 oz. Kent Goldings. Boil 15 more minutes and add remaining hops and Irish moss. Boil 15 more minutes. When wort has boiled for 60 minutes, shut off heat and cool wort. Aerate wort and pitch yeast at 75° to 60° F. Ferment at 60° to 72° F. Use sugar for bottling.

OG = 1.048
FG = 1.010 to 1.013



Backyard Brewing

SHAWN TURNER ILLUSTRATIONS

by Sam Wammack

Ah, nature! The birds are singing, the bees are buzzing, and the beautiful outdoors is the place to be. Since homebrew is a natural beverage made from grain, hops, yeast, and water, why not make it outdoors where nature made the ingredients?

Many homebrewers do their brewing outside. Some brewers choose the great outdoors because they like the peace and quiet and because it helps the brewing process. All that's needed is a small area of a backyard or patio, and you can enjoy a nice, quiet beer-making session far from the roar

of the vacuum cleaner, the kids, and the television set.

Other brewers take it outside because they have to. It's not unusual for homebrewing to be done outdoors at the request of someone else in the household — usually a spouse who doesn't appreciate the pleasant aroma of boiling wort or whose enthusiasm for kitchen cleanup is surprisingly limited.

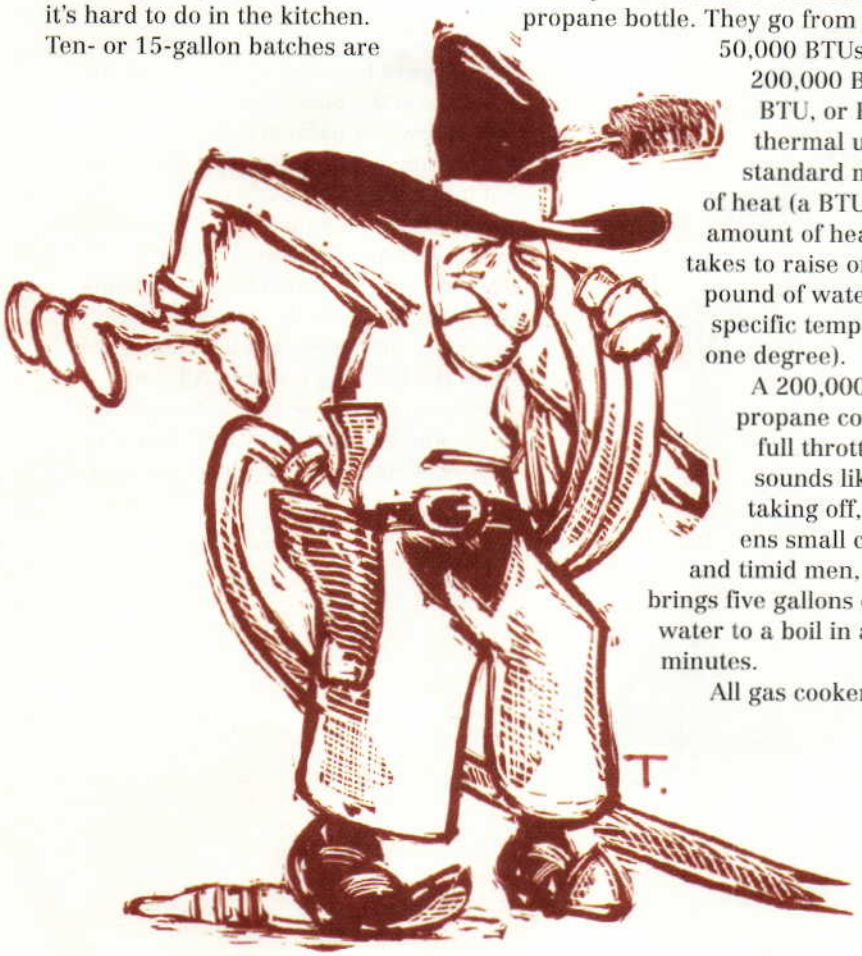
The Outdoor Advantage

There are some real advantages to taking the brewing process outside: having space for a full-wort boil, making cleanup easy, and cutting down on wasted water, to name a few.

Full-wort boil: The ability to boil the entire wort on a natural gas or propane cooker is one of the biggest advantages to brewing in the great outdoors. A full-wort boil is important to beer quality, and sometimes it's hard to do in the kitchen. Ten- or 15-gallon batches are just about impossible on a kitchen stove, because the pots are much too large to fit on a single burner. And even if they did, it would take a long time to bring one to a boil.

Even a five-gallon batch requires about a seven-gallon brewpot. A pot that size often won't fit conveniently under a kitchen range hood. If it does it will probably span a couple of burners, which can scorch the stove top. Electric ranges can cause some problems in brewing, such as scorching malt extract in the bottom of the pot. Temperature control on an electric range is difficult because the heating element stays hot after it is turned off.

The solution to all this is purchasing a natural gas or propane cooker to use outside. Bigger is better for this, so don't be afraid to get a big one for homebrewing. Gas and propane cookers are economical, usually less than $50 without the propane bottle. They go from about 50,000 BTUs to 200,000 BTUs. BTU, or British thermal unit, is a standard measure of heat (a BTU is the amount of heat it takes to raise one pound of water at a specific temperature one degree).



A 200,000-BTU propane cooker at full throttle sounds like a 747 taking off, frightens small children and timid men, and brings five gallons of cold water to a boil in about 15 minutes.

All gas cookers *must* be used outdoors, unless you have an inspected and approved venting system installed for the exhaust gases.

If you are brewing 10- or 15-gallon batches, be sure to get one of the cookers with extra steel support to handle the weight. Your homebrew supplier can help you find a cooker made especially for homebrewing. The "shrimp cookers" made of round wire and sold by chain stores will bend under the weight of a big brewpot.

Easy cleanup: Brewing outside can save a lot of cleanup time in the kitchen. At the start of a full-wort boil, it seems that the pot tends to boil over once or twice just before the hot break. Indoors that's a big deal. If you can't stop the foam from going over, the stove has to be cleaned. Outdoors, all that is involved is hosing off a patio slab after the brewing session. Since I brew outdoors in all weather, I have found that being outside can even help control a boilover. A handful of clean, fresh snow tossed into the brewpot makes the foam go down!

Instant cooling in the heat and heating in the cold: Snow, on the other hand, is not an effective wort chiller. Some homebrewers in cold areas figure that they are getting effective wort chilling when they brew outdoors in sub-freezing weather by packing the brewpot in snow.

Unfortunately, that doesn't work very well. It takes too long that way to get a boiling batch down to yeast pitching temperature, and a wort chiller is still needed. What does work well, and makes the brewing experience more pleasant in sub-freezing weather, is standing close to the boiling brewpot and holding your hands in the steam!

In the summer getting warm is not a problem; quite the opposite is true. Boiling the wort outdoors can be a lot better than boiling it inside the house on hot days. By brewing outdoors you can avoid generating a lot of unwanted heat in the kitchen. Of course in the summertime it may be more important to keep a lid on your outdoor brewpot. I once made a batch of homebrew I named "Grasshopper Ale," and the origin of the name is obvious when you consider that I made it outdoors, on the grass, in Missouri, in August. Every

time I removed the brewpot lid to stir the wort, my beer had visitors. I think I got them all out. People eat grasshoppers in some parts of the world anyway, and heck, it was a great beer.

Water Conservation: Wort chilling (not with snow) works great and wastes less water when it is done outdoors. All immersion and most counterflow-type wort chillers use running water to chill the wort, but if you're using them indoors, the outflow of running water has to be sent down a drain, wasting water. When chilling wort outdoors, the water source is usually a garden hose, which is easier and more mobile than hooking up to a kitchen faucet indoors. When doing this outside, it's easy to direct the outflow to plants that need watering, a wading pool, or buckets for washing a car. The water from the outflow is clean and there is no need to waste it.

Easy-to-use equipment: The garden hose is an outdoor brewer's friend. It's great for rinsing equipment, hosing off spills, and attaching to a wort chiller. It should not be used for brewing water or to add water to the beer wort. If you have to top up a brewpot to replace water that has evaporated, bring water from inside the house. Hose water tastes like, well, a garden hose — which is not a desirable beer flavor.

A "sanitation tub" can be maintained outdoors better than indoors, at least in above-freezing weather. There are many different versions of this practice, and homebrewers have figured out various ways to keep items of equipment in a semi-sanitary condition between brews.

I hate scrubbing dirty beer bottles — especially when they come from a bar and have mold and cigarette butts inside. Instead, I keep a covered, 30-gallon plastic trash can in the backyard. It holds about four

cases of 12-ounce beer bottles, stacked neck-up so they will fill. The trash can is full of water, to which one pound of chlorinated TSP has been added.

The bottles are kept in the sanitation tub until they are needed. At bottling time it's easy to fish out two cases of bottles, blast them with a hot water rinse, then sanitize them. Chlorinated TSP is a powerful cleaner and sanitizer, and it will even soak off factory beer labels after a couple of days. It does have a warning label about not ingesting it or getting it in eyes, so if you use it, be sure children aren't exposed to it. Also, rinse the bottles well with hot water to get rid of the TSP, then sanitize again with iodophor or chlorine before using.

Choosing Your Site

Deciding to brew outdoors depends a lot on the housing situation of the brewer. A convenient yard, patio, or porch with an available water supply is a great place to brew. If you live in an apartment, brewing outdoors might be more difficult, but it depends on the physical situation. Many apartments have fenced outdoor areas that would be perfect for brewing. Homebrewers are wonderfully inventive, and everyone seems to come up with the brewing setup and location that he enjoys most.

Unless the outdoor brewing location is completely fenced, your neighbors will see you when you brew outdoors. This can be both good and bad. There are still a very few places in the US where homebrewing is technically illegal. Those laws are usually hold-overs from Prohibition and are not generally enforced, especially when the activity is carried out inside a home. However, if you happen to live in a place where homebrewing is against the law, doing it outside might get you more attention than you want. Find out for sure that homebrewing is technically legal in your area before taking it outdoors.

