Brew Yo

MARCH 2000, VOL.6, NO.3

THE HOW-TO HOMEBREW BEER MA

3 Great U.S. Brewers Want You!
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8 Tips for Expert Brewing

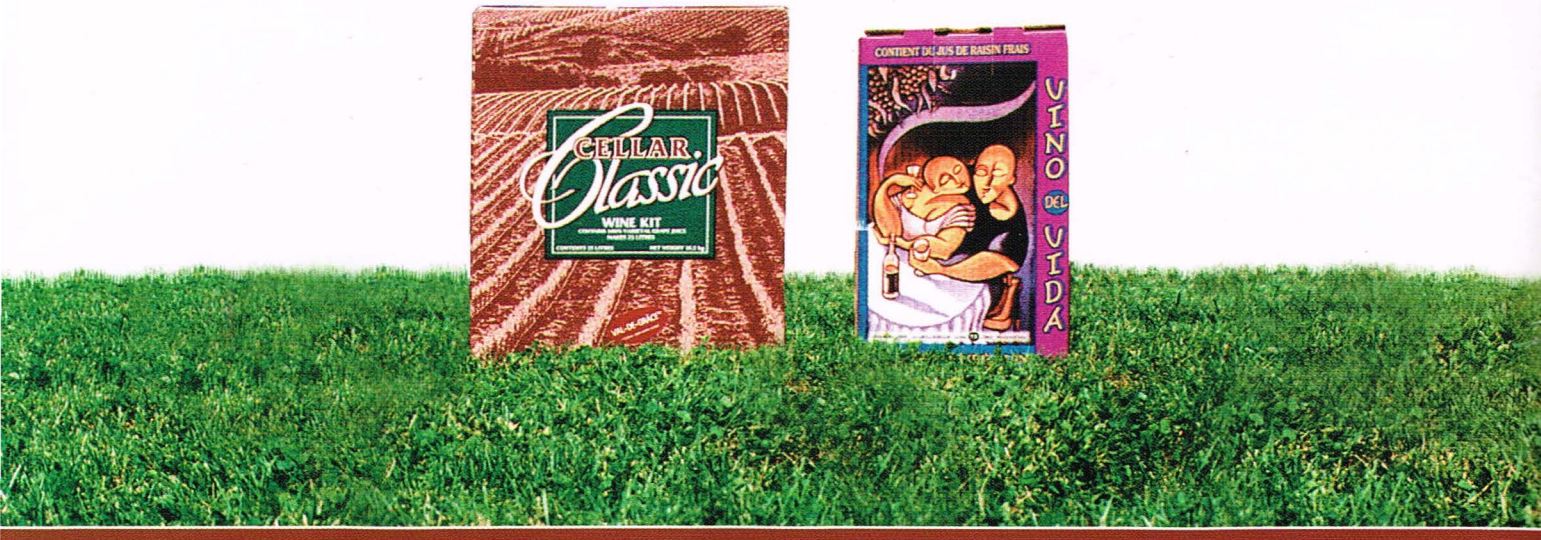
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Cover photo: Kent Lacin

Beer On The Ceiling

Some people remember with absolute clarity where they were, and what they were doing, on the day Kennedy was shot or the U.S. Olympic hockey team beat the Russians. Me, I remember the night the beer exploded.

At 3:32 AM on January 10, 1990, Brad and I were yanked from sleep by a sonic boom in our kitchen, followed by a long hiss. "Oh god," he said. "The beer," I said.

It was Brad's first batch of homebrew, an ambitious cherry stout made from malt extract and several pounds of fruit. We ran into the kitchen and saw a horrible sight: In the five-gallon carboy, two gallons remained. The rest looked like it had been sprayed around the room with a fire hose. As we stood there, a few cherries dropped from the ceiling and plopped at our feet. "Maybe I should have strained out the cherries," he said. Sure enough, an evil little fruit was stuck in the blow-out hose.

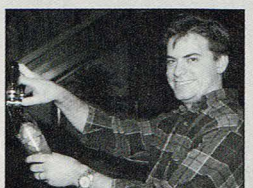
Then came one of those marital moments. "You clean it up," I said. "I'm going back to bed." When I woke up four hours later, Brad was mopping the ceiling in his boxers.

You'd think we might have bagged homebrewing after that fiasco. Instead, that batch of Cherry Bomb Stout started a decade-long hobby that's become our profession: This past December, Brad and I bought *Brew Your Own* from its visionary founder, Carl Landau, and moved the magazine to our hometown of Manchester, Vermont. Brad is the publisher; I'm the editor.

I won't blab about our credentials, beyond saying we've both worked in magazines for a long time, and we're both avid homebrewers. (On second thought, I will mention that Brad has been *BYO's* circulation director since March 1999, and before that spent several years editing beer and wine books for Storey Communications.)

Since we're new, we're especially eager to hear from our readers. Let us know what you think of the magazine. We'll consider all your suggestions ... as we sip a pint of our latest batch.

KATHLEEN



He's the Man! Ashton Lewis, BYO technical editor

High time you met the man who's key to making *BYO* such an accurate, informative magazine: Ashton Lewis, our technical editor since *BYO* was founded in 1995.

Ashton brewed his first batch of beer as a high-school senior in Laurel, Maryland. "It was a stout, but we used way too much malted barley," he says. "It was all burnt and bitter. Totally undrinkable." Still, he liked homebrewing so much, he went on to study food science at Virginia Tech.

After graduating in 1991, Ashton was accepted to the country's only graduate program in brewing science, at the University of California in Davis. Over the next four years, he wrapped up a masters' thesis on beer foam stability, worked as a brewer in the local German-style micro, taught brewing science classes, and passed a nine-hour exam at the University of Brewing in London.

Since then, he's worked at the American Brewer's Guild, helped found a brewing consulting company, and, since 1997, has held the title of Master Brewer at the Paul Mueller Company in Springfield, Missouri. His job is twofold. First, he's head brewer at the company's showcase brewery, the Springfield Brewing Company. Second, he helps design new breweries, including one in Japan. Suffice it to say: Ashton knows his stuff. We're lucky to have him on our staff. ■

Photo courtesy of Springfield (MO) Business Journal

Brew Your Own
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Homemade Siphon

Dear Brew Your Own,

I see we're talking about starting siphons in the mail section again (Jan. '00 BYO). I have a really great tip for getting your beer moving. I use a mouthpiece on the siphon hose. My siphon hose is 3/8-inch outer diameter, so I use a small, 1-inch piece of 3/8-inch inner-diameter hose as a mouthpiece. Sanitize it and the siphon hose together, and when you're ready to siphon, slip the mouthpiece onto the end of the siphon hose, grip the mouthpiece with your teeth, get the siphon going, and pull the mouthpiece off. I usually pinch the siphon tube off with the pincher thingy, get a sample for the hydrometer, and then fill the carboy or keg. This works really well, with no chance of contamination. Rinse off the mouthpiece in hot water, and put it back in the sanitizer in case you have to start the siphon again.

Bill Tobler
Lake Jackson, Texas

Sparge Specific

Dear BYO,

I'm confused about your definition of sparging. I have read a few articles that say to collect the first runnings, then sparge with the required amount of sparge water. Does this mean that you let the wort run out of the mash tun and start to sparge when that runs out? Wouldn't you end up with a stuck mash?

Roy McKenzie
via e-mail

There are several techniques used for sparging. Some brewers do indeed collect first runnings until no more wort flows, then add a large amount of sparge water (usually between one-third and one-half of the total sparge water), and then repeat the process. This method is known as "batch sparging" and is even used by some commercial brewers. A more common method is "continuous sparging." This method seems to work best if first runnings are collected from the grain bed until there is about 1/2 inch to 1 inch of wort covering the top of the grain bed. At this point sparging begins. It is important not to let the top of the bed run dry during the sparging process; if the grain bed does become dry, a stuck mash is more likely to occur.

Baking Beer

Dear BYO,

Couldn't one use baker's yeast in the brew kettle at the start of the boil as a yeast nutrient? I think it would work as well as old brewer's yeast.

Lillie Sawyer
Idleyld Park, Ore.

Autolyzed yeast is a common additive to beer and wine fermentations as a yeast nutrient. Autolyzed (killed and opened) yeast contains vitamins, minerals, and amino acids required by yeast for growth. Baker's yeast or old brewer's yeast added to the wort boil would certainly add these components required for a healthy fermentation. Be careful not to add too much because yeasty flavors might follow.

Higher Alcohol Content

Dear BYO,

How do I raise the alcohol content by about 1 percent without changing the taste of my recipe?

Rob Danford
Columbia, S.C.

Since alcohol is a key contributor to beer flavor, it is very hard to change one without changing the other. The most flavor-neutral way to increase alcohol without affecting flavor is by adding rice or corn syrups. If you add about 1.25 pounds of corn or rice syrup to a five-gallon batch, you will increase the alcohol content by about 1 percent. ■

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Strange Brews

Tales of bloody ale, baby bottles and urban-island brews

Roy Lowe
Waldport, Oregon

After having gone six months without brewing, I finally got with it again and started a five-gallon batch. I decided I wanted a robust ale with lots of malt and hops, so I used nine pounds of light malt extract syrup along with a pound of rice syrup solids. I used two ounces of Willamette hops for bittering and two ounces of Cascade hops for aromatics.

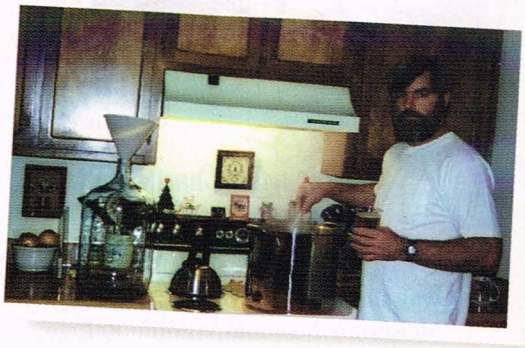
Since my wife's beer consumption averages two to three beers a year and she detests the smell of boiling wort, as do my two sons, much of my brewing is done when they are away from home. My fermentation room also serves as our laundry room, and since our washer and dryer seem to run about 18 hours a day, it's tough for me to get in there and do my thing between loads of laundry. However, when it was time to rack this beer to the secondary, my wife conveniently left to go shopping for an hour. I rushed into the laundry room and cleaned and sanitized my equipment and another carboy.

I racked the beer to another carboy, and I only needed to clean up and put away a 6.5-gallon carboy full of iodophor sanitizing liquid in the adjacent stairwell closet. I swung the carboy up to slide it down into the cardboard box, but as it began to go down, it slipped from my slightly wet hand. I attempted to grab the neck of the carboy, but I reached it just as the bottom of the carboy hit the ground. It exploded!

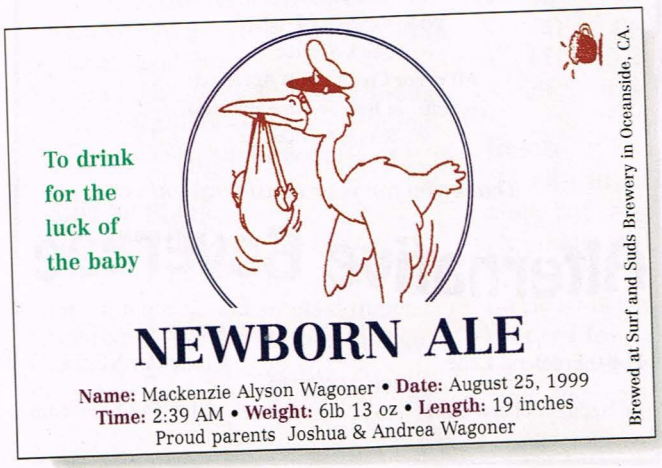
I immediately felt a searing pain in my hand, and when I swung my hand upward, blood sprayed up the wall and across the ceiling of the closet. My ring finger on my right hand was askew, pointing sideways, and I feared it was going to fall off. I had severed the tendon at the base of my ring finger along with the major nerve. The emergency room just patched me up until I could see a specialist. I had two surgeries to repair my finger.

The only good thing about the whole incident was that I didn't lose a drop of beer. And as fate would have it, this was the best batch I had ever brewed. My whole family had to help me bottle, which didn't occur until a month later, and I decided during bottling that the most appropriate name for the beer would be "Severed Tendon Ale." The beer was not cheap, as the medical bills came to $16,500—or about $330 per bottle for my Severed Tendon Ale.

A recommendation: Take your time, enjoy brewing, and ensure that *all* of your carboys have handles securely installed on them.



My injury healed and I could once again brew and drink simultaneously. The final cost of Severed Tendon Ale? About $330 per bottle.



Josh Wagoner
Oceanside, California

This is the label from my strange brew. The beer wasn't so strange, but some people might think the occasion an odd one to celebrate with a beer. As for me? I think it was an experience worthy of a homebrew.

I made Newborn Ale in honor of my daughter's birth. I used the bottles as birth announcements to give to my family and close friends.

This label — attached to bottles of homebrew, of course — served as the birth announcements for my daughter.

Strange Places



Charlie Pelizza
Lake Andes, S.D.

During the summer of 1989, I was the manager of the Stewart B. McKinney National Wildlife Refuge, a scattered group of islands off coastal Connecticut. Uninhabited Chimon Island, lying outside of Norwalk Harbor, was home to thousands of nesting herons, egrets, and gulls. During the summer the refuge would staff a research camp. Back then there were two individuals, the "Chimon Women," who spent their days counting nests and young birds. Evenings on this remote island were left to their hobbies. Luckily for me, one of these hobbies was brewing beer. Not so lucky was that all brewing supplies, including water, had to be carted to the island by boat, lugged across a rocky shore, and then hauled up a stinging-nettle-lined path to their campsite.

I would typically visit the site every week or so, bringing supplies and helping with the research. On one occasion I helped cart the extra 10 gallons of water, grain, and other supplies needed to brew a batch of "Black Death Stout." That evening, with the lights of New York City to the west and the Connecticut shoreline to the north, we brewed in seclusion, listening to herons squawk and trying to keep the bugs out of the wort. It was truly amazing that we could be so close to millions of people, yet be brewing without electricity, running water, or heat at the turn of a button.

The beer was more appropriately renamed "Chimon Island Stout," and in the coming weeks we enjoyed the fruits of our labor, savoring the liquid that we worked harder than average to produce. While I don't have the recipe, this batch remains one of my most memorable as it began my own decade-long, 100-gallon-per-year homebrewing hobby. ■

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"Kick Save, and a Beauty..."



by Scott R. Russell

I had a fairly athletic upbringing. All of my male relatives were sports fans, and I can't remember ever not being one myself. My great-grandmother would read me the sports pages when I was very young, and my grandmother was a *huge* hockey fan. I went to Red Sox baseball games starting at the age of 4 or 5, and family gatherings frequently revolved around watching football, basketball, baseball games, golf tournaments, and so forth.

Of course we all played sports, too. No summer cookout was complete without a whiffle-ball game, fall gatherings included touch football, and there was always a golf outing on the mornings of Memorial Day and the Fourth of July. But, no matter how I tried, I just couldn't ice skate. I blame it on weak ankles, the kind that flop over sideways after about five minutes propped up on thin metal blades. I always ended up with exhausted and painful feet. My great invention and contribution to mankind was always going to be skates with a second blade set at a 90° angle to the main blade, facing outward, like the outrigger canoes on "Hawaii 5-0."

I loved hockey, still do. Thursday night was hockey night in our house, because that was the night Mom was at choir rehearsal. My dad and I (my brother and sister were too young to stay up that late!) would turn on Channel 38 and watch the Bruins together every Thursday. Bobby Orr, Phil Esposito, Bucyk, Hodge, MacKenzie...heroes of a generation.

So when the guys in the neighborhood would gather at the local pond to play hockey, I was the proverbial Last Kid Picked. And often, because I couldn't skate, I'd get stuck playing goalie. No mask, no gloves, no big wide goaltender's stick, just skinny little

Kick Save Smoked Maple Brown Ale
(5 gallons, partial mash)

Ingredients:

- 4 lbs. pale malt
- 1 lb. brown malt
- 0.5 lb. dark crystal malt, 90° Lovibond
- 0.25 lb. chocolate malt
- 0.125 lb. German rauchmalt (beechwood smoked malt)
- 3 lbs. unhopped amber dry malt extract
- 1 qt. pure maple syrup
- 0.8 oz. Styrian Goldings hops (5% alpha acid, 4 AAUs) for 75 min.
- 1 oz. Hallertauer hops (4% alpha acid, 4 AAUs) for 15 min.
- European ale yeast (Wyeast 1338 or equivalent)
- 1/4 cup brown sugar for priming
- 1/2 cup maple syrup for priming
- 1/8 cup corn sugar for priming

Step by Step:

Heat 2.5 gal. water to 164° F. Crack and mix in pale, brown, crystal, chocolate, and smoked malts. Hold at 152° F for 90 min. Sparge with 2.5 gal. water at 168° F.

Add to kettle the dry malt and the maple syrup. Total boil is 75 min. Bring to a boil, add the Styrian Goldings hops, boil 60 min. Add Hallertauer hops, boil 15 minutes. Remove from heat, pour into fermenter and top up to 5.25 gal. with chilled pre-boiled water. Cool to 68° F, pitch yeast.

Ferment at 65°F for three weeks, then rack to your secondary. Age cool (50° F) for four weeks. Prime with the brown sugar, maple syrup, and corn sugar. Bottle and age three to five weeks.

OG = 1.065
FG = 1015
Bitterness = 22 IBUs

Notes:

All-extract version: Omit pale malt, but steep the brown, crystal, chocolate, and smoked malts in 2.5 gal. of water at 150° F. Increase dry malt to 6 lbs., proceed from boiling.

All-grain version: Omit the dry malt. Increase the pale malt to 8 lbs., mash together with the specialty grains as above in 3 gal. water, sparge with 5 gal. water. Add maple syrup as above, and proceed from boiling. Plan your boil to reduce volume to 5.25 gallons, or top up in the kettle as you go along.

About maple: If you have the good fortune to have access to fresh maple sap, substitute it for water (or even boil a few gallons halfway down to get some additional maple flavor). Please use only real maple syrup (preferably from Vermont!) and not the commercially produced flavored corn syrup!

About smoked grains: If your local supplier does not stock, or can't at least special-order smoked malts for you, try the mail-order catalogs and online suppliers. If all else fails, it is possible to smoke your own malt, but I don't recommend it because it is complicated, especially for a small quantity like what you need for this recipe.

me, a regular hockey stick, and if I was lucky, mittens that were not soaking wet.

My epiphany came one gloomy afternoon when I saved a game by accident. With time running out, a long booming shot came down the ice at me and I fell. But I fell with my legs out in the direction of the flying puck and knocked it aside to a teammate, and we won. The kid doing the play-by-play on the sideline (there was always someone doing play-by-play on the sideline...) yelled out, imitating the TV announcer, "Kick save, and a beauty..." and, well, my teammates didn't mob me, but they didn't give me the traditional whitewashing either...

This was the voice I heard in my mind a couple of winters ago, when I almost burned down my house, and worse, almost ruined a batch of beer. It was sugaring season, and I had been boiling maple sap on the porch for hours. I had reduced 60 or 70 gallons of sap down to about a gallon and a half of thick amber sweet glue. And then I forgot about it, got doing something else inside, and left it still boiling. I smelled burnt sugar, smoke, and in a panic ran out to the porch to find my pan now filled with almost solid, burnt maple toffee. A few more minutes, and I bet it would have burst into flames.

I did the logical thing, what you all would have done in my place, right? I turned off the heat and poured water into the pan, to reconstitute the syrup. But boy did it taste burnt. No longer fit for human consumption. Not on pancakes, at least. But not wanting to waste it — after all, there were 70 gallons of sap and five or six pounds of propane invested in it — I concocted a recipe for an old ale, which would use the burnt syrup instead of molasses or treacle. It is now three years old, and the burnt sugar and smoky maple are wonderful.

Now, I don't want to encourage anyone to go out and evaporate 70 gallons of fresh maple sap, and then burn it, to duplicate my brewing version of a "kick save." Instead, I offer a recipe for a stronger-than-average brown ale, with a small amount of smoked grain and some maple, to give you an idea of what it might have been...

Reader Recipes

Skooter's Hefe-Weizen

(5 gallons, extract)

This award-winning hefeweizen recipe is simple, and tastes great!

Mark Froehlich
Rockport, Mass.

Ingredients:

- 4 lbs. Alexander's wheat malt extract
- 2.5 lbs. Muntons dry wheat malt extract
- 1 oz. Tettnanger hop plugs (4.7% alpha acid, 4.7 AAUs) for 60 min.
- 0.5 oz. Hallertauer hop plugs (3.2% alpha acid, 1.6 AAUs) for 30 min.
- German wheat yeast culture
- 3/4 cup corn sugar

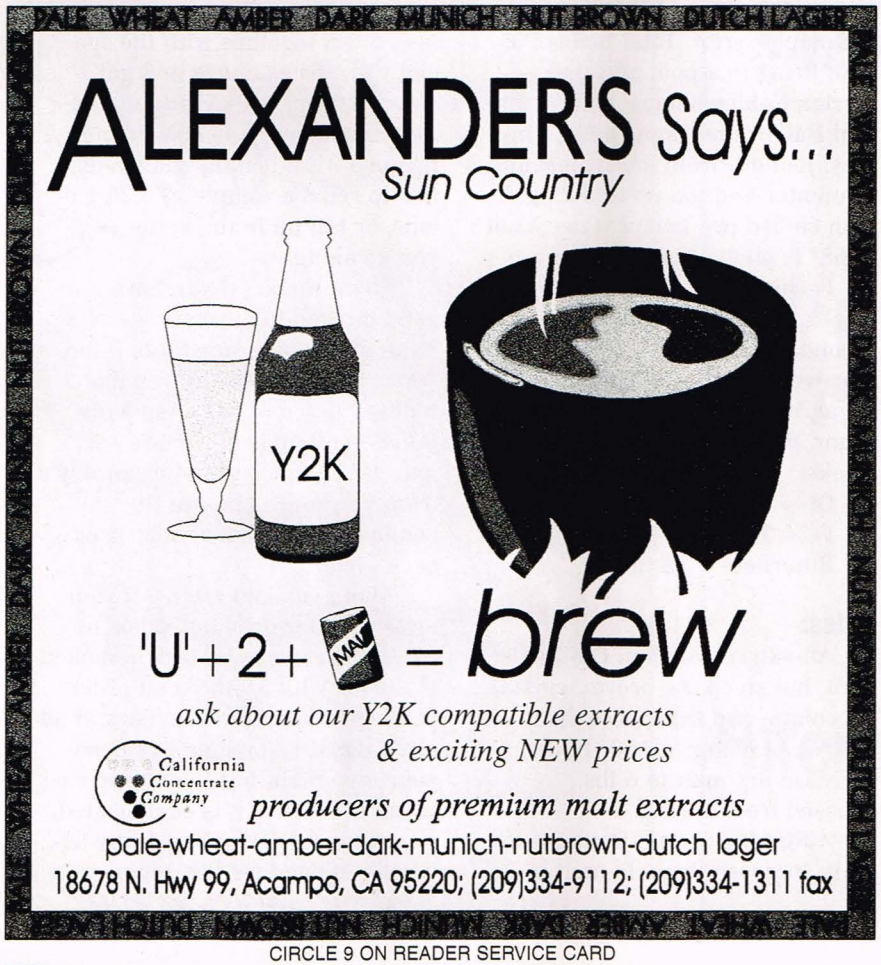
Step by Step:

Prepare 1 qt. starter of yeast culture (with pinch of yeast nutrient added) 48 hours before brew day.

Bring 2.5 gal. of chlorine-free water to a boil. Remove from heat and dissolve malt extracts thoroughly. Total boil is 60 min. Add Tettnanger hop plugs and boil 30 min. Add Hallertauer hops (about one hop plug) and boil 30 min. more. Remove from heat, cover brew pot, and cool in sink for about 20 min. Strain wort into fermenter with enough chilled, chlorine-free water to make 5 gal. Cool to 65° to 70° F, pitch yeast, and aerate thoroughly.

Ferment at 68° F for seven to 10 days (make sure fermentation temperature does not rise above 68° F, or you might get sulfury off-flavors). Transfer to secondary for seven days. Prime and bottle, or force carbonate in keg.