Brewing outdoors can be a great way to meet your neighbors, and it can help spread an understanding of the homebrewing hobby. Homebrewing is a much more popular hobby now than it used to be, and as homebrewers we tend to assume that most people understand what the hobby is about. Unfortunately, that's not true. A great many people don't really know what we are doing, and they don't know how beer is made. The people who don't understand what homebrewing is are sometimes the ones who oppose it. There's a lot of neo-Prohibitionist sentiment right now, and some public education regarding homebrewing sure doesn't hurt anything.

There's something about standing beside a boiling brewpot, stirring, smelling, and tasting, that gives you a good feeling. Balancing the malt and the hops, adjusting the burner, stirring, measuring, and creating the beer you want is a fine thing. Doing it outdoors can enhance the experience, and if someone comes over to share the experience, so much the better. ■

Join the Party!

Celebrating BYO's 2nd Anniversary

Drinking beer is good eating.

So said philosopher Immanuel Kant, and he was right. Beer is food. "Liquid bread" as the monastery and convent brewers of Europe describe it. A beverage made with the most basic of ingredients — but made to be savored, celebrated, enjoyed. Like a masterfully grilled steak of tender, aged beef. Like a plate of risotto, cooked to *al dente* perfection. Like a batch of Mom's favorite ribs, falling-off-the-bone tender and dripping with zesty sauce.

Like *Brew Your Own* Magazine.

Hey, we're serious!

Think about it. The food we enjoy the most is that which is prepared with tender loving care. Whether it's a simple or complicated recipe, whether it took five minutes or five hours to make, we look forward to the dish coming to the table. Enjoy the aroma, regard the presentation. The best food is prepared by someone who knows the ropes.

Just like *Brew Your Own*. For two years, the staff of BYO has brought you a monthly menu of tasty and tantalizing tidbits of brewing knowledge, history, art, and industry. There's something for everyone and for every palate. It's a monthly *smorgasbord* of brewing techniques, tales, and culture.

So what better way to celebrate our second anniversary than with a feast of food and beer!

The BYO staff recently put their heads together to pick a batch of special cooking-with-beer recipes and gathered for an impromptu picnic to enjoy them.

TODD HAMMOND PHOTOS

The BYO Gang: (standing from left) Craig, Gailen, Christy, Julie, Evan, Carl, Steve, Suzanne, (sitting from left) Elisa, Stephanie, Corey, Karen, Mike.

BYO's 2nd Birthday Barbecue Bash Menu

Onion Beer Dip served with chips and raw veggies

Tossed Green Salad with Wheat Beer Vinaigrette

Fourth of July Potato Salad

Mom's Barbecued Ribs

Grilled Vegetable Salad

Spicy Beer Cake with Broiled Caramel Frosting

Appetizer

Onion Beer Dip

- 8 oz. cream cheese, softened
- 3/4 cup beer (we used Märzen)
- 1 cup sour cream
- 1-oz. package onion soup mix
- Black pepper to taste

Whip cream cheese and add beer. Mix well. Add sour cream, soup mix, and pepper. Stir. Refrigerate before serving. Makes about two cups. Great served with chips or fresh vegetables.

Salads

Tossed Salad with Wheat Beer Vinaigrette

- 1/4 cup Dijon mustard
- 1/4 cup white wine vinegar
- 1/2 cup Wynkoop Wilderness Wheat beer (or other wheat beer with very low or no hop bitterness)
- 1/2 cup canola oil
- 2 tbsp. minced chives
- 2 tbsp. minced parsley
- 2 tbsp. freshly squeezed lemon juice
- Salt and pepper, to taste
- Salad (mixed greens, cucumber, thinly sliced red onion)

In the bowl of a food processor, blend mustard, vinegar, and beer. While processor is running, slowly dribble the oil into the mixture a few drops at a time. Then pour a slow, steady stream of oil until it has been mixed and emulsified. Add herbs, lemon juice, salt, and pepper. Drizzle over tossed salad. Gently toss and serve immediately. Serves four. *Recipe courtesy of* Famous Chefs and Other Characters Cook with Beer, *by W. Scott Griffiths and Christopher Finch, Doubleday.*

Fourth of July Potato Salad

- 2 lbs. medium red potatoes, unpeeled
- 5 tbsp. cider vinegar
- 2 tsp. Dijon mustard
- 1 tsp. salt
- Freshly ground pepper, to taste
- 4 slices bacon
- 2 large red onions, chopped (about 2 cups)
- 2 tbsp. vegetable oil
- 1/2 cup amber ale (or other ale with medium hop and medium malt characteristics)
- 1/4 cup finely diced red bell pepper

Boil the potatoes in water to cover until just tender, 20 to 30 minutes. Drain and let potatoes cool. When cool enough to handle, peel and cut them in half. Cut the potato halves into 1/4-inch-thick slices and place them in a large bowl. Combine three tbsp. of the vinegar, the mustard, and salt and pepper to taste. Pour the mixture over the warm sliced potatoes. Toss lightly.

In a skillet, fry the bacon until crisp. Remove and drain the bacon, reserving the drippings in the skillet. Crumble the bacon over the potatoes.

In the reserved bacon drippings, sauté the onion over medium heat until just tender, adding vegetable oil as needed to prevent the onions from sticking to the skillet. Pour in the ale and the remaining vinegar. Heat just to deglaze

the skillet, stirring to loosen any browned bits. Pour the ale-onion mixture over the potatoes. Add the red pepper and toss well. Serve at room temperature. Serves six to eight.
Recipe courtesy of Famous Chefs and Other Characters Cook with Beer, *by W. Scott Griffiths and Christopher Finch, Doubleday.*

On the Grill

Mom's Bar B Q Ribs

- 4 to 6 slabs of pork baby back ribs
- 1 bottle barbecue sauce
- 1/4 cup soy sauce
- 2 tbsp. Worcestershire sauce
- 2 tbsp. Heinz 57 sauce (optional)
- 1/4 cup honey
- 1 tbsp. A-1 sauce (optional)
- 3/4 cup beer (we used porter)

Place rib slabs on a rack in a large pan with water on bottom. Bake 45 minutes in a 400° F oven. Cut the slabs into two ribs each. Mix above ingredients together and dip ribs into the mixture. Put them on a large pan with tin foil on bottom in a single layer. Bake 30 minutes in a 375° F oven.

At this stage you can finish them on the grill or cool the ribs and freeze them in large plastic bags to grill another day. Save any extra sauce, and add it as you grill. Yum yum.
Recipe courtesy of Elaine "Mom" Landau.

Grilled Vegetable Salad

Salad:

- 1 crookneck yellow squash
- 1 large zucchini
- 3 medium onions
- 6 portabello mushrooms
- 1 Japanese eggplant
- 1 red bell pepper, 1 green bell pepper, 1 yellow bell pepper, cored and sliced into wide strips

Beer Basting Sauce:

- 1 cup honey ale
- 2 cloves garlic, minced
- 2 tbsp. grated fresh ginger
- 1 tbsp. honey
- 1/2 cup olive oil
- 1/2 tsp. chili garlic paste (sold in the Asian food section of most supermarkets)

Wash all vegetables and cut into one-half inch slices. (Slicing squash and eggplant lengthwise, into long strips, makes them easier to grill.) Blend all ingredients for basting sauce.

When coals are ashy and glowing, place vegetables on the grill. Baste with beer sauce. Serve.
Recipe courtesy of Cooking With Beer *by Lucy Saunders, Time-Life Books.*

Dessert

Spice Beer Cake

- 12-ounce bottle of beer (we used amber ale)
- 1 cup quick oats
- 2/3 cup margarine
- 1 cup sugar
- 1 cup brown sugar, packed
- 2 eggs
- 1 1/4 tsp. vanilla
- 1 3/4 cup flour
- 1 1/4 tsp. baking soda
- 1 1/2 tsp. cinnamon
- 1/2 tsp. nutmeg
- 1 cup finely chopped nuts

Bring beer to boiling point in saucepan. Add oats and let stand 20 minutes. In a separate bowl, cream margarine and sugars together; blend in eggs and vanilla. Add oatmeal mixture and mix well. Sift dry ingredients and add to creamed mixture; add nuts. Pour into greased and floured 9x13-inch cake pan. Bake at 350° F for 35 minutes or until cake tester comes out clean. While cake is still warm to the touch, frost with Broiled Caramel Frosting. Serves 12 to 16.

Broiled Caramel Frosting

- 1/2 cup margarine
- 1 cup dark brown sugar, packed
- 1 cup flaked coconut
- 2 tbls. half and half

Combine all ingredients and mix well. Spread on cake and broil on lowest rack until bubbly and golden brown.
Cake and frosting recipes courtesy of Drink Your Beer and Eat It Too! *by Joanie Steckart, Nob Hill Press.*

BEER
Bud Peen

CLONE YOUR OWN

With some research and experimentation, you can brew copies of your favorite commercial beers.

One way or another, every homebrewer has said to himself or herself, "I wish I could make a beer like..." For many of us, in fact, that's why we got into homebrewing in the first place, to make our own version of our favorite commercial brew, or one that we could rarely find (or rarely afford!).

This is the most common lead-in to conversation in my homebrew supply store (Seven Barrel Brewery Homebrew Shop, West Lebanon, N.H.) as well. Customers are always coming in and asking, "How can I make a batch of..." and I proceed to put together a recipe that will replicate their favorite. I've gotten very good at it, and you can, too, with a little research and practice.

The general theory of "cloning" goes like this: Figure out what ingredients the commercial brewer uses and how. Then get the closest ingredients that you can and copy their procedure as closely as possible.