OG = 1.048
FG = 1.009
Bitterness = 23 IBUs ■



CIRCLE 9 ON READER SERVICE CARD

Don't Lose That Fizz

Mr. Wizard

I have assembled the equipment to start kegging my beer and force-carbonating it in soda kegs. I will still want to bottle some of the beer for ease of transport. How much difference in carbonation levels can I expect, filling from a counter-pressure bottle filler or just filling quietly from the keg with an extension tube on a party tap?

Dan Edward
Manteca, Calif.



The amount of carbonation lost during filling is heavily influenced by the carbonation level of the beer being filled. Highly carbonated beers lose more carbonation when bottled compared to beers with lower levels of carbonation. It is almost impossible to give hard numbers to directly answer your question, but based on personal experience, you will lose a considerable amount of carbonation if you simply fill bottles from a tapped keg.

I use a long-tube, counter-pressure filler to fill 22-ounce bottles. The fill tube extends to the bottom of the bottle and gently lets beer in as the counter pressure in the bottle is slowly vented. My filler allows me to fill one bottle in 40 seconds, which is fast enough for my needs. I know from carbonation measurements taken before and after filling that my beers lose about 0.25 volumes of carbon dioxide (they drop from 2.65 to 2.40 volumes).

Although I am happy with the carbonation level of my bottled beer, this is an appreciable loss of carbonation. I can guarantee that if I did not use a long-tube, counter-pressure filler, my losses would be much higher. In practical terms your beer will begin to seem flat when the carbonation level drops to around 2.2 volumes.

Another real issue to consider when bottling beer is oxygen pick-up. The rule of thumb in a commercial brewery is that oxygen pick-up becomes increasingly more important as the beer nears completion. Beer transfers following fermentation, filtration and packaging are three areas to be especially careful with, in respect to oxygen pick-up. The reason is simple; yeast is capable of mopping up oxygen when it is active and yeast activity rapidly decreases after fermentation. In the case of filtered beer, there is no yeast activity because there is no yeast!

There are some very fancy bottling systems, used by commercial brewers, that use a vacuum-evacuation technique to remove oxygen from the bottle and short filling tubes that allow the beer to cascade down the surface of the bottle. These fillers work very well in respect to carbonation retention, low oxygen pick-up and speed, but are out of reach for homebrewers. The best filler for the homebrewer is a long-tube, counter-pressure filler. This technique will fill your bottle without losing too much fizz, your main concern, and will also do an excellent job of minimizing oxygen pick-up.

My advice is to use the hose from your keg to fill a glass or mug — but not to fill bottles.

Mr. Wizard

I've been homebrewing for approximately four years now, and to this day it remains my primary obsession. I've wanted to get into brewing some high-gravity beers such as barleywines and imperial stouts. I've read quite a few articles on high-gravity fermentation, but I still have a number of questions I was hoping you would be able to answer for me.

1) I've read that pitching a strain of champagne yeast after racking to the secondary will assist with the full attenuation of the beer to the desired alcohol level. Is this a recommended procedure? If so, wouldn't you need to re-oxygenate your beer again in order for the additional yeast to begin fermentation? If so, wouldn't the addition of oxygen at this point cause some considerable off-flavors? Is champagne yeast the strain to use or should you pitch some additional alcohol-tolerant ale yeast? Also, is it necessary to build another starter for this procedure?

2) I've seen many recipes for high-gravity beers that indicate quite extended primary and/or secondary fermentation schedules (some two to three months). I would surmise that after such extended fermentations, most of the yeast will have settled out of suspension. Some of these recipes recommend pitching an additional smack pack of your original yeast at bottling to ensure adequate carbonation. Is this practice usually necessary and is it safe (i.e. exploding bottles)? Again, wouldn't you need more oxygen for the yeast to go to work? I would guess that this procedure may also be recommended prior to bottling after extended lagering at low temperatures. Would you recommend doing this along with adding more yeast to the secondary as discussed above?

Your enlightenment on these issues would be greatly appreciated.

Mike McNeil
via e-mail

There are several schools of thought on high-gravity fermentations and how best to ferment all of the fermentables in the wort. The idea that appeals to me the most is based on some very simple principles. I answered a rather similar question in the last issue of BYO (February '00) but there are a couple of points you raise that I didn't address.

My basic philosophy with high-gravity beers is pretty simple. Pitch enough yeast, aerate the wort well and get on with it! Most brewing strains can handle wort gravities up to about 1.080 without much problem and many will work fine with worts up to about 1.100.

In response to your question, I would personally never add more oxygen to fermenting beer — period. Adding more yeast, on the other hand, is often beneficial when fermenting a high-gravity wort. Additional yeast is also frequently added to beer following very long aging periods prior to bottling. This practice is safe as long as the beer is completely fermented when it is bottled; it's really no different than normal bottling.

It is important to understand that yeast does not require oxygen to ferment; rather it needs oxygen to multiply — oxygen is required by yeast cells to synthesize sterols and unsaturated fatty acids that are used to build new cell walls. Fresh yeast that comes out of a propagation step contains an excess of these cell-wall-building compounds and is capable of limited multiplication in the absence of oxygen. When wort is first pitched after cooling, it is very important that the wort is aerated because the excess of sterols and unsaturated fatty acids is insufficient for the intensive growth in the early stages of fermentation.

A similar method used by many brewers to help finish a fermentation is to add a portion of actively fermenting beer to a slowing fermentation. This technique of "kraeusening" is traditionally used as a method to carbonate lagers but can also be used to solve other problems. With or without kraeusening, lagers are carbonated during aging because they are aged under pressure. For this reason high-gravity lagers, like doppel bocks, are allowed to naturally clarify during their long lagering period without having to worry about bottle conditioning. All traditionally aged commercial lagers employ this method, but most homebrewers treat ales and lagers the same when it comes to carbonation. If you use a traditional lagering method, there is no need to add more yeast before bottling, although you will need a counter-pressure bottle filler.

Some fermentations begin to slow down toward the end because of premature flocculation of the fermenting yeast. A simple technique to keep these sorts of fermentations on track is to "rouse" the fermentation. In a commercial brewery, rousing may involve transferring the beer to another fermenter or pumping the beer around in the fermenter to mix it up, but at home rousing is simple — just gently rock your carboy or fermenting bucket and the fermentation has been roused!

Like I said, I don't like to aerate beer during fermentation, but this answer would be incomplete if Yorkshire stone squares were not mentioned. Yorkshire stone squares are a type of fermenter developed in Yorkshire, England. Sam Smith's in Tadcaster is famous in the United States for its use of stone squares, although it has been reported that Sam Smith's no longer uses this technology. A Yorkshire square is an open fermenter with two chambers separated by a deck and connected with some tubes. The center of the deck has an opening that flares upward to allow the fermenting beer to spill up onto the deck.

The key feature of a square is a recirculation device that actually pumps the beer from the lower chamber and sprays the beer through a device resembling a shower-head onto the shallow deck that separates the upper chamber from the lower chamber. The beer in the upper chamber flows back into the lower chamber through tubes called organ pipes. These things sound really strange when described — it's no surprise they were invented in merry old England. The pump-over simultaneously rouses and aerates the fermentation.

This technique works for the brewers that use it and there are some really nice beers made using this method. One of the side effects to aerating a fermentation is abnormally high levels of diacetyl; that's a trait of beers fermented this way. If all else fails, aerating your beer during fermentation will not be the end of the world. You may even be pleasantly surprised with the resulting beer!

Mr. Wizard

I was wondering if it's possible to ferment cider that has been preserved with potassium sorbate. I've heard that this particular preservative works by lowering pH levels. If so, could a basic substance be added to counteract it, and what would that substance be?

Tom Buerkle
via e-mail

Mmm, cider! The best fermented ciders are made by using fresh-pressed apple cider from an orchard that uses no form of preservation — be it chemical (like sorbate preservation) or thermal. Hard cider is much like wine and depends on the quality of the juice, both in terms of flavor and microbial load.

Sorbates and benzoates are commonly used to inhibit the growth of bacteria and yeast cells in juices and other susceptible beverages, such as sweetened teas. One of the more common uses of sorbates in food is in combination with nitrates to protect foods from *Clostridium botulinum*. Benzoates are more commonly used in beverages to inhibit fermentation and are known to give beverages a peppery

flavor. In the beverage community this is known as a "benzoate burn." In either case, the antimicrobial effect is due to an interference with membrane transport systems. In other words, these compounds screw up the microbial cell's ability to absorb and excrete metabolic compounds. Microbial cells (bacteria and yeast) don't do too well in such a state.

Neither of these compounds works by lowering the pH of the beverage, but both require an acidic pH to be effective. Sorbates work best against yeast in the pH range between 5 and 6; benzoates are most effective against yeast in the pH range between 4 and 5. This pH dependency is due to the pK and these compounds are most effective below their pK, or the pH at which 50 percent of the compound is in its undissociated state. Both compounds exhibit antimicrobial activity in their undissociated state, but not in their dissociated state. This is all jargon if you're not a chemistry buff. The take-home message is that these compounds must be in an acidic environment to be effective.

Hypothetically you could add an alkaline or basic compound, like lye, to your cider to increase its pH. This would render the sorbates or benzoates ineffective against yeast cells, which you hope to prosper in the apple juice, but it wouldn't work for long. For starters, fermentation causes a decrease in pH and this would reactivate the preservatives. Secondly, adding alkaline compounds to apple juice will certainly affect its flavor, most likely in a downward direction.

The best thing to do if you are serious about making hard cider at home is to buy fresh apple juice from a good orchard. To suppress the growth of wild yeast and bacteria, you should add a generous amount of good brewing yeast. The idea here is that a healthy pitching rate will over-power rogue organisms, so off-flavors associated with such bugs most likely will never show up. I have made very good cider using these simple precautions and wouldn't think twice about doing the same thing again. Stay away from preserved juice and buy your raw material from a good, local orchard and a tasty cider is sure to follow!

Mr. Wizard

When I brew beer, I always prepare a starter for my yeast. I boil one gallon of water with one cup of dry malt extract. I would like to prepare and can a starter instead of preparing one each time I brew. Unfortunately, apart from knowing that one must use sterilized jars, new lids and seals, and clean utensils, I don't know anything about the procedure required for canning a starter. Some of the questions I have are:

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CIRCLE 10 ON READER SERVICE CARD

Is a "water-bath" method acceptable, or is it necessary to can a starter under pressure? If a water-bath is okay, what is the required length of time for the canning process?

If pressure canning is required, what pressure should be used and for how long? Is there anything else I should know...any tricks, anything obvious?

George Hutton
via e-mail

Canning wort starters for propagation is a very convenient method to use because of the time savings involved. The best way to can wort, or anything else, is to use a pressure cooker. The canning time varies with what you are canning, but 20 minutes at 15 pounds of steam pressure is sufficient for wort. A water bath can be used but the cooking time should be extended to a full hour, just like a normal wort boil.

There aren't many tricks to canning, but there are a few important ones. If you use a pressure cooker, the air must be thoroughly vented from the cooker before placing the weighted cover on the vent. If a pressure cooker is not vented, the air will interfere with the transfer of energy from the steam to the product in the cooker. All pressure cooker instruction manuals will have a prominent section on proper venting.

The second tip is to leave the lids loose during the actual cooking process. This is important because it is possible to fracture a sealed container during heating. Immediately tighten the lids after the cooking process is complete. This rule applies to pressure cooking and atmospheric cooking (the water bath).

The last tip I can give is to fill your jars about three-fourths full. This gives enough headspace to eliminate a boilover in the jar. Whatever you do, let the pressure cooker slowly de-pressurize. If you get in a hurry and rapidly bleed the pressure off, for example by yanking the weight off of the cooker at 15 pounds of pressure, the wort in the jar will boil over regardless of how much headspace you leave! ■

Mr. Wizard's Address

Do you have a question for Mr. Wizard? Write to him c/o *Brew Your Own*, 5053 Main Street, Suite A, Manchester Center, VT 05255. Or send an e-mail to wiz@byo.com.

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

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CIRCLE 21 ON READER SERVICE CARD

Brewing the European Greats

by Mikoli Weaver

March is a classic month, with two time-honored styles that should be in every homebrewer's recipe book. You'll start off with a pale, clean pilsner from the Czech Republic that tastes like the original Urquell. Then you'll brew a Belgian dubbel, a red ale that mirrors the beer brewed for 150 years by the Trappist monks of Chimay.

Pilsners Around the Planet

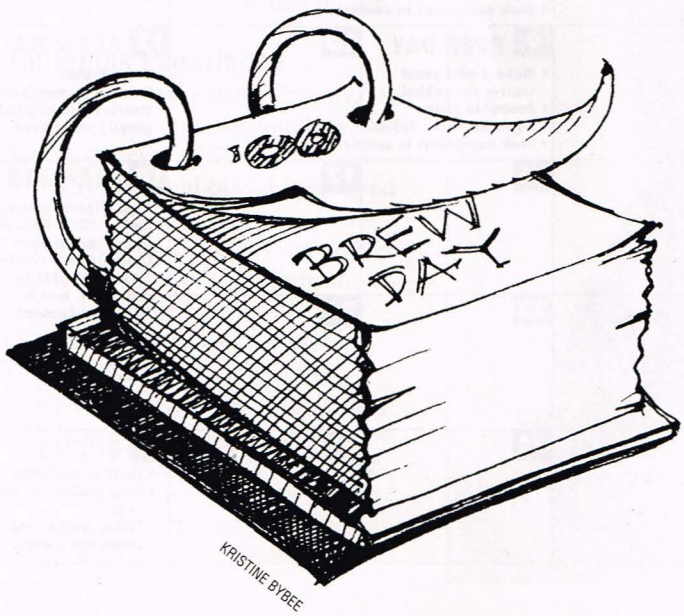
For most brewers the formal definition of a pilsner is a lager made with hops grown in the Saaz region of the Czech Republic. But the world of pilsner is more multicultural than many people realize.

There are three main types of pilsner: the traditional Czech style, German, and European (also known as Dutch or Scandinavian). There's also an American version, spelled pilsener. Yet another style, lesser-known in this country but popular in Germany and Britain, is Diat Pils. This beer, sometimes called "Diet Pils," really has nothing to do with being on a diet. It was originally formulated for diabetics to drink, being well-attenuated and lower in residual sugar. Feldschöbchen Diabetiker Pils is one example.

The original pilsner, brewed in 1842, was Pilsner Urquell. The first name reflects a Bohemian village in what was Eastern Czechoslovakia. The second name is Germanic, meaning "original source."

The pilsner style — and lagers in general — came together as a combination of factors over time: advances in malting to create pale-colored base malts, a viable lager strain of yeast, and mashing by decoction. Advances in equipment technology also played a role as steam was used to heat brew kettles instead of fire, which decreased the amount of coloring in the kettle.

The fruition of all these factors created a pale, clean beer which had never been seen before. The introduction of glass drinking vessels further clarified the charms of pilsner, and soon the new clear lager took the world by storm. By the 1850s, pilsner — a term synonymous with lager at the time — was being brewed in Germany, exported to Britain and gaining a foothold in the United States. These days, some better-known pilsners are the original Urquell and Budweiser Budvar (Czech styles), DAB Pils, Warsteiner and Spaten Pils (German styles), and Heineken (a Dutch style).



KRISTINE BYBEE

Czech pilsners are very smooth and well-rounded, but have a distinct hop presence — a result of noble varieties, namely Saaz. The finish is malty and can, in some cases, be slightly sweet with terminal gravities as high as 1.020 (5° Plato). The German pilsners are similar, but are lower in original and terminal gravities. They also may have a more perceptible hop bitterness due to the higher degree of attenuation, decreased maltiness, and the use of hops other than Saaz — Northern Brewer and Perle, for example. The Dutch style is lighter still, commonly made with some sort of adjunct such as corn or rice and attenuated to possess a very dry finish with little maltiness.

Becks, brewed in Northern Germany, is another popular pilsner that models the light Dutch style. Others include Golden Pheasant (Zlaty Bazant), a very authentic, traditionally flavored pilsner lager brewed by the Hergestellt-Abgefiillt brewery in Slovakia. The Aass brewery in Norway, founded in 1834, whose beer possesses a distinct character due to the yeast strain and a malty, caramel background, is also a well-known name. A few more recommended Czech pilsners: Radegast, Lobko and Lev Lion.

Brew Like the Czechs

When people in this country think of pilsner, Urquell usually

comes to mind, although some say Budweiser Budvar (which you can't buy in America) is a better beer. The key to reproducing these pilsners is understanding the ingredients and the methods involved, because they may be a bit unorthodox at times.

Malt and Mashing

Budvar, Urquell and other Czech breweries are still using very undermodified two-row malt, a variety most American microbrewers would never touch. This mandates a decoction method of mashing to maximize the yields from the grain. Many U.S. micros use American, Canadian, or English two-row malts, that are more highly modified than their continental cousins, for the pilsners they brew.

The base of the pilsner should be created from the palest malt possible, and one as modified as possible, no matter your mashing technique. The malt recommended here is a two-row Chariot-type malt, 1.5° to 2° Lovibond, with a protein content of 10.5 percent to 11 percent and a high nitrogen level. The conversion temperature for Urquell is 149° F, the same as our recipe. The full decoction schedule at the Urquell brewery has rests at 95° F, 122° F, 149°F, and 165° F. The recipe here will convert at 149° F for 60 minutes or until a starch test shows conversion is complete.

After mashout, the wort is lautered into a traditional copper kettle and boiled for two hours. Saaz hops are used in three additions, and eventually the wort is run through a hop back of Saaz flowers and cooled in a large coolship for pitching.

It's the Water

The water in Pilsen is very soft, with only 35 parts per million total dissolved solids. Some North American brewers adjust their brewing liquor to emulate this profile, but the fact is that the liquid would have to be acidified anyway during mashing —which would add some of the dissolved solids back into the water. Very hard water, however, may need to be softened to reach the mash pH desired.

There is an interesting note about the Urquell process. Most water is adjusted by changing the concentrations of a few ions like calcium, magnesium, sulfate, chloride and carbonate. The soft Urquell water could be acidified before or during mashing by the use of gypsum or similar calcium-containing substances, but instead it is done naturally through the steps of the decoction. An acid rest at 95° F activates peptidase, which lowers the pH of the mash mix by converting malt phosphates to acids.

The water profile for pilsner varies with the source consulted, but the numbers used for this article (in parts per million) are: calcium 7, sodium 2, magnesium 2, chloride 5, sulfate 5 and bicarbonate 15.

Fermentation: Just the Facts

Primary fermentation for Pilsner Urquell takes place in large wooden casks. The yeast is pitched at 40° F. The beer is fermented at 46° F for 14 days. It is then transferred to lagering vessels and kraeusened for the long secondary. The yeast used here is Wyeast 2278 (Czech Pils), although 2124 (Bohemian Lager) and 2007 (Pilsner Lager) are both excellent. You can also try White Labs WLP800 (Pilsner Lager).

Ninety Days of Lagering

Traditional lagering takes three months. At Urquell the beer is

March 2000

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2 PREP DAY • Make 2-pint yeast starter for pilsner • Assemble recipe ingredients for pilsner • Soak equipment in sanitizer	3	4 BREW DAY • Brew pilsner • Primary fermentation starts; check original gravity and record
5	6	7	8	9 PREP DAY • Make 1-pint yeast starter for dubbel • Assemble recipe ingredients for dubbel • Soak equipment in sanitizer	10	11 BREW DAY • Brew dubbel • Primary fermentaion starts; check original gravity and record
12	13	14	15	16	17	18 TRANSFER • Rack pilsner to secondary, cool to 33° F. Ferment for three months (June 17) • Check gravity and flavor • Transfer dubbel to secondary, cool to 65° F and ferment 14 more days
19	20	21	22	23	24	
26	27	28	29	30	31	1 BOTTLE • Sanitize and rinse bottles • Rack dubbel to bottling vessel • Prime, bottle, and age seven more days

lagered in oak casks and sealed with a thin layer of molten pitch.

Our beer will be lagered for the full three months and primed before bottling. After a couple of days to carbonate, the beer will be ready to drink. Lagering should be as close to 32° F as possible without freezing the beer. Lagering refrigerators and chest freezers are two ways of keeping the beer cold during aging. The yeast will most likely be settled out, so adding a little to the priming solution may be necessary. To do this, activate a smack pack of yeast and let it grow for a day or two until the nutrient inside is consumed, just like you would for brewing. Mix it with your corn sugar and pour it in the bottling vessel with your bright beer.

The Timeless Belgian Dubbel

Now that your pilsner is in the fermenter, it's time to turn to another classic style: the Belgian dubbel. This style varies from one brewery to the next — as do all Belgian and Trappist beers — but for the most part they are brownish red ales, fermented fairly warm, with distinct estery and spicy yeast flavors. They are subtly hopped, with fragrant noble and French-type hops, and are medium- to full-bodied. By the numbers dubbels look like this: OG 1.050 to 1.070 (12.5° to 17.5° Plato), ABV 6 percent to 7.5 percent, Color 10 to 14 SRM, IBU 18 to 25.

Some great dubbels to try are Affligem, Duinenn and, of course, Chimay — our model for this month.

A Religious Experience

In 1850, not far from Chimay, Belgium, some Trappist monks who followed the rule of Saint Benedict built a Cistercian abbey. As recorded on the commemorative cross erected in 1925, they immediately started working the land of the Scourmont plateau, formerly known as "Mont du Secours." Their work was restricted to a maximum of five hours per day. The rest of their day, which began at 4:30 a.m. and ended at 8:30 p.m., was centered on their main activity: the search for God through study, silence, and prayer. They farmed solely to provide for

2000 Style Calendar

January **Barleywine, Roggenbier**
A barleywine to age until the New Year and a flavorful German rye beer.

February **Cream Ale, Dublin Stout**
Black and tan brewing month. A light cream ale and a traditional Irish stout.

March **Belgian Dubbel, Pilsner**
A Chimay clone followed by a traditional Czech pilsner.

April **Maibock, Scotch Strong Ale**
Maibock for celebrating next month and a peated Scotch ale high in gravity and flavor.

May **IPA, Mild Ale**
A highly hopped American-style IPA. Plus: a mild English brown ale.

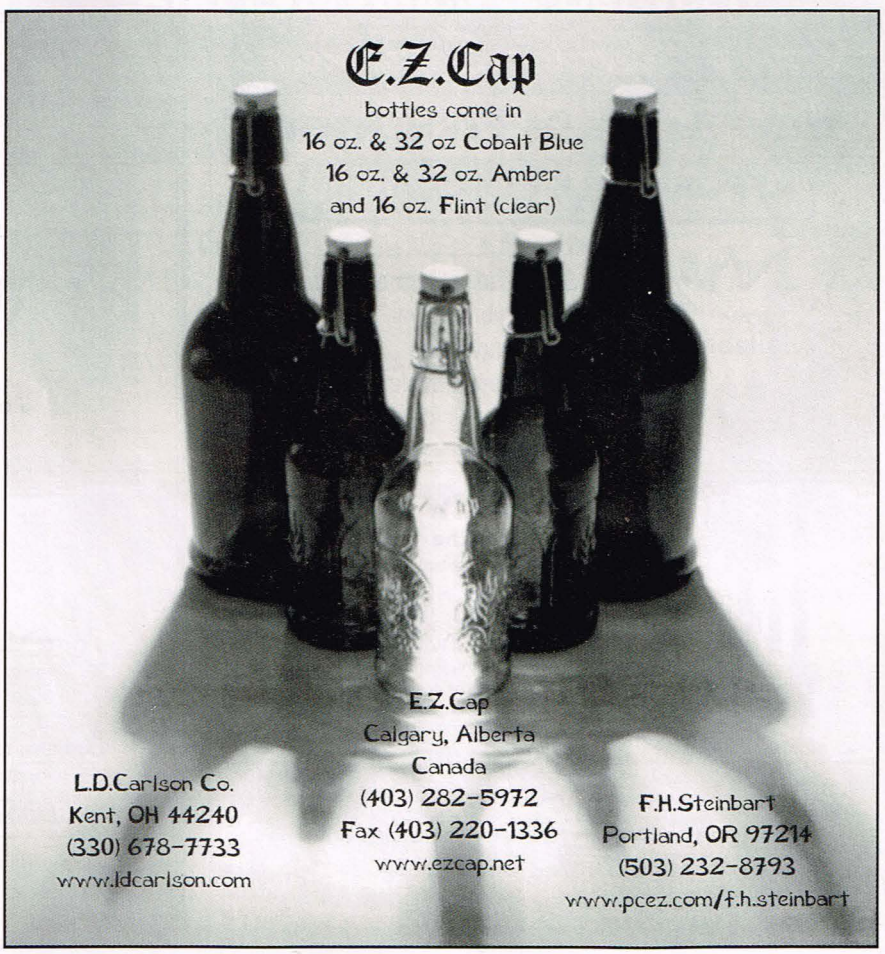
June **Golden Ale, Oktoberfest**
A "lawnmower" beer for the start of summer. And a tasty Oktoberfest begins aging.