Some words of warning: Many successful commercial brewers don't particularly want everyone to be able to copy their beers, for obvious economic reasons, so it may be difficult to figure out some of the secrets. Some ingredients (such as yeast) remain secret, so you may have to approximate. Also, big breweries, even with the same ingredients and the same brewing procedures, will generally produce a different product than homebrewers just by sheer numbers — volume, efficiency, consistency, and so forth. Your version at home may be better because you can tailor the original to your distinct taste!

The first place to start if you want to get to a particular beer is the beer itself. Do a focused study of the beer, take notes on its color, appearance, fragrance, taste, bitterness. With a little brewing experience, most of us can figure out roughly what gives a beer its flavors and aromas, or at least how to produce similar results with ingredients we know. You should also read the labels. Many brewers, especially American craft-brewers, are proud to let you know which grains and hops they are using (I've even read labels that give the grain percentages, which makes it easy to calculate the grist bill for a five-gallon batch).

For older beers, or foreign breweries' products, you may need to rely on published research materials. I often start with Michael Jackson's *New World Guide to Beer* and *Beer Companion*, Dave Line's *Making Beers Like Those You Buy*, and articles and books by Roger Protz of CAMRA (Britain's Campaign for Real Ale). Line

by Scott R. Russell

BUD PEEN

and Protz's works include old recipes for classic British and Scottish beers (and others) that may be impossible to duplicate with American ingredients, but they are a great place to at least get directions. From Jackson I often can get, if not recipes, at least an indication of hops and specialty grains, as well as quirks in brewing procedures that might otherwise be overlooked.

The last source to consult for information is the brewery itself. If you get a chance to visit, ask questions. Take notes, mental or otherwise.

The Ingredients

Grains are the relatively easy part — you can pretty much fake color and body by playing around with crystal and dark malts, malt extracts, and so on.

Hops are trickier. I can identify with almost complete accuracy only three or four hops. With a little knowledge of beer styles, however, it's possible to narrow the choices to certain classic hop varieties. Getting the right degree of bitterness, flavor, and aroma is more a matter of guesswork and trial and error than anything. You may have to brew the same recipe a few times, tweaking the amount of hops and the boiling schedule each time until you get it right.

Yeast can be the hardest part or the easiest to figure out. If you can pinpoint the yeast, especially if you can use the *same* yeast (recultured out of a bottle-conditioned beer, for example), you may well hit the style and the brew pretty darned close. If you can't get the yeast, you'll need to think about what different yeast strains can and will do under different fermentation conditions to decide which one to use.

If you do luck out and get the real thing, pitch big. My worst failed experiments have been the result of underpitching, so now I try to always build up my yeast (over the course of almost two weeks, usually) to at least three pints (1.5 quarts) of starter, more if I have time.

Keep in mind that yeast starter should be made up of roughly the same type of wort that the beer will be (i.e. color, relative strength, hop level) but in miniature. For example in brewing a dry stout, make up a starter with dark malt extract at about the same original gravity of the beer, with some roasted barley steeped in and some of the same bittering hops you will use in the beer. Condition the starter at the same fermenting temperatures that you will use for the beer, too.

A particular beer's water, mash conditions, and fermentation and aging procedures can be very difficult to nail down. Emulate what you can find out through research, make an educated guess on what's missing, and then start experimenting through trial and error.

The Recipes

These five are recipes that are at once fairly straightforward and yet a nice *coup* to pull off. The version I've given is the way I've brewed it, but all-extract or all-grain versions are possible too, of course.

Old Peculier

MARK BULLARD PHOTOS

(5 gallons, extract and grain, OG 1068)

The first ribbon I ever won in a regional competition was with this beer, entered into the "old ale/strong ale" category. It was inspired by one of my favorite British brews, only I made it a little stronger. The real secret here is getting real English treacle. Molasses is just not the same thing. Treacle is available at many homebrew supply stores and at gourmet food and baking stores.

Ingredients

- 0.5 lb. roasted barley
- 0.5 lb. dark crystal, 120° Lovibond
- 1 lb. crushed two-row pale malt
- 1 can (3.3 lbs.) Munton's Old Ale kit
- 3.3 lbs. unhopped dark extract
- 1 can (10 oz.) black treacle
- 2 oz. Willamette hop pellets, 1 oz. for 45 min., 1 oz. after boil
- 1 qt. to 0.5 gal. slurry of British ale yeast such as Wyeast 1098
- 3/4 cup brown sugar for priming

Step by Step

In 3.5 gals. cold water steep roasted barley, dark crystal malt, and two-row malt. Raise heat gradually to 170° F and remove grains. Sparge grains with about 0.5 gal. very hot tap water. To kettle add Old Ale kit, dark extract, and treacle. Bring to a boil and add 1 oz. hop pellets. Boil 45 minutes. Remove from heat and add another 1 oz. hop pellets. Chill, top off in fermenter to 5.25 gals., and cool to 75° F. Pitch yeast slurry (1 qt. is minimum, 0.5 gal. is better).

Ferment around 70° F for 10 days, rack to secondary, and condition at 65° F for three weeks. Prime with brown sugar and bottle. Age at least six weeks, more if you have the patience.

Adelscott Malt Liquor

(5 gallons, grain and extract, OG 1060)

This beer is hard to find in the United States. Brewed by Fischer in Schiltigheim, France, it is a sweet and strong reddish-amber ale with a smoky nose and a whiskey-like flavor. The peated malt gives the smokiness, and the Dutch dry malt used in this recipe finishes more full bodied and sweeter than English or American dry malt

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extracts to keep the character of the original. The Irish ale yeast will also help to leave some residual sweetness.

Ingredients

- 0.5 lb. dark crystal malt, 90° to 120° Lovibond
- 0.25 lb. Munich malt
- 0.5 lb. peat-smoked malt
- 6 lbs. Dutch unhopped light dry malt extract
- 1 cup light brown sugar
- 0.5 oz. Brewer's Gold hop pellets (4% alpha acid), for 45 min.
- 1 oz. Hallertauer Hersbrucker hop pellets (3% alpha acid), for 15 min.
- 1 qt. or more of an Irish ale yeast (Wyeast 1084)
- 2/3 cup corn sugar for priming

Step by Step

In 2.5 gals. cold water steep dark crystal, Munich, and peat-smoked malts. Bring water up to 170° F and remove grains. Rinse grains into kettle with 1 qt. hot tap water. Add to kettle extract and brown sugar and bring to a boil. Add Brewer's Gold hop pellets and boil 30 minutes. Add Hallertauer Hersbrucker hop pellets and boil 15 minutes more. Turn off heat. Chill, top off to 5.25 gals. with pre-boiled chilled water. At 75° F pitch yeast.

Ferment at 70° F for three to five days. Rack to secondary, condition at 60° F or so for 10 days. Prime with corn sugar and bottle. Age 10 to 14 days.

Blanche de Chambly

(5 gallons, extract and grain, OG 1049)

There are many Belgian witbiers. Most are shimmery and pale with a sprightly, refreshing orangey-spicy aroma. One of the best that I have ever tried comes from a medium-size brewery near Montreal, Unibroue, makers of La Fin du Monde (The End of the World) and Maudite (Damned), Belgian-style strong ales that have earned numerous international gold and platinum medals.

I don't know if the brewers use the same yeast in all their brews, but I have had great luck reculturing their yeast and brewing with it. They don't reveal what particular combination of spices they use, beyond the traditional coriander and orange peel, but I like to add ginger.

Ingredients

- 3 lbs. Belgian pilsner malt
- 0.5 lb. flaked wheat
- 0.5 lb. flaked oats
- 3 lbs. unhopped wheat dry malt extract
- 1 oz. Saaz hop pellets, for 40 min.
- 0.5 oz. cracked coriander seed
- 0.25 oz. dried curaçao bitter orange peel
- 0.125 oz. grated dried ginger
- 1 qt. slurry of recultured Blanche de Chambly yeast (or Wyeast 3944 or 3942, if you can't get the real thing)
- 7/8 cup corn sugar for priming

Step by Step

Mash pilsner malt, flaked wheat, and flaked oats in 2 gals. of water at 150° F for 60 minutes. Sparge with 10 qts. water at 168° F. To kettle add extract. Boil 10 minutes. Add hop pellets and boil another 30 minutes. Reduce heat to simmer, steep (in a fine mesh bag or muslin hop bag) coriander, orange peel, and ginger for 10 minutes. If desired, other spices could be added, such as cumin, cardamom, black pepper, and paradise seeds. Remove from heat and chill, removing spice bag. Top off in fermenter to 5.25 gals. and cool to 75° F. Pitch yeast.

Ferment for eight to 10 days at 65° F or so. Rack to secondary and condition for three weeks at 60° F. Prime with corn sugar, bottle, and age four weeks.

Chimay Cinq Cents

(5 gallons, grain and adjuncts, OG 1068)

Deep copper to light brown, fruity and rich, there just isn't a better beer in the world than this Belgian Trappist ale. This is essentially an all-grain recipe, although there are some sugar adjuncts for higher alcohol content. The yeast is essential. I carefully saved the dregs from an entire six-pack of the White Label and a 22-oz. bottle of the Cinq Cents (which Michael Jackson says are the same thing) and built up to a half-gallon starter. Golden syrup is an English sweetener (increasingly easy to find here; check your gourmet bakery shop if your homebrew supplier isn't carrying it yet), which is essentially invert sugar.

Ingredients

- 9 lbs. two-row pale malt
- 1 oz. black patent malt
- 1 lb. brown sugar
- 10 oz. golden syrup
- 4 plugs (2 oz.) Hallertauer hops, for 60 min.
- 2 plugs (1 oz.) Kent Goldings hops, for 60 min.
- Chimay Cinq Cents yeast
- 5/8 cup brown sugar for priming

Step by Step

Mash malts in 12 qts. of water for five minutes at 148° F. Add in 3 qts. boiling water to raise temperature to 152° F. Hold 85 minutes, then sparge with 12 qts. water at 170° F. Add to kettle brown sugar, golden syrup, and hops. Boil 60 minutes or until reduced to 5 gals. Cool and pitch yeast.