September **Dortmunder, Oatmeal Stout**
Dort is a light European export lager. Plus: a new English oatmeal stout.

October **ESB, Weizenbock**
A caramel-laden ESB and a gigantic German winter seasonal weizenbock.

November **Bavarian Dunkel, Belgian Tripel**
A dark, chocolate dunkel and a high-gravity Belgian tripel.

December **Christmas Ale, Spiced Ale**
Our annual Christmas ale and a lightly spiced dark ale with a distinctly festive edge.



their livelihood and assist those in difficulty, as permitted by their order, and not to make profits. In 1862 they set up a brewery. This activity, as well as a cheese factory, still generates income for the monks who, in accordance with their way of life, use it to assist foundations that the order has established in India, Wales, and Rwanda.

Chimay Premier (nicknamed "red cap" for the color of the label and bottle cap) is the brewery's dubbel. It stacks up as a 7 percent ABV. Original gravity is 1.070 (17.5° Plato). The main flavors are malty, toasted, yeasty, and well-rounded alcohol. Slightly sweet, it finishes with apricot, banana, and clove. It is also highly carbonated, which adds to the flavor and white, rocky head. Overall, tasting a Chimay Premier is a religious experience.

Brew Like the Monks

Belgian dubbels are made with combinations of Belgian pale, crystal, and brown malt. They also contain candi sugar like many other Belgian beers. This recipe uses dark candi sugar. Candi sugar is 100 percent fermentable and yields about 1.046 per pound per gallon.

The hops in our recipe will be Styrian goldings for bittering and flavor with French spalt to finish. IBUs are a moderate 20. Other good hops for dubbels include the noble varieties.

Yeast for our recipe is the slurry grown from a bottle of Chimay red. The beer is not filtered or fined, so the original yeast remains in the bottle. Fermentation takes place at 71° F, a few degrees warmer than our normal beers but a common practice. It adds a bit of ester and character to the beer that is typical and desirable. Too much warmth, however, will result in a great deal of banana flavor which can overwhelm and destroy the beer's finer qualities. Fermentation starts in the primary for seven days at 71° F followed by a 14-day secondary at 65° F. Then the beer is bottle-conditioned for at least a week before drinking.

MARCH RECIPES

Czech Pilsner

(5 gallons, all-grain)

This is a slightly drier version of pilsner from last year's schedule. The previous recipe finished at 1.015 (3.7° Plato). This recipe ferments down to 1.010 (2.5° Plato).

Ingredients

- 6.5 lbs. two-row pilsner malt, 1° to 2° Lovibond
- 1 lb. carapils malt, 2° Lovibond
- 1 lb. cara-Munich malt, 10° Lovibond
- 4.5 oz. Saaz whole hops (3.2% alpha acid, 12 AAUs): 2.5 oz. (5.6 AAUs) for 90 min., 0.5 oz. (1.6 AAUs) for 30 min., 1.5 oz. (4.8 AAUs) at end of boil.

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- 2 pt. yeast starter of Wyeast 2278 (Czech Pils)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 2.75 gal. of water for 60 min. at 149° F. Sparge with enough 168° F water to yield 5.75 gal. of wort.

Total boil time is 90 min. At beginning of boil add 2.5 oz. Saaz and continue for 60 min. Add 0.5 oz. Saaz and boil 30 min. At end of boil, add 1.5 oz. Saaz. Whirlpool and cool to 45° F to pitch starter.

Ferment at 40° F for 14 days then rack to secondary fermenter. Continue fermentation at 33° F until gravity is 1.010 (2.5° Plato).

OG = 1.048 (12.0° Plato)
ABV = 4.5%
Color = 4.2 SRM
Bitterness = 40 IBUs

Extract with Grain Option:

Substitute 5.5 lbs. very light pilsner malt syrup for the two-row malt. Steep carapils and caraMunich malt in a nylon bag at 150° F for 30 min. Remove bag and rinse with enough 168° F water to make 5.5 gal. Add extract. Total boil time is 60 min. At beginning of boil, add 2.5 oz. Saaz and continue for 30 min. Add 0.5 oz. Saaz and boil for remaining 30 min. At end of boil, add 1.5 oz. Saaz. Follow fermentation schedule for all-grain version.

Belgian Dubbel

(5 gallons, all-grain)

Ingredients

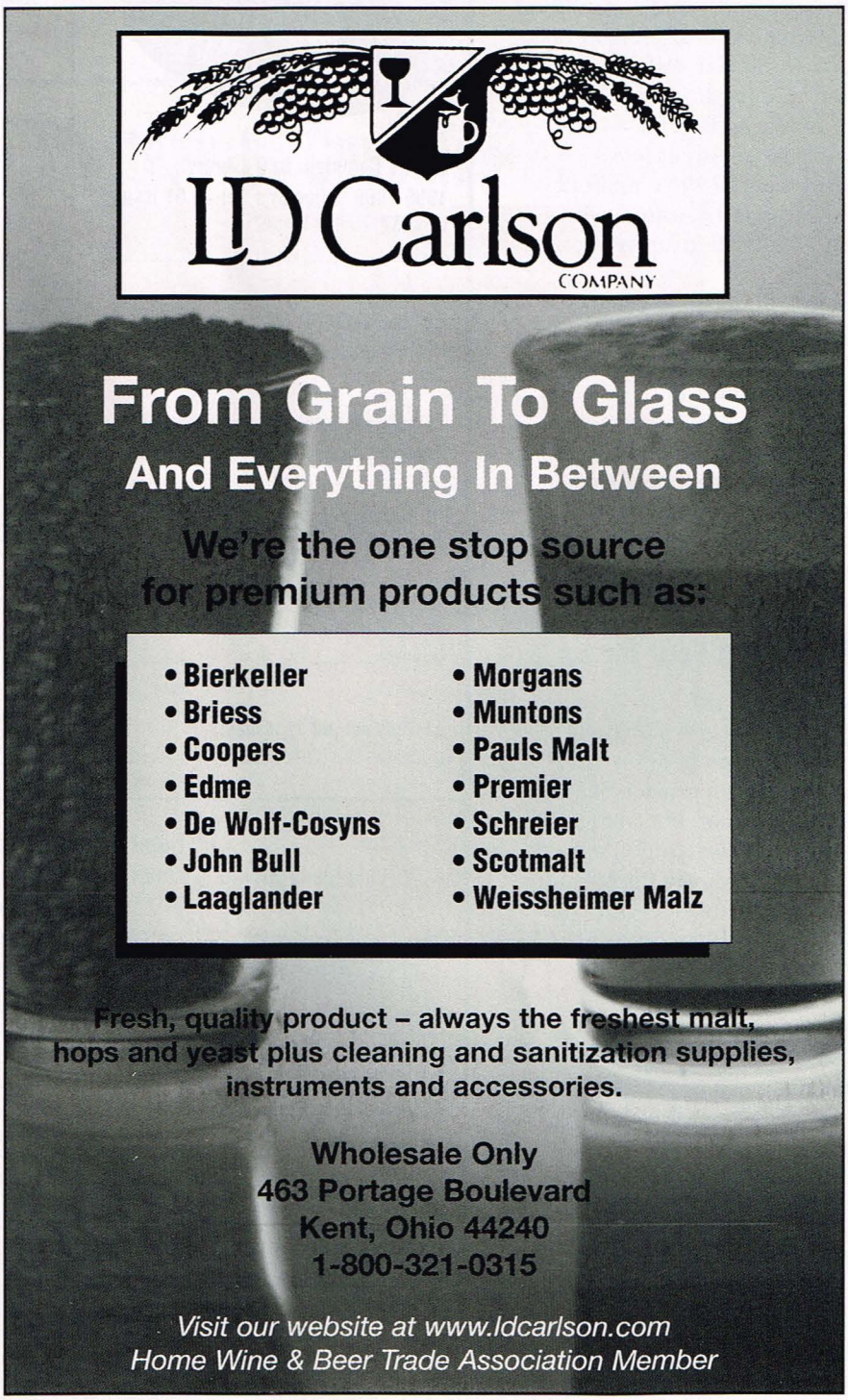
- 5.5 lbs. Belgian aromatic pale malt
- 1 lb. carapils or dextrin-type malt
- 2 lbs. crystal malt, 20° Lovibond
- 1.5 lbs. Belgian biscuit malt
- 2 lbs. dark candi sugar
- 1 oz. Styrian Goldings (5.5% alpha acid, 5.5 AAUs): 0.5 oz. (2.75 AAUs) for 90 min., 0.5 oz. (2.75 AAUs) for 45 min.
- 0.75 oz. French Strisselspalt hops (4% alpha acid, 3 AAUs) at end of boil
- 1 pt. starter of yeast from Chimay bottle
- 2/3 cup priming sugar

Step by Step

Mash grain in 3.25 gal. of water at 150° F for 60 min. Sparge with 168° to 170° F water to collect 5.75 gal. of wort.

Total boil time is 90 min. At beginning of boil, add 0.5 oz. Styrian Golding hops and candi sugar and boil 45 min. Add 0.5 oz. Styrian Golding hops and boil 45 min. more. Add the Strisselspalt hops. Whirlpool and cool to 71° F to pitch starter. Oxygenate/aerate well.

Ferment for seven days at 71° F, then rack to secondary fermenter. Continue for 14 days at 65° F until fermentation is done or gravity is about 1.012 (3° Plato). Prime and bottle. Carbonate and age at least seven more days before drinking.



OG = 1.070 (17.5° Plato)
Color = 25 SRM
Bitterness = 20 IBUs

Extract with Grain Option:

Substitute 5 lbs. pale Belgian malt extract syrup for Belgian aromatic pale malt. Steep carapils and crystal malts in 5 gal. of 150° F water for 30 min. Sparge grains with enough 170° F water to make 5.5 gal. Heat to boiling and add extract syrup and candi sugar. Total boil is 60 min. At beginning of boil, add 0.75 oz. Styrian Goldings, continue for 15 min., and add 0.5 oz. Styrian Goldings. Boil for 45 min. more, add Strisselspalt hops. Whirlpool. Cool to 71° F and pitch starter. Oxygenate/aerate well.

Ferment as all-grain version.

April Brews: Maibock to celebrate the upcoming month, and a bold, peated Scotch ale that's strong in gravity and flavor. ■

Special thanks to Notre Dame Abbey de Scourmont and the Chimay brewery for literature, information and help with this Styles article.

Defining a Few Terms

SRM (Standard Reference Method) and degrees **Lovibond** are two methods of describing color. The scales provide roughly the same number, but SRM uses a more sophisticated method and is more accurate. For example, a light yellow beer is 2 SRM (or 2° Lovibond); an amber is 13 SRM; brown is 22 SRM. Malt color ratings are typically expressed in Lovibond.

IBU (International Bittering Units) is a measurement of hop bitterness in beer. For example a beer with 27 IBUs is mild. A beer with 42 IBUs is very bitter.

Degrees **Plato** is a liquid-density scale that also is expressed as **specific gravity**, which is read on a hydrometer. A beer that is 12° Plato is 1.048 specific gravity.

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GREAT grain

Cracking The Mystery Of Crushing At Home

Malted barley is the heart of all beer. Its presence is paramount to the flavor profile and character of the finished brew. Whether you are a seasoned all-grainer, a partial masher, or an extract brewer who steeps your grains, the physical condition of the grains needs to be just right to achieve the desired effect. So take a quick look at the hero of this story — the barley kernel.

What's in There?