Ferment warmish (68° to 72° F) for two weeks and rack to secondary.

Condition at roughly 65° F for three to four weeks. Prime and bottle. Age six months.

Anchor Steam

(5 gallons, extract and grain, OG 1046)

The classic pioneer-spirited, West-Coast-hoppy, all-American brew that restarted it all. Make it light in color but with cara-pils to give it more body, and hop it well. Anchor reportedly uses only Northern Brewer hops, to bitter, to flavor, and for aroma. Yumm. The only yeast I have ever tried this with is Wyeast 2112.

Ingredients

- 0.5 lb. cracked cara-pils malt
- 0.25 lb. cracked wheat malt
- 0.25 lb. toasted pale malt (toast it at 350° F for 15 min. on a cookie sheet)
- 1 can (3.3 lbs.) Munton's unhopped extra-light malt extract
- 2 lbs. British or American unhopped light dry malt extract
- 2 oz. Northern Brewer hop pellets (8% alpha acid), 1 oz. for 45 min., 1 oz. for 15 min.
- 0.5 oz. fresh whole Northern Brewer hops, after boil
- 1 qt. starter of Wyeast 2112 (or other warm-tolerant lager yeast)
- 7/8 cup corn sugar for priming

Step by Step

In 2.5 gals. cold water steep cara-pils, wheat, and toasted pale malts. Raise the water gradually to 170° F and remove the grains. Add extracts to the kettle. Bring to a boil and add 1 oz. hop pellets. Boil 30 minutes and add an additional 1 oz. pellets. Boil 15 more minutes. Remove from heat and steep fresh whole Northern Brewer hops as the wort cools. Chill, top off to 5.25 gals., and remove aroma hops. At 70° F, pitch yeast.

Ferment warm (68° to 72° F) for a week. Rack to secondary and condition cool (40° to 50° F) for three weeks. Prime with corn sugar, bottle, and age four weeks.

SEND US YOUR CLONES

Have you been dabbling in that hottest of modern sciences — cloning? Send us a recipe for your best commercial beer clone. If we publish it, we'll send you a BYO T-shirt. Send to Clones, c/o Brew Your Own, 216 F St., Ste. 160, Davis, CA 95616. E-mail: edit@byo.com. Be sure to include your phone number and mailing address!

EASY, CHEAP, AND

by Sean Mick

How many times have you taken a 12-pack of your brew to a party or picnic to share with friends, only to find that they toss out your bottles or worse, drop gum or cigarettes into them? Don't they know you spent hours scraping off labels and soaking, scrubbing, and sanitizing those precious amber vessels? Perhaps it's time to leave your bottles at home for personal consumption. (Only you will truly appreciate that bottle's value anyway.)

Before you visualize a 50-pound transportation nightmare or something that you can't exactly fit next to the milk in your fridge, think about an easy-to-use, small-enough-to-store solution that

MARK BULLARD

PORTABLE

Check Out the Advantages of a Mini-Keg System

can be had for as little as $35.

Mini-keg systems are cheap ($35 to $100, compared with $140 to $250 for a new five- to 7.5-gallon Cornelius- or pony-keg system), reusable, and convenient. They hold one to 2.5 gallons of beer under pressure. They're small enough to fit into a refrigerator or ice chest but large enough to deter premature trashing. There are several stand-alone options on the market. All can be obtained at homebrew supply shops or through mail order.

Tin Mini-Kegs

If you are planning to take a gallon of your brew to a small gathering, the best bet is probably a five-liter tin mini-keg. These are generally of German manufacture (Datograf, Fass-Frisch, and Beer King). These kegs allow the homebrewer to naturally carbonate the beer, just as in the bottle.

Although the kegs can be reusable

Keg Systems at a Glance

Keg System	advantages	disadvantages	reusability	suggested retail cost
Tin mini-keg	Small, portable, holds 1.25 gallons (5 liters), provides oxygen barrier w/CO_2 taps. Good for one-gallon lagering.	Small, harder to wash, Bierzapfer "picnic pump" tap can oxidize beer. Tin eventually needs replacement.	Tin reusable depending on care taken in cleaning. CO_2 cartridge is one use only.	Tin: $12; CO_2 tap: $40-55; Bierzapfer tap: $25-30; rubber bung: $1; 16-gram CO_2 bulb: $1.50; 8 gram CO_2 bulb: less than $1
Party Pig	Air doesn't contact beer. No need to regulate CO_2 flow. Can be used as fermenting/lagering vessel.	Plastic allows for some transfer of oxygen over time.	Bottle reusable as long as the inside isn't scratched. Bladder replaced after every use.	Pig w/ 2 pouches: $38; pouch alone: $3.50; activation pump: $7.50; Pig parka: Ask your retailer.
Medicine Rock System	Easy to ice down. Lagering capable. Durable shaded plastic. Basic setup is inexpensive.	Plastic allows for some transfer of oxygen over time. Short-term storage (one to five days) only.	Snap Cap seal must be replaced every time.	Keg with tap, two seals, pump: $24.95; extra seals: $2; "Convert-a-keg" CO_2 tap: $35 (you supply CO_2).
PET w/CO_2	Affordable. Portable. Easy to use. Soda bottles readily available.	Carbonater requires ball-lock CO_2 disconnect. Requires CO_2 tank & regulator. Short-term storage.	Completely reusable.	Carbonater cap: $18; ball lock disconnect: $9; Double Drafter: $45-50; regulator: $40-55; CO_2 tank: varies.

since they are lined with a food-grade plastic, multiple usage may wear the lining. That means that they will need to be replaced periodically. Also, tapping could cause leaks immediately or within the first few uses. As long as a gentle but thorough cleaning regimen is used — one that includes a food-grade sanitizer such as One Step or iodophor — and you have luck tapping, you will get your $12 worth of use (the average retail price on the tin mini-kegs).

A special two-piece rubber/plastic bung acts as both a keg stopper during carbonation and as a grommet, or seal, once the tap is inserted.

Taps are available from a variety of manufacturers, ranging in both price and quality. A picnic pump-style tap for this mini-keg will generally run in the range of $25 to $35 and displaces beer with air. More elaborate taps, ranging from $40 to $55, push the beer out of the keg with CO_2.

The CO_2 is provided by eight- to 16-gram food-grade bulbs, the kind you can find in some homebrew supply stores or kitchen supply stores for less than $1 (they may need to be adapted to fit). The smaller bulbs will work but require a special adapter. (Don't wad tin foil into the bulb holder! This can cause serious problems as there must remain an open vent hole.) The CO_2 bulbs do not deliver enough pressure to carbonate the beer by force.

For a continuous drinking session, say a barbecue or weekend event, the Bierzapfer picnic pump by Datograf is perfectly adequate. If you plan to store the beer, you run the risk of oxidation. That is why the CO_2 model made by Fass-Frisch or Beer King proves a more versatile alternative.

Sanitation on tin mini-kegs may seem a daunting task; after all, you can't get your hand through that small opening, and a bottle brush may not reach everywhere inside unless you are willing to bend it. Just as with bottles, it's best to rinse the keg with water immediately after it's empty. Flush the tap with water, too. This doesn't sanitize anything, but it sure does prevent a sticky mess later. As soon as you can, flush the whole assembly with the sanitizer of your choice. This will prolong the reusability of the tin and make your cleaning regimen much easier.

PET-Based Systems

What if you want to double your capacity? Well, you could buy two mini-keg tins, keep one bunged up and tap the other. Or you could invest in a PET-based dispense system such as the Party Pig from Quoin or Medicine Rock's mini-keg system.

The Party Pig is an increasingly popular option with homebrewers. Amber in color and made of plastic, this 2.25-gallon system uses a pressure pouch to push the carbonated beer out through the "snout" (a valve on the front of the apparatus). The pouch (which recently underwent a redesign to avoid some minor problems with dispense) eliminates the need for CO_2 or worse, air, to pressurize the tank. Thus, you can avoid the oxidation problem posed by other mini-kegs and commercially kegged

beer used with rental taps.

You must prime the beer with sugar as indicated, seal the PET bottle with the valve assembly, and allow it to carbonate at fermentation temperature for at least a week. When carbonation is achieved, chill the beer and open the valve. Out flows carbonated homebrew, while the activated pouch displaces missing beer like an expanding balloon.

Each pressure pouch can be used one time only, and pouches can be purchased separately for about $4. Suggested retail on this kit, including two pouches, is $38. A one-way "squeeze bulb" needed for activating the pressure pouch is an additional $7.

Both this system and the one-gallon tin mini-keg system are sometimes known to leak homebrew through the tap after dispense. It seems that residual beer remains in the tube between the valve and the dispense side, dripping once the gravity force overcomes the vacuum created by shutting off flow. A drip tray placed in the refrigerator would help.

Both systems offer advantages over bottling other than larger dispense volume. For instance they can be used as fermenting and lagering vessels as well. The mini-kegs can be fitted with a standard airlock and the rubber stopper provided, and a Party Pig uses a #13 stopper and airlock instead of the valve assembly. They could provide a good testing ground for two gallons of that "experimental" beer you've been dying to make.

You still need to transfer the beer out of the Pig to remove the sedimented yeast and trub, which may make the use of your standard primary fermenter seem advantageous. (Also, if you're using a yeast strain with a prolific kraeusen, you may prefer the additional headspace of an oversized primary fermenter. Keep in mind though, these systems weren't designed for fermentation. It's just a perk that some may consider.)

Another mini-keg system comes from Medicine Rock, part of Dakota Supply. This 2.5-gallon, spherical-shaped keg resembles the Coors Partyball, only smaller in scale and designed with the homebrewer in mind.

The tap assembly pumps air into the Rock's keg, forcing the beer through the tap and into your mug. It is made of food-grade plastic, is amber/brown in color to prevent skunking, is durable, and might offer a hidden advantage over other mini-keg systems: It fits perfectly in your six-gallon bucket (you know, the one you ferment in), which can serve as an ice holder.