The barley kernel can be viewed in four very basic parts. The outermost layer, the husk, is a tough coat that surrounds the seed and helps it survive partway through the malting process (the seed is alive at the beginning of the malting process, but is killed when the kilning process begins).

The husk plays another important role in the brewing process. It helps separate the particles in the mash and sets up a filter bed that is essential for easy sparging. Without the help of the husk, it would be difficult to successfully run off the sweet wort from the grains.

Delving deeper into the barley kernel, the next layer is called the aleurone (also known as the seed coat). This thin layer secretes enzymes that are vital to mashing.

But wait, there's more! The center of the kernel is separated into two parts, the embryo (the smaller part) and the endosperm (the larger part). The embryo can be considered the control center for germination. The endosperm is the source of food for the embryo; it contains starch and protein. These proteins give the yeasts the nutrients that they need for a healthy fermentation.

Now that you have an idea of what's in that little kernel, you can understand why you need to have access to all of these parts to create great beer at home.

The Ideal Crush

The idea behind crushing the malt is to open up the malted barley kernel and allow you to process and extract all that you need from inside it. You want to split the husk along

by Todd Frye

the length, if possible, in big pieces. The kernel should be broken into several larger pieces and some smaller pieces to expose the starch and enzymes. Your goal is to keep flour to a minimum.

In crushing, as in everything else in life, you must achieve a balance. If the crush is light and the particles are larger, the husk is undoubtedly well preserved for the runoff, but the barley kernels are not broken down enough to give a good yield. If the crush is too heavy, the husk is powdered and the particles are very small. Although the yield may be higher with a finer crush, this can lead to some harsh flavors and a great deal of trouble running off the sweet wort from the grain bed (if you can even have a bed without a husk). The bed becomes gummy when the grain is milled too fine. Clearly, some sort of compromise must be met.

The compromise crush for most homebrewers is more on the coarse side, with the least possible amount of pulverized material. Yes, this will definitely decrease the yield available from your grains. But on a homebrewing level, it makes sense to sacrifice a small loss in extract yield and add another half-dollar's worth of grains to prevent headaches in this area. As you become more experienced with crushing the grain and the mashing process, and more familiar with your equipment, you may be able to fine-tune your crushing technique to suit your apparatus and increase your yield.

"What's in a mill? That which we call a mill, by any other name, would crush as neat."

—William Shakesbiere

Plate Mills

Although all mills are not the same, their purpose is: crushing the grains consistently. Thanks to the voice of homebrewers everywhere, there are a great variety of mills on the market today. These mills break down into two basic categories, the plate (or grind) variety and the rolling variety.

Practical Milling Tips

1. Crush your grain the day before you brew. This frees a little more time on brewing day.

2. Crush your grains outdoors if possible, or in a different room from where you intend to brew. This prevents grain dust from falling into your brew.

3. If your grist isn't quite what you wanted, make your beer accordingly. A fine grist is suitable for brewing darker beers, since the harsh taste from pulverized husks will have less of an impact in a heavy, flavorful beer. A coarse grist is ideal for mashing with adjuncts and keeping the grain bed open and flowing.

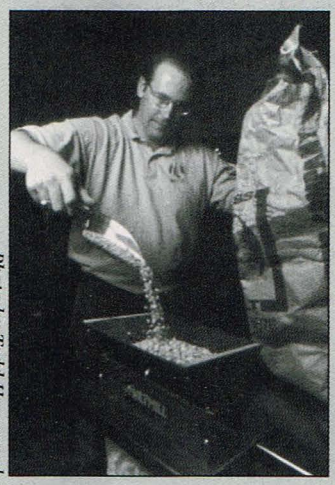


Photo by Todd Hammond

Homebrewers should crush on the coarser side, with the least amount of pulverized material.

The first type of mill is called a plate mill and is manufactured to grind cereal grains into flour. These are usually the most affordable mills and range in price from about $37 to $50.

These mills are simple machines that push your grain, usually with a spiral auger, through the gap (or distance) between two metal plates. These plates usually have ridges or bumps on the opposing surfaces to grip the grains as one of the plates rotates against the other, creating a grinding action.

The ability to adjust the distance between these two grinding discs is absolutely essential to a good-quality crush. If the plates are too far apart, many grains will be pushed through without being crushed and will be useless for brewing. If the plates are too close, they can easily grind grains into flour, leaving only a few traces of husk behind.

With the plate-type mills it is best to create a constant speed either by hand or by means of an electric motor or drill. This gives a better and more consistent crush. A trip to the hardware store should provide all the equipment needed for a simple conversion.

With the Corona-brand grain mill, for example, all that is needed for basic drill conversion are a common bolt—to fit into the hole that holds the handle on the auger shaft—and a heavy-duty variable speed drill. The drill should fit on the head of the bolt that is in the handle end of the auger.

More complicated setups can be made using a motor-and-pulley arrangement. You will get the best crush with the right adjustment of the plates and only a couple hundred RPMs (which, by the way, is a lot faster than you can crank the mill by hand).

One of the drawbacks of plate mills is that its adjustment usually needs constant attention. Checking the output of any mill is very important, but with the plate mills, it needs to be done much more frequently. To check the output, just grab a handful of the grains exiting

the mill and look them over. If you grab from the pile, you don't always get an accurate representation, as the husks tend to migrate to the bottom of the pile.

Another problem with plate mills is capacity. For most all-grain recipes, these mills do not hold enough grain to grind efficiently. It is difficult to get that ideal crush when you have to stop many times to refill the hopper with more grain. So plan to have someone there to help top you up or make yourself a bigger hopper!

For the cost, plate mills do a good job on your grains and by grinding at home, you can preserve peak freshness.

Roller Mills

The other category of mill is the roller mill. Roller mills range in price from approximately $80 to $200 depending on quality and features. These mills use cylinder-shaped rollers to crush the grain, usually with a ridged surface to grab the grains. Some roller mills use only one roller and feed the grain between a stationary plate and the roller surface.

Other roller mills feed the grains between two rollers spaced close together. Both processes squeeze the grains just enough to crack them into little pieces and drop them through quickly, limiting contact time with the rollers. Because the grains pass quickly through the rollers and there is not a grinding action, the husks are preserved. This makes the roller mill the most desirable mill among the majority of homebrewers.

The ability to adjust the gap between the rollers is much more accurate than the plate types and can be beneficial if you find yourself brewing with many different sizes of grain. With a roller mill, adjustability is not as much of an issue as with the plate types. These mills can also be motorized to ease the homebrewer's workload.

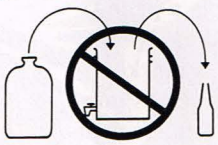
This is best done with a motor-and-pulley arrangement, with a large-diameter pulley on the mill and a small-diameter pulley on the motor, to step down the speed. Unlike the plate mill, speed is not necessary here. Too much speed, in fact, could cause excess wear without improved results. Hopper size can also be an issue with these roller-type mills.

Whatever mill you choose, check it out carefully before buying to be sure it will fit your needs. ■

Todd Frye is the owner of The Home Brewery in Ozark, Missouri. His most recent contribution to BYO was "Find a Carboy and Fill It!" (November 1999).

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Eight Tips to Advance Your Brewing Skills

CHUCK THE RECIPES. CRUNCH THE NUMBERS. QUESTION STYLE. AND FIVE OTHER STEPS TO HELP YOU JOIN THE RANKS OF ADVANCED HOMEBREWERS.

by Ashton Lewis

Brewing is a blend of science and art. This often-used cliché has real merit when you consider its meaning. In the pursuit of good beer, an informed brewer draws from microbiology, chemistry, biochemistry, food science, mathematics, and engineering principles on a regular basis. Just like excellent laboratory technique is crucial to good science, a solid command of brewing technique is also required for consistently excellent beer.

The art of brewing comes into play when brewers draw from their knowledge, experience, and available techniques and tools to create new beers and brewing techniques. In a certain sense, all the brewing knowledge and technique in the world is useless unless it is properly and creatively applied. This is the brewer's art.

Hobbyists in general like to identify their skill level with terms such as beginner, intermediate or advanced. Snow skiing is a prime example. Every ski trail on every mountain in the world is marked with a symbol that tells skiers how difficult the terrain is. And it's pretty easy to spot, say, an intermediate: He's the guy flailing down the black-diamond slope.

Brewing is one of those hobbies in which skill level is difficult to define. A first-time brewer, for example, is capable of brewing a beer that blows the socks off a batch brewed by a seasoned veteran. Is this brewer a prodigy, plain lucky, or exceptionally good at following the directions on that excellent kit he got for his birthday? One way to define an advanced brewer is that he fits the following four-point profile:

- An advanced brewer is usually, but not necessarily, an all-grain brewer. Most advanced brewers prefer all-grain brewing because of the added freedom.
- An advanced brewer must have an open mind. He must be eager to get out of the routine of following directions and pursue the art of brewing.
- An advanced brewer must be knowledgeable about beer and brewing and have good technique.
- An advanced brewer continually expands his knowledge base.

If you fit this profile, these tips will give you ideas on how to become even more advanced in this great hobby. If you're on your way to joining the advanced ranks, they may help you hone your skills.



SHAWN TURNER ILLUSTRATIONS

1. Chuck the Recipes

Brewing shares many common traits with cooking, including recipes. Recipes are an excellent method of communicating the particulars of how something is made. This is great for restaurants that need to deliver the same plate of pasta day after day. Cooks use recipes, but a real chef will use a recipe as a very general guideline in an attempt to put his own twist on another's idea.

Brewing works the same way. Beginner and intermediate brewers find comfort in recipes because they minimize the risk of a design flaw. Let's face it: Some blends of malt, hops, yeast, and water can make for some pretty nasty brews. Advanced brewers eventually grow out of recipes because recipes are, by definition, restrictive.

Learn to read a recipe in general terms. Evaluate the ratios of the various specialty malts and the hopping schedule. Your experience may throw a flag that you are not going to like the flavor produced by the recipe. Then look at the mash profile. Does it fit with how your system is designed? If not, change it!

Similarly, don't worry too much about details like mash thickness, sparge temperature, and the nitty-gritties of fermentation and aging in a recipe. When you see a recipe, you should take a hard look at the malts, the original gravity, the bitterness, and the type of beer. You will have your own methods of mashing, sparging, fermenting, and aging and are usually not going to change your brewing process for most recipes. On the other hand, you should definitely look at information that pertains to the beer's flavor. An example is a very warm fermentation temperature or a certain yeast strain that produces a special flavor.

2. Crunch Those Numbers!

There are many different methods for calculating a brew. Each method has its own assumptions and limitations. Whatever methods you use, an advanced brewer should be able to determine his system efficiency and formulate malt and hop blends to hit a target wort gravity at a target bitterness level. Calculations are also useful for estimating color, determining yeast pitching rates, and even can be used to calculate carbonation levels.

The only way to evaluate other brewers' recipes or become completely free of them is by learning how to effectively do brewing calculations. The other power you gain is to read a beer description and formulate a close approximation of the beer. Many breweries now describe their beers in brewer's terms because of more knowledgeable consumers. If you know an IPA



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contains British pale, crystal, and wheat malts; has an OG of 1.065 and 50 IBUs; and is dry hopped with British aroma hops, you can easily calculate this brew.

The action item to go along with this tip is to choose useful calculations from the literature you feel comfortable with and add them to your bag of tricks.

Check out the recipe in this issue by Teri Fahrendorf. It's a good example of a commercial recipe. Try to crunch through the calculations to test your ability to handle advanced homebrewing math.

3. Question the Importance of Style

Beer styles help brewers inform beer drinkers about their beer. When someone opens his mouth for a swallow of stout, he is mentally prepared for the flavor of stout. The study of styles is interesting from a historical view and shows how styles travel around the globe. Styles can also be used to categorize beers for competitions, making it easier for judges to define and evaluate various beers.

Styles can also get in the way of brewing if taken too seriously. Too many beers have been slammed because they were inappropriately labeled. For example, "Bob's IPA was terrible — it was way underhopped and its OG was too low to be an IPA. Too bad. It would have been a great ESB." Advanced brewers should evaluate a beer by its flavor profile first and then determine whether it is labeled with the appropriate style.

A no-style philosophy also makes it easier to be creative because new beers can be accepted even if they don't conform with an established style. The Great American Beer Festival now has an "experimental" category for beers that don't fit the traditional style

4. Increase the Depth of Your Brewing Knowledge

This tip is easier said than done considering the best brewers are proud to state that learning never stops. The key is to invest in a small brewing library and keep the library growing. A good brewer uses his collection of information as a reference and will challenge ideas by referring to the library.

There's something interesting about brewing and debating — very few brewers (or homebrewers, for that matter) share the same interpretation of any given issue. The hotly debated topics these days include hot-side aeration, the significance of the "protein rest," and decoction mashing and its affect on flavor formation. An advanced brewer should know enough about

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these hot topics to develop his own beliefs. An advanced brewer should be able to defend his position on such issues.

5. Learn from the Giants of the Industry

Too many small-scale brewers (homebrewers and craft brewers) spend way too much time bad-mouthing big brewers. Maybe it makes small brewers feel superior or something, but it could simply be a complex. Most small brewers feel pretty tiny when they dwell on the numbers. A small brewery may squeak out 1,200 barrels of beer a year — that's roughly 0.0006 percent of annual domestic beer sales. If every domestic brewery only produced 1,200 barrels per year, there would be 150,000 breweries in the United States!

The fact is that the big breweries really know their stuff, but they choose to brew what 95 percent of the public wants to buy. Their decisions are based on basic economic principles that drive the world. Some past experimental brews from the corporate R&D facility of a rather large brewery located along the Mississippi River were truly exceptional beers. Included was a doppel bock, a barleywine aged in French oak, and a dry-hopped IPA. These beers will never be sold commercially because the market is too small, but they proved that these companies can do about anything they want.

Learn how the big breweries do what they do and you are sure to pick up some useful information. This doesn't mean you need to start brewing light beer at home, but many of the techniques used by the big breweries are pretty slick and can give homebrewers new ideas.

6. Sharpen Your Palate

It's hard to be critical of your own beer. After all, the whole idea is to brew beer at home that you like. Being your own worst critic can be very discouraging at times, but it is also key to improvement.

There are many things a brewer can learn from books, magazines, and experience. When it comes to tasting, however, a training program organized by a knowledgeable and experienced taster is essential. Training programs use flavor standards to illustrate aromas like diacetyl, acetaldehyde, isovaleric acid (cheesy hops), oxidized, DMS, and others. It is very hard to educate your palate without learning to identify the aromas typically encountered in beer.

Once your palate is sharpened, then the connection between ingredients, process, and flavor can be made. This is perhaps the single most important skill required to be an excellent brewer.

7. Experiment with Raw Materials

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CIRCLE 33 ON READER SERVICE CARD

hops, yeast, and water affect flavor, color, and the brewing process (for example, rye and lautering) is essential. This knowledge is useful when formulating new recipes or modifying a recipe you want to try. One of the ingredients that is interesting to play with is malt. Although all crystal malts are made using a similar process, malts from different malt houses have different flavors. Exposing yourself to a wide variety of maltsters is a great way of discovering subtle and interesting flavors. When you are tasting beers and wondering where a particular flavor came from, often you will discover a certain malt was the key to reproducing the flavor.

The same reasoning can be applied to hops, yeast, and water. Knowing your hops is especially useful when you are forced to substitute one variety for another. It also comes in handy when you are formulating a new recipe: You can smell and taste the hop flavor you desire, and need to decide what variety (or varieties) to use to get that flavor. One of the rewards of knowing your ingredients is the ability to create a signature flavor in your beers.

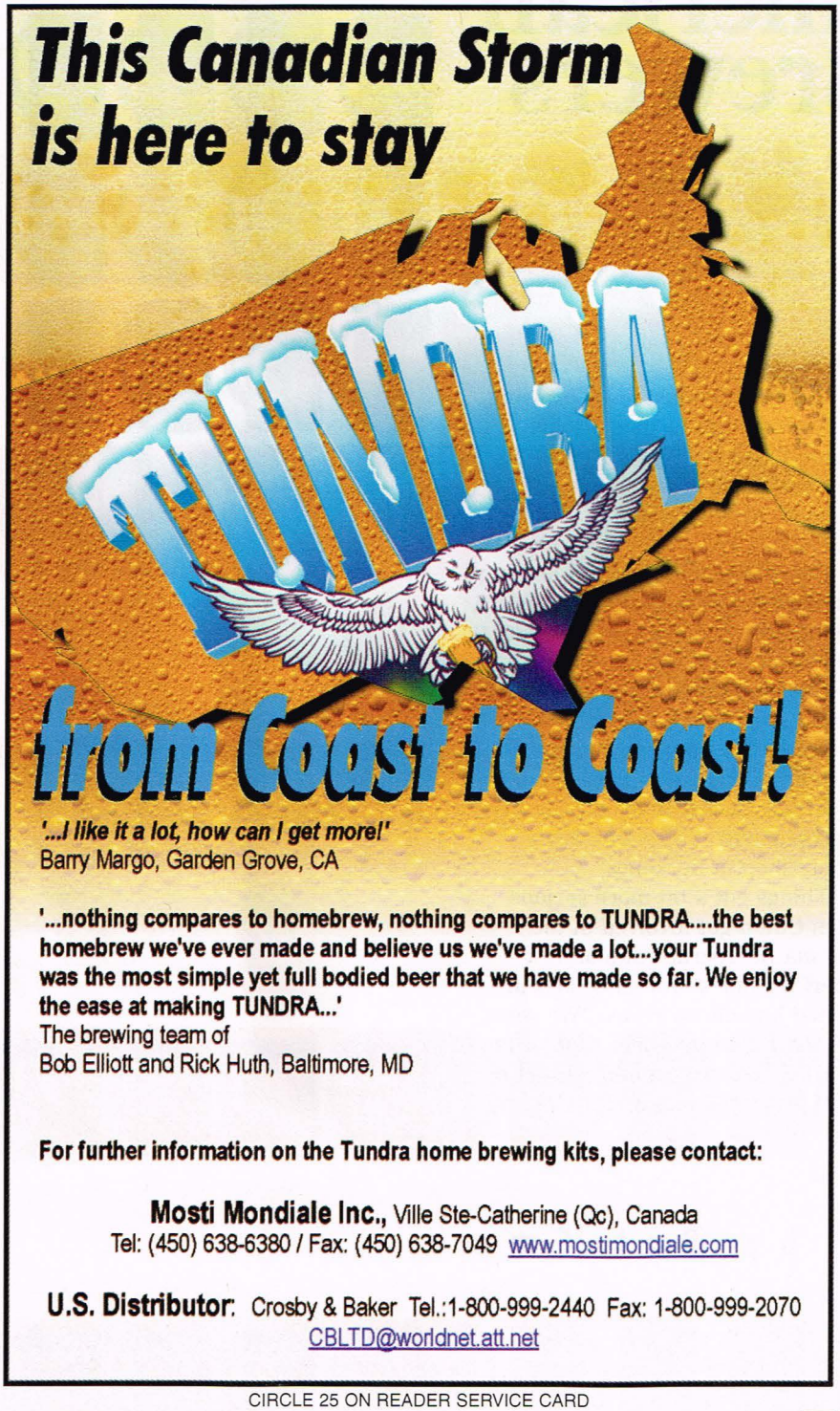
8. Take the Consistency Challenge

One of the great benefits to homebrewing is having the freedom to brew just about anything, anytime. Commercial brewers, especially those who began as homebrewers, are envious of this creative freedom. One drawback to creative freedom is that many homebrewers are constantly trying different recipes and rarely brew the same beer over and over again.

Choose one of your favorite brews to become a stock beer. The challenge is to brew the same beer several times to test your ability to be consistent. Once you become consistent, you can then move on to making very small changes in your stock beer recipe and procedure to learn how to fine-tune a beer. This can be a very valuable learning tool since it enables you to demonstrate how certain ingredients and techniques affect the finished beer.

If you decide to give this idea a try, you can do some informal sensory-evaluation panels with your brewing pals to assess how similar your stock beer is from batch to batch. A blind tasting is also a good way to test your palate; for example, if you and your brewing partner are tasting a beer from the same batch and bottle, and find yourselves describing significant differences, someone probably needs a bit more sensory training. ■

Ashton Lewis is brewmaster at the Springfield (Missouri) Brewing Company. He holds an MS in brewing science from the University of California at Davis, and is BYO's technical editor.



CIRCLE 25 ON READER SERVICE CARD

3 Great American Brewers

want you to have their best recipes!

by Sal Emma

Paddy Giffen

Moylan's Brewpub
Novato, California

Paddy Giffen just loves brewing. So much so that he gave up his "regular" job to go pro. He has been the brewmaster at Moylan's Brewpub in Novato, Calif., since it opened in 1995.

Giffen is one of those pioneering microbrewers whose ticket into to the industry was his prowess as a homebrewer. He got interested in beer beyond the megabrands in the early 1980s. "Back then, there weren't many micros available. I started making my own beer to have something decent to drink," he says. "I was buying extract kits from a supply shop in Berkeley."

Things got a bit more serious when Giffen got involved in the Sonoma Beerocrats, one of America's oldest and most accomplished homebrew clubs. "We were the AHA's National Beer Club of the Year for 10 years running. I met a lot of great brewers and it was an



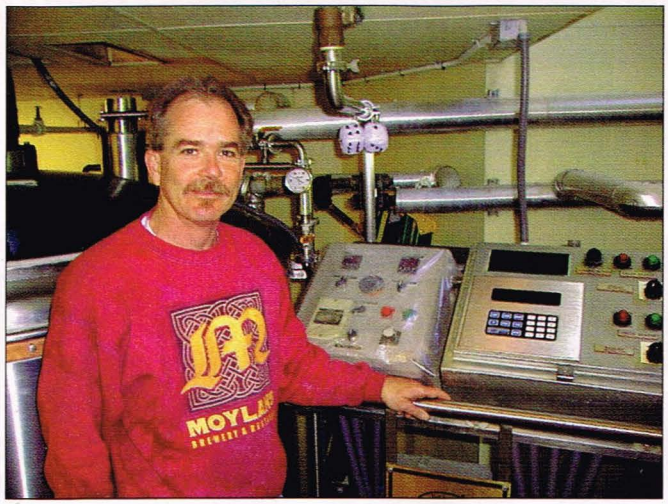
Teri Fahrendorf
Steelhead Brewery



Paddy Giffen
Moylan's Brewpub



Bill Covaleski
Victory Brewing Company



From computer science to the brew kettle: Paddy Giffen quit his "real" job to go pro. He's now the head brewer at Moylan's in Novato, California.

awesome place to learn," he says.

At the time, Giffen was finishing a graduate degree in computer science at Sonoma State. His brewing improved as he got more involved in the club and learned to handle all-grain brewing. He also met some influential people, including Byron Burch and Nancy Vineyard, who ran the Great Fermentations supply store in Santa Rosa (now called The Beverage People).

"I thought about how cool it would be to brew professionally, but I was already involved in computer studies. It was too late to switch to brewing school," he says. But after school, the more he worked in computers the more he realized he simply didn't like it. "It was no fun. I changed jobs a couple of times, but things never got any better."

So he made a life decision: He quit the computer business and went to work full-time for Burch and Vineyard as a technical consultant. He was making a name for himself during the microbrewing industry's early days of explosive growth. "Things were heating up in the Bay and Northern California. I watched all these micros popping up all over," he says.

Then a few of his beer buddies went pro — Kevin Cox and Dale James among them — and Giffen's turn came up, too. Grant Johnston was the brewer at Marin Brewing Co. He knew Giffen as a reputable homebrewer and offered him a part-time job.

Giffen apprenticed at Marin Brewing Co. and worked at the supply shop four years. Working at the brewery gave him the chance to learn the professional ropes, which set the stage for taking the reins at Moylan's when it opened. Owner Brendan Moylan has a part-interest in Marin Brewing — which is where Giffen met him.

Giffen says his years as a homebrewer have stood him in good stead as a pro. "Home-brewing is a great way to learn. For example, I like ale, so I went through every ale recipe I could find and I was successful. That's the beauty of homebrewing. It gives you lots of opportunity to experiment with recipe design. As I was experimenting, I was learning," he says.