Since you are pumping air into the keg, it is best to consume your brew within a few days. However, if you allow the beer to dispense with the force of CO_2 (from priming) only, you may be able to draw a few pints before having to pump it up.

The Rock's keg requires about 18 inches of clearance from the bottom of the keg to the top of the installed tap, so it may not fit in your fridge. However, it should store there until you tap it, requiring only 12 inches of space untapped, providing you can

work out arrangements with your significant other. Sanitation notes from the Party Pig would apply here. Don't use abrasives on plastic, and try to rinse the apparatus with water/sanitizer as soon as possible.

The suggested price for the Rock's system is $24.95 for a keg, tap, Snap Cap, and two seals. Each time you keg up a batch using the system, you need to use about 1/3 cup of corn sugar and replace the Snap Cap seal. Seals run about $2 in brew shops where the system is sold. If you want to convert the Medicine Rock keg to a CO_2 system, you would need to order the "Convert-a-Keg" assembly in addition to having a CO_2 bottle and regulator. "Convert-a-Keg" gives you a CO_2 tap and dispense hose for around $35. You provide the CO_2 bottle and regulator.

PET Bottles

There is one other portable solution worth mentioning. If you happen to have access to a CO_2 tank and regulator (maybe you own a Cornelius keg but want something smaller to deliver your beer to a houseboat party), you can fill a two-liter PET bottle with your brew either out of the keg or out of the fermenter. Then you can force carbonate your homebrew with products such as the Carbonater ($18) or the Double Drafter ($50). These products provide a coupler between your CO_2 line and a standard PET bottle. The Double Drafter also includes an auxiliary regulator, should this be missing from your setup.

Either setup allows you to store your homebrew in the same way you would get two liters of soda in the grocery store. There is no additional tap provided or needed. You simply pour the beer into a glass after force carbonation with the special coupler and replace the cap onto the "soda" bottle.

The downside is that this system is much more vulnerable to oxidation than dispensing from a keg, and long-term storage is not recommended. Since you are storing your beer in a relatively thin plastic bottle, oxygen will transfer through the plastic after several months to a year. This applies to the PET mini-kegs as well but to a much lesser extent because they are constructed of harder, thicker plastic. This phenomenon of gas transfer through a semi-permeable membrane can be seen even with soda, which will go flat after a time even if you don't ever open the bottle. Nevertheless, this type of system is great for making small batches of beer or soda. Making soda with the Carbonater or Double Drafter is much less risky than gambling on natural carbonation of soft drinks in the bottles using yeast.

For $35 to $100, you can invest in a reasonable system to serve your homebrew, provide a stunning conversation piece, perform lagering, satisfy your yearning for gadgets, and still have enough money left over to purchase ingredients for your next batch! ■

Sean Mick is the proprietor of Mick's Homebrew Supplies, Davis, Calif.

BREWING WITH BACTERIA

by Sal Emma

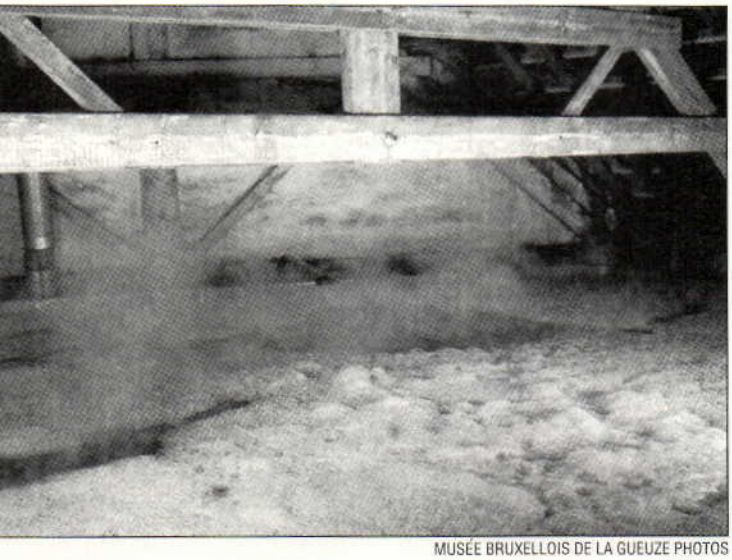
Homebrewer Wanted: Must be willing to risk contamination of entire brewery with strange and exotic microbes from faraway lands. Must be willing to wait many years to see if the beer turned out okay. Must have a strong stomach and not be bothered by slime, scum, noxious gas, and foul odors. Must possess the patience of Job and the stick-to-itiveness of Knute Rockne. Ph.D. in microbiology a plus. Salary, none. Benefits, legendary beer — if you do all your homework — and lots of terrific stories to tell.

If this job description piques your interest, you have what it takes to make lambic-style beer, the wild beer of Belgium.

KUNSTHISTORISCHES MUSEUM, VIENNA

Well, it's kind of wild in its home country. But in your brewery, things are not quite as wild. In fact to do lambic right at home, you have to get things pretty well under control. Sort of. Wild fermentation is not really a good idea at home, unless of course your home is the Payottenland outside Brussels, where the magic lambic microbes live!

Assuming your address is more domestic than that, lambic fermentation should follow a schedule and never really turn wild. Which is the reason, technically, you can't make lambic at home. For a beer to be called lambic, it has to have been made in the Lambic region of Belgium and fermented spontaneously by resident bacteria and yeast that inhabit the nooks, crannies, and casks of traditional Belgian lambic breweries.



MUSÉE BRUXELLOIS DE LA GUEUZE PHOTOS

In the cooling tun, steam pours off the hot lambic wort.

Make It If You Like It

If you like lambic, you have sufficient incentive to make it if for no other reason than the cost of commercial lambic. Quite a few are available in beer shops that stock unusual selections, but be prepared to pay between $5 and $10 per bottle, on average.

Another reason to make your own is that traditional, unfiltered, and strongly flavored versions of lambic are generally those that stay at home in Belgium and do not make it to US store shelves.

So, What Is This Stuff?

Lambic is a complex, unique, and unusual beer like few others. It's fermented by no fewer than a dozen

creatures, the populations of which ebb and flow in the cask as the long fermentation proceeds. More microbes may be at work but have yet to be isolated by modern laboratory techniques.

The characteristics that seem to be shared by most lambics are lactic/sour, horse, acid, and tannin/wood. Hundreds of other flavors have been detected in the brew, including esters, leather, straw, cheese, soap, mold, earth, vinegar, spice, goat, vanilla, caramel, chocolate, butterscotch, honey, sulfur, and sweat.

Now there's a complex glass of suds!

Traditional lambic is crisp, tart, fairly dry, effervescent, and quenching. It is golden and often hazy with yeast and suspended proteins. Fruit lambics, made traditionally, are on the dry side. Unfortunately, a few of the lambics made for the US market are quite sweet and not really typical of the style.

At least one beer calls itself lambic but really is not. That's Samuel Adams Cranberry Lambic, made by Boston Beer Co. The Sam Adams version is a well made, crisp cranberry wheat beer. However, it is not fermented spontaneously and lacks the unusual characteristics associated with the large variety of microbes that do their work in traditional lambic.

Lambic breweries are anything but clean. Dust, grime, and cobwebs are left undisturbed. Roof tiles are missing. Windows are open.

The origin of its name is clouded by centuries. Most sources trace the origin of the name to the town of Lembeek, in the heart of lambic country.

Lambic is generally an aged style. It ages for a long time during fermentation and again in the cask. A new or young lambic is described as *vos*. This is encountered infrequently in Brussels cafes, where *gueuze* is the most popular form of unflavored lambic.

Gueuze is a blend of young and old lambics. The young lambic is not completely fermented and it is used as priming to set up conditioning in the bottle, similar to champagne or homebrew. Bottle conditioning is what gave it its name; Gueuze describes a "geyser" of beer erupting from a particularly active bottle when opened.

To pronounce it, say "gurz" or "gurza," but don't pronounce the "r."

Say it like you're from Boston or New York.

A version of lambic sweetened with candy sugar is known as *faro*. Lambics made with fruit take on a variety of different monikers.

Students of beer know that when you drink beer, you drink living history. This is especially so with lambic, which may be one of beer's missing links. In his Brewers Publications book *Lambic*, Jean-Xavier Guinard writes that ancient Sumerian beer bears a striking resemblance to modern-day lambic formulations. The recipe was written in clay cuneiform tablets uncovered by archaeologists.

Foam oozes out of casks of fermenting lambic.

The brew, known as Sikaru, was produced 5,000 years ago from 63 percent malt and 34 percent raw wheat. Sikaru was flavored with cinnamon and other spices in the boil, then fermented spontaneously. Guinard cites the example of Cantillon's version of lambic, which is brewed with 65 percent malt and 35 percent raw wheat and also fermented spontaneously. The main difference between modern lambic and ancient Sikaru is the spice. Lambic is made with aged hops, while hops were unknown to the ancients.

Breaking All the Rules

Lambic wort is produced by conventional means, usually through a decoction mash. Beyond that, Lambic marches to the tune of another drummer. The grist is around 65 percent malt, 35 percent raw wheat — not wheat malt.

Forget everything you know about cooking unmalted adjuncts before mashing to gelatinize the starch. Lambic wheat is not cooked before mashing, so the starches are not gelatinized. Although some lambic brewers use a decoction mash, boiling portions of the whole, other lambic brewers use a regular temperature program mash.

In either case some portion of the raw wheat starch remains unmodified. These starches contribute to the beer's overall character and its turbid whiteness in the glass.

Forget everything you have ever read about preserving hops — freezing, storing in airtight containers, and so forth. Lambic hops are aged. They are old, oxidized, and cheesy. That's the way the lambic brewers want them!

Brewers use aged hops because they do not want hop bitterness in the finished beer. Aged hops retain preservative properties without contributing much bitterness to the brew. Because the hops have lost their potency due to aging, hopping rates are relatively high.

Forget everything you have read about keeping your brewery clean. Lambic breweries are anything but. Dust, grime, and cobwebs are left undisturbed. Roof tiles are missing. The windows are open. And for good reason. It's the dust suspended in the air that starts the magical fermentation of the milky wort.

The wort is pumped into a wide, shallow vessel, completely open to the brewery atmosphere. As it cools, dust and bacteria settle on the wort and contaminate it for its first fermentation, the enteric bacteria phase. The beer is racked to wooden casks shortly thereafter.

It's no wonder the beer is so complex, since its fermentation is nothing short of Byzantine in its complexity. Amazingly enough, lambic brewers in

Stacks of wheat and barley malt and bags of hops are stored in the loft of the Cantillon Brewery.

Ralph Colaizzi's Lambic
(5 gallons)

Ingredients:

- 4 lbs. unmalted wheat
- 5 lbs. DeWolf Belgian pale malt
- 5 lbs. cara-pils malt
- 2 oz. aged Fuggle or East Kent Goldings hops,2 years old or oven-aged
- Chico ale yeast
- *Brettanomyces* culture
- *Pediococcus* culture
- 3/4 cup corn sugar for priming

Step by Step:

Crush and mix grains. Heat 2 gals. water to 185° F. Stir the grains into 1 gal. of the water. Slowly add more water, stirring constantly, until temp. reaches 130° F (you may not need all the water). Rest for 30 min. Add about 1 gal. boiling water to raise temp. to 140° F. Hold for 30 min. Add about 1.5 gals. boiling water to reach 155° to 158° F . Hold for 60 min. or negative iodine test. Add 1.5 gals. boiling water to reach 170° to 175° F. Sparge with 4 gals. water at 175° F, collecting 6.5 gals.

Bring to a boil and boil 30 min. Add hops and boil 90 min. more. Chill to 70° to 75° F and pitch yeast.

Let the yeast work for two weeks, then pitch the *Brettanomyces*. Let the Brett work for two weeks more, then pitch the *Pediococcus* and let it work for another two weeks before priming and bottling.

Ralph also pitches the dregs from bottles of commercial Lambic he happens to drink during the fermentation.

To oven-age hops, Ralph lays them on a cookie sheet and bakes them at 200° F for around 30 min.

Fermentation temperature varies between 68° and 75° F, depending on the season.

OG = 1.048

FG = 1.004

Gravities are approximate, because every batch of Lambic tends to behave differently.

Note:

In Belgium gueuze is made by blending old and new lambics. The new brew contains some residual sugar and acts as bottle-priming to set off the secondary ferment in the bottle. To make your own bottle-conditioned gueuze, bottle with 3/4 cup priming corn sugar, as usual.

Belgium do not inoculate their wort with much of anything. The fermentations are spontaneous, either airborne or from colonies living in the old casks in which the beer is aged.

Contamination!

Forget everything you have read about keeping bacteria out of your beer. Lambic is made possible by bacteria. Nasty ones.

The first nasties to descend on the cooling wort have been identified as varieties of bacteria related to *E. coli* and others known as *Kloekera apiculata*. They do their work for three or four weeks, after which another magic trick is performed. From nowhere, strains of *Saccharomyces cerivisiae* — beer yeast — take over the workload and continue to ferment the brew for up to three months. Another yeast, *S. bayanus*, also comes into play during this fermentation.

These somewhat conventional microbes are responsible for the main alcohol production and reduction of sugars in lambic. The rest of the colonizations occur later, after the sugar and pH levels have dropped significantly.

◆

All these bacteria could make you sick, if they were in your bloodstream. By the time lambic is ready to drink, all the bugs have done their work and bought the farm.

◆

Take Two Penicillin and Call Me in the Morning

The next phase is the one that scares most microbiologists and food inspectors away from drinking lambic: the *Pediococcus* contamination. Again, the bugs that live in lambic live in few other places. Most are specially adapted to making beer. *P. damnosus* is the most prevalent bacteria at this stage, and lots of lactic acid is produced, which gives the beer its acidic and lactic/sour character.

By the time the *Pediococci* get going, the beer has become quite alcoholic and some acetobacters crop up at this stage. Believe it or not, they can make the beer go bad by turning it to vinegar. Yes, even lambic can spoil!

In *Lambic* Guinard explains that acetobacter is a problem throughout the process, but that the brewers know from experience that acetobacter grows aerobically — that is, it needs air, in addition to alcohol, to grow. So the casks are kept as full as possible to minimize exposure to air. In later

phases a skin of muck is formed on the top of the fermenting beer, which helps to protect it against air and discourage the formation of vinegar.

You might think that all these bacteria could make you sick. Well, they could, if they were in your bloodstream or lungs. But by the time lambic is ready to drink, all the bugs have done their work and have pretty much bought the farm. Drinking lambic won't make you sick. Even if the bacteria survive aging, they won't survive in your digestive tract.

The hops play a key role here. Scientists such as Guinard and his colleagues have discovered that the dangerous bugs won't grow in hopped wort, while the special bacteria indigenous to lambic are allowed to flourish.

The last fermentation occurs when the *Pediococcus* population is overgrown by strains of *Brettanomyces*, including *B. Lambicus* and *B. bruxellenses*. "Brett" is the yeast responsible for the "horsey" or "leathery" character of lambic beer. *Brettanomyces* work very slowly and are allowed to continue to age and ferment the beer for up to 18 months.

Plan Now for the Next Century

That's right, 18 months. The average lambic fermentation is two years. But the hops used to brew the beer are aged for at least two years before that. So if you plan to make lambic, expect to taste it after the turn of the century!

This is a slight exaggeration. You can make lambic on an accelerated schedule. You won't need four years, but you should plan to age the beer at least a year in the bottle. Shorter than a year and it will not be too drinkable, as homebrewer Chuck Allen of Westminster, Colo., discovered.

"My lambic was pretty disgusting for a pretty long time," he explains. Allen's lambic was too nasty to drink after two weeks in the bottle. After two years, it took first place in the 1996 first round American Homebrewers Association national competition in Denver.

Allen says he was intrigued with the style, though he really knew little about it at first. "I make almost exclusively Belgian styles. It was inevitable that I would eventually have to try my hand at lambic.

"I read up on it and realized very quickly that the multiple fermentations would make it a technically difficult style, so I decided to give it a try," he recalls.

His malt bill included Belgian malt and wheat, fleshed out with Dutch extract. To keep hop bitterness low, he used only an ounce of Styrian Goldings, which he had left out at room temperature for a week before he brewed.

He fermented his lambic with a schedule of separate inoculations of Belgian Trappist ale yeast, *P. damnosus* (formerly known as *P. cerevisiae*), and *Brettanomyces*.

"The Trappist fermentation really went to town, dropping the gravity from 1.063 to 1.018 in just a week. It smelled great, typically Belgian and

Chuck Allen's Lamp Lighter Lambic
(5 gallons)

Ingredients:

- 3 lbs. Belgian pale malt
- 1 lb. Belgian wheat
- 1 lb. Belgian cara-Vienne, 24° Lovibond
- 4 lbs. Dutch extra light dry malt extract
- 1 oz. Styrian Goldings hops (5% alpha acid), for 60 min.
- 35 ml YeastLab Belgian Trappist Yeast A08
- 35 ml YeastLab *Brettanomyces lambicus* yeast
- 35 ml YeastLab *Pediococcus cerevisiae* (*P. damnosus*) bacteria

Step by Step:

Add 1 gal. water to brew pot and bring to 135° F. Add all pale and wheat grist and stabilize at 124° F. Let stand with no heat for 30 minutes. Bring 2 qts. plus 1 pint water to a boil and add to mash to bring temp. to 145° F. Add heat to 156° F (I had to add 1 pint cold water). Add specialty grains and let stand for 30 minutes.

Remove grains and sparge with 1 gal. water at 170° F. Add extract and hops. Boil for one hour. Strain into carboy with 1.5 gals. cold water, aerate, and pitch Trappist yeast. Note: Yeast was cultured twice to ensure sufficient population, OG = 1.063.

Primary fermentation should last seven to 10 days. Rack to secondary, SG = 1.018.

Prepare *Pediococcus* starter and let culture for at least one week.

Rack to tertiary, SG = 1.018.

Pitch *Pediococcus* and begin culture of *Brettanomyces*. Culture twice to obtain large quantity. Allow *Pediococcus* to develop for two weeks.

Rack to fourth, SG = 1.016.

Pitch culture of *Brettanomyces*, let it work for two more weeks.

FG = 1.021

Alcohol = 4.41 percent by weight, 5.51 percent by volume.

The gravity was up slightly in the end. Chuck Allen believes this was caused by some fermentables that entered the beer with the large volume of *Brettanomyces* starter culture.

Prime, bottle, and wait it out until it becomes drinkable.

aromatic with lots of esters," he says.

While the Trappist yeast was working, he got the *Pediococcus* culture going. "The *Pediococcus* was slow to start. I kept it at 75° F for a week to get it going. Man, was it nasty. It was stringy and slimy. Loads of milky white stuff settled to the bottom of the culture bottle," he says. Allen usually describes this culture using words normally reserved for body fluids, such as "snot" and "phlegm."

Allen racked the beer off the trub and pitched the *Pediococcus* a week after the Trappist yeast. He started the *Brettanomyces* culture at the same time. "I wanted a lot of brett culture, so I stepped it up once to double the volume, over two weeks. The brett was pitched last and worked for over three weeks before bottling," he says.

He tasted it after the usual two weeks in the bottle. It was like bad beer times 10. "It had absolutely no redeeming qualities. It smelled and tasted like something that had gone really, really bad after you forgot it in the back of the fridge.

"It took courage to drink it. It smelled of decay, like something that had crawled under a rock in a swamp. The *Brettanomyces* character — the horsiness — was very strong. The bacteria made it nasty. It was like a rotting horse.

"I called a friend of mine, also a brewer. He listened to my description and declared it lambic," Allen recalls.

His friend told Allen his beer was right on the money and advised that he taste it again in a year. "I took his advice and did not go near it again for a full year. I tasted it again after a year had passed and, sure enough, it was starting to taste like lambic. Still bad, but you could just detect the beginnings of a potential lambic in there," he says.

Allen says it improved dramatically in its second year of aging. After 18 months it was nearly drinkable and was really coming into its own. After 24 months he was satisfied with his efforts. It was lambic, to be sure.

"The difference is staggering. It's quite good now, with a distinct lambic profile. The brett 'horse-blanket' character is very assertive, it's very effervescent with tiny champagne bubbles. It has no hop character at all, which is the norm for the style. I think it will continue to improve over the next few years," he says.

Since you obviously want to keep lambic organisms out of your other beers, Allen advises lambic brewers to use only glass for all fermentation and culturing, or use old plastic containers that are ready for the trash, anyway. He used old hoses and siphon gear and discarded it all afterwards.

"The one mistake I made was bottling it in 22-ounce bombers. Even for lambic fans, that's a lot of lambic to drink in one sitting. Next time, I'll use smaller bottles.

Tooty Frooty, Man

Lambic's acidic, sour nature makes it a perfect foil for fruit. Traditionally,

lambic brewers add different fruits to produce different beers, each with a special name. Peaches make peche. Raspberries make framboise. Cherries make kriek. The commercial examples run from very dry to very sweet and everything in between.

Ralph Colaizzi, a homebrewer in Pittsburgh, used whole cherries to make his own version of kriek. "I would prefer raspberries but haven't made a framboise yet because I wanted to try a kriek first. I used 10 pounds of frozen whole cherries, thawed and added to the fermenter. Next time, I'd use even more cherries since the fruit character is more subdued than I wanted," Colaizzi says.

It's important to use whole fruit when you make fruit lambic, because the flavor of the pit lends an important characteristic to the finished beer. In Belgium, orchards of small, black, sour cherries are grown especially for the brewing of kriek. These cherries are unavailable in the United States, but regular cherries make an adequate substitute for homebrewers.

The Sourmash Method

In the appendix of his landmark work *The New Complete Joy of Homebrewing*, Charlie Papazian describes a sourmash method to encourage bacterial growth to make a lambic facsimile. Papazian's method requires a little barley malt, which is loaded with bacteria, used to contaminate warm wort to develop lactic acid sourness. The method will work with either extract or mash-based wort.

However, lactic sourness is only one component of the lambic flavor profile, and Papazian's recipes also require fermentation with *Brettanomyces* yeast to complete the process. His method was developed before bacterial cultures were widely available through the homebrew supply network.

Homebrewer Colaizzi has experimented with the technique. "I used the sourmash method a long time ago for a lambic kriek. The sourness was there, but all those other bacterial-based tastes and the typical barnyard aroma and flavor were greatly missed. I have used a sourmash successfully with other beer styles, most notably several Flanders brown ales.

"The Flanders brown is an attempt to duplicate Liefman's Goudenband. Although the sourmash technique has gotten me closer, the recipe needs a bit of work. I get a nice sour brown ale, but it falls short of the complexity of well aged and blended flavors in the target. This is an ultimate quest for me. I love Goudenband; in fact it is my favorite beer other than the one in my glass. Some day I will perfect it, I hope. In the meantime all the attempts have been great beers," Colaizzi says.

Passion Flows with Lambic

Like many fans of the style, Colaizzi is passionate about lambic. "I love the style! I have spent a lot of time and effort over the years to seek out lambics to taste. Pennsylvania's beer distribution system makes finding many of the more renowned brands difficult. I've always been intrigued by the spontaneous fermentation method and how it creates such a complex and enjoyable brew. Every

bottle of lambic I've ever tasted has been a unique tasting experience," he says.

Colaizzi says the technical challenges posed by the style gave him incentive to try his hand at it.

Colaizzi uses American ale yeast for his primary fermentation. "I've always used Chico ale for the primary because I wanted a neutral yeast flavor. After five to seven days, I add the brett and pedio cultures. I use Brewtek's *Brettanomyces Lambicus* and their *Pediococcus* strain. I've considered using *Kloekera* but haven't obtained any.

"After a month or two, I add dregs from every lambic I drink. I hope to get more of the unusual microflora introduced this way. This is a very odd brew every time because I forgo the usual racking and just leave it all in the original carboy until fruit is added. After six months or so, I add the fruit by racking the beer into a plastic fermenter with the fruit but stir up most of the sediment in the process.

"I let it continue for another six months, then rack it off the fruit and bottle it," says Colaizzi.

Colaizzi has a few lambics cellaring in his brewery.

"The gueuze, my first, is three years old and never developed the character I hoped for. It's very sour but lacks complexity and has very little brett character. The kriek is two years old. It has a very pronounced acetic/vinegar aroma and a bit in the flavor. It has improved in the past six months, so my hopes are up. The brett is very evident in this one as well as many other complex flavors. If the vinegar notes mellow, it may be good. At this time it would not win any competitions.

"I'd be more careful with aeration when racking to the bottling bucket. The kriek was just wonderful when I bottled it but after a month or so the vinegar character appeared. I believe the oxygen introduced by racking triggered the growth of the acetobacter," Colaizzi says.

"Blended" Yeast

Wyeast sells a lambic blend smack pack, which contains both yeast and bacteria cultures. While pitching both up front will generate some "horse-blanket" character, Colaizzi says it's better to pitch the organisms separately.

"By pitching a blend you will get some horsey, leather-type character in your beer in time. This can produce a satisfying beer but will not give it the classic lambic character.

"I suggest seeking out a *Pediococcus* strain and perhaps some *Kloekera*. The pedio is available from Brewers Resource as well as a *Brettanomyces* strain. If you really want to do it authentic, you need to go for the biohazard stuff," Colaizzi says.

So let your hops go stale, let your wort get contaminated, and mark your calendar for your own lambic tasting, in a year or two!

Hidden Treasure at Diamond Knot

by Stan Hieronymus and Daria Labinsky

Do you have to be a knot head to hold down a full-time job and run a microbrewery on the side?

Brian Sollenberger and Bob Maphet call themselves knot heads, but in less than three years their Diamond Knot Brewing Co. in Mukilteo, Wash., has made a name for itself in one of the hottest beer towns in the country, Seattle. They continue to work long hours at Boeing while running the brewery in what used to be their spare time.

Diamond Knot, named for a sailor's knot, is most definitely micro. The brewery takes up 350 square feet in back of a bar called Cheers Too!, and the brewing area itself is only 280 square feet. The partners store and mill the grain in Sollenberger's garage, then haul it to the brewery. Although the brewery is close to Mukilteo's Possession Sound waterfront, it's so well hidden that some brewers attending a recent conference in Seattle couldn't find it.

Brian Sollenberger, Bob Maphet, and Justin Abel have earned a large reputation for their small brewery.

"We might be the most underground brewery in Washington," Maphet says. It's located near the Whidbey Island ferry dock, but a lack of street frontage precludes on-premise advertising.

The small brewery has developed a large reputation since its first beer was ready in October 1994. That didn't happen by accident; a lot of planning went into the venture. Originally, Sollenberger and the owner of Cheers Too! wanted to turn the tavern into a brewpub, but the state's licensing rules made that very difficult.

Sollenberger, 34, was running out of money and patience when he hooked up with Maphet, 37, at a homebrew club meeting. "I was single and had a little bit of money to burn, so I got involved," Maphet says. He is a business systems analyst for Boeing, and Sollenberger is a manufacturing engineer.

Diamond Knot leases space from Cheers Too! but is a separate business. The tavern is the brewery's best customer.

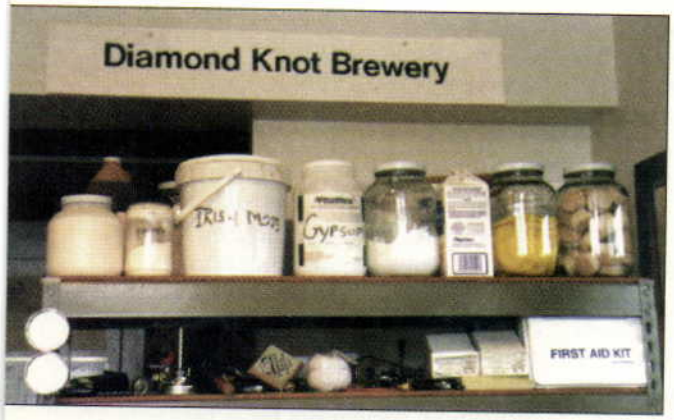
Much of the brewery's equipment is used or handmade. "Though he doesn't claim to be an expert welder, Brian does well enough to make it work," Maphet said. A lot of equipment was acquired as they went along. The mash tun came from a dairy, and a homemade pulley system enables them to fill the tun easily. They bought used grundy tanks and managed to stitch together a seven-barrel system.

The brewers started with two fermenters and increased their capacity when they added a third and hired a

full-time employee, Justin Abel. Before then, they would brew on Sunday and keg on Saturday (a batch brewed two weeks before). Now, one week they keg on Saturday and brew on Sunday, but the next week they keg one batch, transfer another to secondary, and can brew on Sunday and an additional batch on Monday. In 1996 Diamond Knot produced about 400 barrels.

They brew three beers year round plus seasonals, and they make sure the highly regarded India pale ale is always available. "We have to keep constant production, or we have upset customers," Maphet says. Although most Seattle-area alehouses rotate their draft selection often, about 10 accounts never take off the IPA. "They freak out if they run low," Maphet says.

Diamond Knot IPA is a Northwest-style India pale ale with a heavy emphasis on hops. "Part of our mission is to produce products that are true to style," Maphet says. The IPA is made from crystal, Munich, cara-pils, and two-row pale malts. Galena is the bittering hop, and the beer is finished and dry-hopped with Columbus. The result is an aggressively hopped beer that smacks the drinker in the nose, provides a depth of bitterness throughout, and has malt character clear to the finish.



Although grain is stored in Brian Sollenberger's garage, the rest of the supplies are kept in the 350-square-foot brewery.

It took more than a year to perfect this recipe. "We wanted to make something that stands out, and the IPA has done that," Maphet says. Hopheads are stunned to learn that the 1.056 (original gravity) beer checks in at "only" 40 IBUs. "People say, 'You've got the hoppiest beer in the world,' but it's the hop flavor," Maphet says.

The secret is the dry hopping with whole Columbus hops. The brewers took a homebrewer's approach when they found a way to dry hop in the keg. They make a tube out of mesh material, some unwaxed dental floss, and zip ties, then stuff it with hops to produce what looks like a string of sausage. The dry-hopped IPA sits in the kegs in the brewery for a week before going into the cooler.

The other regular beers are the Bavarian-style HefeWeizen and the Dublin-style Steamer Glide Stout, both of which prove these brewers aren't one-dimensional hopheads. The stout is made from two-row Gambrinus flaked barley, which enhances head retention and mouthfeel, and black malt. Galena hops are used for bittering only, and the wort is fermented with a traditional Irish yeast. The beer has a modest original gravity of 1.044 and is served by nitrogen dispense.

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The hefe-weizen is a test of their will to remain true to style. Selling a Bavarian hefe-weizen in the Northwest, where Widmer Hefeweizen has defined the style, has been difficult. Because the beer is a slow seller, keeping the Weihenstephan yeast from acting up is a constant challenge, but they likely will quit making the beer before they make it differently. "We keep hoping the trend will be away from the Northwest style," Maphet says. They've thought about dropping the beer, but one loyal account keeps it alive.

Seasonals include an amber Irish ale, a golden ale, a high-gravity holiday special, and a porter.

The partners have plowed their profits back into the business, adding brewing equipment, the kegs necessary for an expanding draft-only operation, and the full-time employee. Abel, 30, splits his time between selling and brewing. He prefers brewing and hates cold calls but often finds receptive potential accounts. "Word of mouth is my best sales tool," he says.

Justin Abel fills the kegs necessary for the expansion of draft-only operations at Diamond Knot Brewing Co.

Maphet and Sollenberger hope to expand Diamond Knot, if only to give themselves more room to brew. At a minimum, they would like to occupy the back half of Cheers Too!, or they could acquire the entire tavern and go through the licensing procedure to turn it into a brewpub. That wouldn't change their brewing philosophy — to make what they make well, rather than merely filling out tap handles. "We're first and foremost a microbrewery," Sollenberger says. "We'd keep the best of the best on. I'm not going to be arrogant and say ours is the best of everything."

Maphet and Sollenberger both have beards, and people often think they're brothers. A message board in the brewery is decorated with cartoon drawings of the two "knot heads," and they have called themselves that since day one. They divide their duties comfortably. While Sollenberger is the metal and welding guy, Maphet is the wood guy, making the tap handles himself. Each is wrapped with a piece of rope, in keeping with the Diamond Knot theme.

Diamond Knot refers to a kind of knot used by sailors but also to a freighter ship that sank northwest of Port Angeles in 1947. The ship's cargo of $3.5 million worth of canned salmon was at first thought to be a total loss. A remarkable salvage effort — during which 12-inch siphon pipelines were rigged from barges to the freighter's holds and the cargo was sucked up by compressed air in the manner of a giant vacuum cleaner — managed to save $2.1 million worth of the cargo.

Diamond Knot's owners found a message in the freighter's tale. "They said they'd never salvage the salmon that was lost and they did it, and they said we could never open a brewery this small and we did it," Maphet says.

Diamond Knot Brewing Co. is at 621 Front St., Mukilteo, Wash. 98275. Beer fans are welcome to view the brewing process on Saturdays and Sundays through the windows in the back of Cheers Too! where you can sample Diamond Knot beers. Call (206) 355-4488. ■

Stan Hieronymus and Daria Labinsky are authors of the Beer Travelers Guide, *which lists more than 1,700 brewpubs, bars, and restaurants in the United States that serve flavorful beer.*

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Practice Makes (Burp)fect

by L. Ray Vinson

My neighborhood buddies and I first got together drinking store-bought beer to discuss the feasibility of beginning an informal brew club. "Practice sessions" we called them. We tried many different types of beer under the auspices of training our taste buds. The rules established were simple: We would take turns choosing the type of beer. Our first decision was to make a good English dark.

We already had some of the necessities: three five-gallon glass bottles, a cool basement, a sink, a cooker, desire, and enthusiasm. We ordered several airlocks, cleanser, a five-gallon plastic fermenter, a hydrometer, the ingredients, and a recipe.

Our group consisted of middle-aged professionals with responsible positions, now acting as if we were 10-year-olds dreaming of Christmas morning. Several beer-drinking practice sessions were held with the excuse that we would need lots of empty bottles. It was our duty to collect enough bottles to support our neighborhood brewery.

Our first lesson on beer brewing began. We were extremely careful in our measurements of each ingredient but failed to designate who was to do what. As a result of our overzealousness we put in some of the ingredients more than once and probably left some out. But we were positive this would be a brew deserving of a blue ribbon.

As the days passed, the yeast was working wonderfully, and the smell was something from heaven. After 10 days with at least one of us checking on the status of the brew daily, a practice session was called to transfer the brew into a five-gallon carboy. We tasted the best beer we ever had.

Patience was not our strongest virtue. Over the next two weeks several practice sessions were called to rack the brew, taste it, rave about how wonderful it was and how with age it was getting better. Racking is our professional brewer's excuse for filtering and tasting the unfinished brew. It is unfortunate that we did not take a beginning hydrometer reading because each of us was convinced this brew was so powerful that any ordinary mortal could not drink more than two bottles and walk away without assistance.

Our second homebrewing lesson was serious business. We had purchased corn sugar, bottle cleaners, disinfectant, measuring spoons, bottle capper, caps, and funnels. An assembly line was established. One person washed each bottle with disinfectant and water. The next shook off excess water and placed the bottle on a makeshift drying rack. Our next assembly worker put a teaspoon of sugar into the bottle, and the next worker filtered (one last time) the brew into one of two tea pitchers. The next in line carefully poured the beer from a tea pitcher into a bottle using a funnel. Pouring was a critical job because too much poured into the bottle was bad and too little was not good; perfection was the order. The job of "pourer" was given to our most meticulous club member.

Our club learned valuable lessons, such as screw-cap bottles cannot be capped.

The last person in our assembly line was our "capper." Our capper was inexperienced and was falling behind miserably. Not only was he falling behind, but he was breaking more bottles than he was capping. So the assembly line was stopped. The problem called for a professional analysis of the situation. A discovery was quickly made: Screw-cap bottles could not be capped. A serious bottle deficiency suddenly existed. The solution was obvious — we needed to get bottles that did not have screw-on caps. We apologized to our capper for calling him names.

We gathered enough money to buy two cases of cold Corona. Corona bottles would be perfect, could be recapped, and were clear. Clear enough to see if our pourer was doing a good job. We started the difficult task of emptying enough bottles for the remaining brew. We would drink one, hand it to the washer, then forward it to the remainder of the assembly line until it was refilled. Each person would empty for a while then fill for a while. It was a good thing that it was a Friday night, because none of us could have made it to work the next day. Practice sessions or not, we were unable to drink enough to bottle the five-gallon container.

Our wives were not happy. We were the most satisfied — and tipsy — failures ever seen. Our next brewing lesson was learned: preparation. ■

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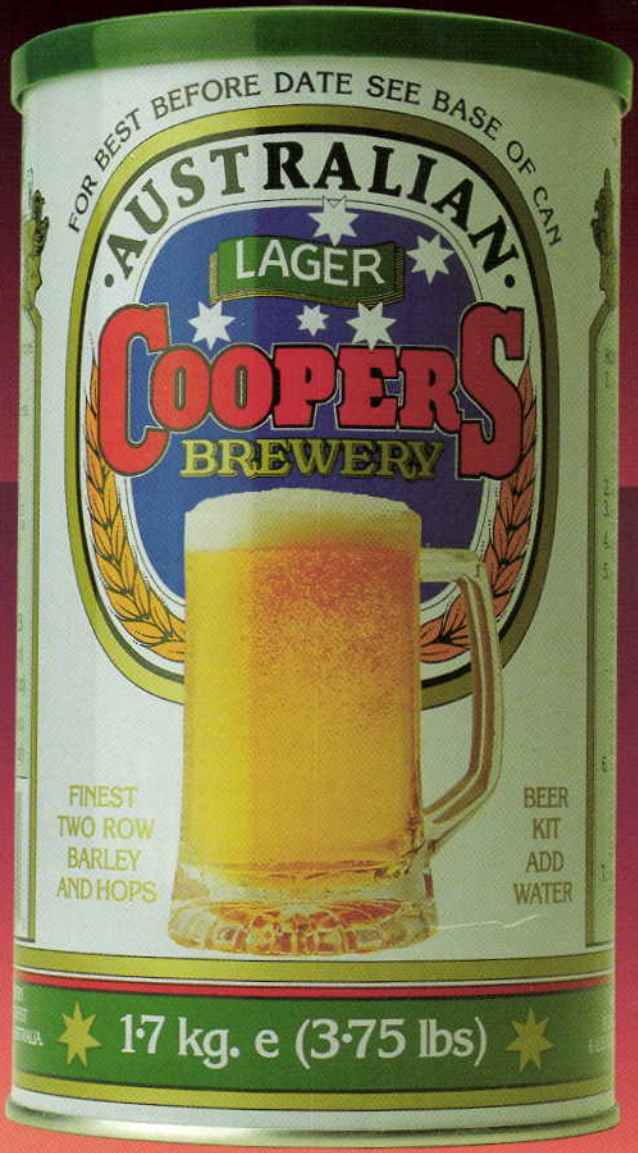

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