His experience and accomplishments were noticed. A wee heavy Scotch ale earned him the AHA's Homebrewer of the Year award in 1993. He went on to be named Meadmaker of the Year in 1995. And the awards keep coming. Giffen's pro beers have earned GABF medals, plus honors at the World Beer Cup, California State Fair, and World Beer Championship.

That spirit of determination has benefited Moylan's regulars, who now line up to pay for Giffen's beer. "We usually have 11 or 12 ales on line at a time. And quite a few are on nitro. We have our own nitrogen generator that was custom-built for us to keep them going."

Moylan's has a 20-barrel brewhouse, with five 40-barrel fermenters and a small bottling plant.

Kilt-Lifter Wee Heavy
(10 gallons, all-grain)

The recipe for Kilt-Lifter, the wee heavy they pour at Moylan's, was developed in 10-gallon batches during Paddy Giffen's days as a homebrewer. It's unusual because it uses German hop varieties that are not traditional to this style.

Ingredients:

- 30 lbs. Belgian pils malt
- 2 lbs. British crystal malt, 40° Lovibond
- 1 lb. DeWulf-Cosyns Special B
- 2 lb. DeWulf-Cosyns caraVienne malt
- 1.75 oz. Perle hop pellets (8% alpha acid, 14 AAUs): 0.75 oz. (6 AAUs) for 60 min., 1 oz. (8 AAUs) for 30 min.
- 2 oz. Hallertauer pellets (4% alpha acid, 8 AAUs): 1 oz. (4 AAUs) for 60 min., 1 oz. (4 AAUs) for 30 min.
- 2 Tbsp. Irish moss
- Wyeast 1968 (London ESB ale)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grains in 11 gal. water near 172° F. Target temp is 155° F. Hold at 155° F for 60-90 min., or until conversion is done. Sparge with 5-6 gal. water at 170° F, collecting 12 gal. wort.

Total boil is 60 min. Bring to boil and add 0.75 oz. Perle hop pellets. Boil 30 min. Add 1 oz. Hallertauer pellets and 1 oz. Perle pellets. Boil 25 min. more. Add 1 oz. Hallertauer pellets and 2 Tbsp. Irish moss. Boil five min. Cool and pitch an active starter of Wyeast 1968.

Keg or bottle when fermentation is complete. Don't rush it. This is a big beer.

OG: 1.081
FG: 1.018
Bitterness: 36 IBUs

"It's a glorified homebrew system, just bigger. I totally love it. I'm doing my hobby. The only thing I miss is the ability to experiment. We're very production-driven and there's not a lot of opportunity for anything unusual, outside the occasional seasonal," he says.

And of course he can't resist practicing the art of zymurgy at home. "I have a mead going, and a few wines," he says.

Bill Covaleski

Victory Brewing Co.
Downington, PA

Sometimes, Bill Covaleski has to pinch himself. "It's usually when I'm driving one of the trucks, making a delivery. The other day, I drove through the tunnel to get to New York and I thought 'Wow. There are people here who buy our beer!' That makes me proud," he says.

Covaleski is co-owner, co-brewer and co-everything at Victory Brewing, in an industrial suburb west of Philadelphia. He splits brewing and management duties with his partner and long-time pal, Ron Barchet.

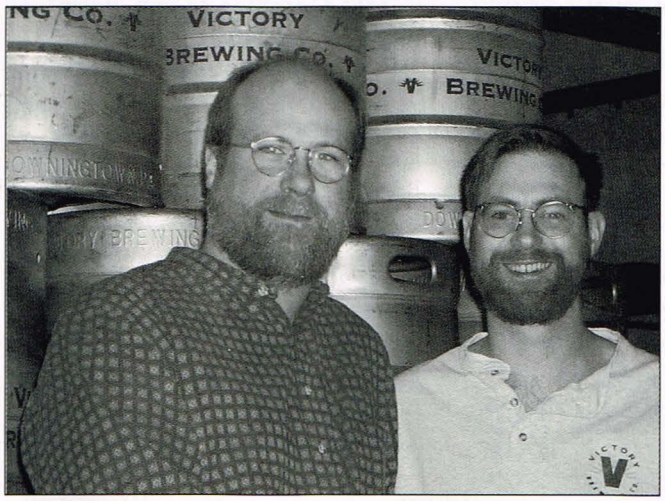
Barchet and Covaleski grew up not far from their brewery, a micro and brewpub housed in an old Pepperidge Farm factory. They've been hanging out since grade school — though their love for beer developed a bit later.

"We discovered beer when Ron moved to California for college. I remember going out to visit him and drinking Henry Weinhard's, Steinlager, Spaten beers — some interesting stuff," he recalls.

Their early forays into the world of craft brewing were more about drinking than brewing. They toured Europe in search of beer in 1987. Barchet has relatives in Belgium, which gave the duo an excuse to visit some abbey breweries. "As soon as we got off the plane, we drove to Orval," he says. They did the GABF in 1988.

As you can imagine, it wasn't long before homebrewing entered the picture. "My dad had gotten a homebrew kit as a gift. We took turns with the equipment — and the beer was actually good," he says.

School was through and they settled down to work: Covaleski in advertising in Pennsylvania, Barchet in the financial industry in Northern Virginia. Barchet was first to consider abandoning his chosen career in favor of brewer's boots. He came across a menu from the original Gordon-Biersch brewery. It profiled brewer Dan Gordon, one of the few Americans at that time who had graduated from the Weihenstephan in Munich. He called Gordon to ask him about his education. Gordon filled him in on the University and also told him about a new brewery that was being built in Baltimore.



Brewing buddies: Ron Barchet (left) and Bill Covaleski (right) grew up together and are now partners in the Victory Brewing Company near Philadelphia.

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Victory Alt #7
(one barrel, all-grain)

With some modifications, this 31-gallon recipe became Bill Covaleski's Victory summer draft.

Ingredients:

- 47 lb. Weyermann Munich light (99.4 percent of grist)
- 1/2 lb. Carafa (0.59 percent)
- 2.6 oz. Northern Brewer hops (9 percent alpha acid, 23.4 AAUs, 13.7 IBU) for 60 min.
- 10.65 oz. Tettnanger Tettnang hops (3.9 percent alpha acid, 41.5 AAUs): 5.4 oz. (21 AAUs, 12.3 IBU) for 60 min., 5.25 oz. (20.5 AAUs, 9.2 IBU) for 30 min.
- 5.9 oz. Hallertau Mittelfrüh (4.9% alpha acid, 28.9 AAUs): 2.2 oz. (10.8 AAUs, 6.2 IBU) for 60 min., 3.7 oz. (18.1 AAUs, 8.2 IBU) for 30 min.
- White Labs WLP029 (German ale)

Step by Step:

Mash in 17 gal. water at 132° F, rest 20 min. Raise temperature to 146° F, rest for 35 min. Raise temperature to 158° F, rest for 30 min. Lauter at 170° F to collect 35 gal.

Total boil is 60 min. Bring to a boil and add 2.6 oz. Northern Brewer, 5.4 oz. Tettnanger, and 2.2 oz. Hallertau. Boil 30 min. more and add the rest of the hops. Boil 30 min. more. Chill and pitch yeast.

Ferment at 65° F for six days. Rack to secondary for 15 days.

OG 1.048
FG 1.009
Bitterness: 49.6 IBUs

Through Gordon, Barchet met Theo DeGroen and was able to secure an apprenticeship at his Baltimore Brewing Company, before the first batch was made. He also set his sights on the Weihenstephan.

"When Ron moved to Germany to get ready for school, that left an opening at Baltimore, which I filled," Covaleski explains. Without looking back, he said good-bye to his regular job and became a brewer's apprentice under DeGroen, the Dutch-born brewing engineer.

When Barchet left DeGroen, he was making only three beers: a pils, a dunkel, and an export lager. During Covaleski's four-year tenure, the portfolio expanded to include lots of specials, including weizenbock, hellesbock, märzen, alt, and doppel. Covaleski's brews earned two GABF silvers and a gold. DeGroen also sent him to Munich to do some studying at Doemann's Institute.

After his year at Weihenstephan, Barchet joined the fledgling Old



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Dominion Brewery in Virginia. Within a few years, his beers were famous in and around Washington, D.C. The boyhood buddies were really getting good at continental beer styles. And they were getting closer to striking out on their own.

"We kept scheming and plotting during the early '90s. It was New Year's Eve 1993 that we decided to get going for real and start writing a business plan," says Covaleski. In early 1995, the pair returned to Pennsylvania, moved into his parents' house and hit the pavement looking to raise capital.

The Pepperidge Farm factory was perfect for them. It had lots of character and, since it was a former food factory, it could handle the water and sewage needs of a brewery. Pepperidge Farm had built it in 1949, the company's first plant outside Connecticut, and had moved farther west to a new facility.

"It seemed like a bad location for a restaurant. There were no others around. But we had faith because the demographics of Downingtown were just right for craft beer. We saw the lack of restaurants in the neighborhood as an opportunity — a location with little competition," he says.

The brewery opened in 1996, backed by Covaleski and Barchet's mastery of financial management, marketing, and European brewing. They make big European styles, including IPA, doppel, tripel, imperial stout, barleywine, and others. Their beers are not for the faint of heart.

The brewhouse is a 25-barrel, full-decoction system. They even have a hopback, a large box filled with whole flower hops through which hot wort is pumped. It's a traditional German method to filter trub and impart extra hop bouquet.

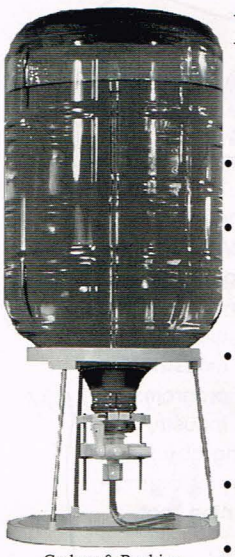
"Using a hopback is expensive, in terms of hops, and risky in terms of infection and aeration. But our goal here is to revive old-world styles and techniques," he says.

Not to forget their homebrewing roots, the boys at Victory regularly partner up with the local homebrew club for competitions and other events. As Covaleski explains, by their nature Victory's beers promote craft brewing. "Our beers are bigger and more gutsy than a lot of styles that are out there. We continue to brew what we like, not what we think will sell," he says.

So far, that approach has been working for the boys at Victory Brewing. And it's testament to the potential of the American beer drinker — considering that Philadelphia is one of the nation's biggest Coors Lite markets.

Teri Fahrendorf
Steelhead Brewery
Eugene, Oregon

Teri Fahrendorf has always had a fascination with fermentation. "I made my first loaf of bread at age 10. The bread was really good, and



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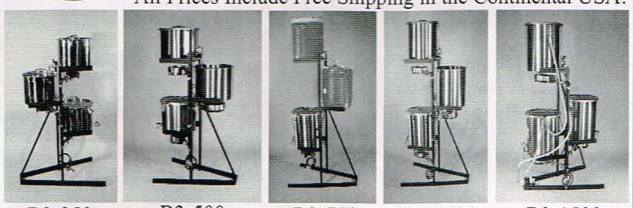
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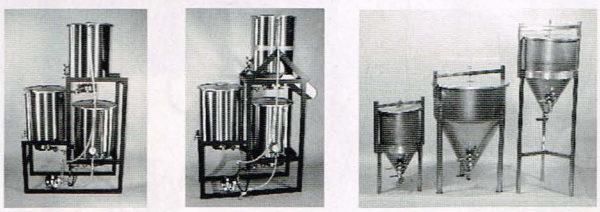
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Dad was thrilled," she says. "He tried to make some himself, but couldn't do it. He killed the yeast. I never had that problem. I'm lucky to have an affinity for yeast. I think my bubbly personality gets along well with bubbly yeast."

It was around that same age that she started thinking about making beer. "We knew about beer in my house, because my parents considered alcohol as food. On pizza days, the kids had their choice of milk, Coke, or beer. It was no big deal," she says.

Fahrendorf remembers buying a pamphlet at a church rummage sale about how beer is made. "I was so enthusiastic; I was going to figure out how to make beer. Well, that pamphlet was not very encouraging. I learned that I needed big giant vats — huge cereal cookers and mash tuns. I was so discouraged that I threw it away. I wish I still had it," she says.

What she had purchased was a beer-industry PR brochure, which described the beer-making process in the large-scale industrial setting. Though she temporarily abandoned the idea, a seed was planted that would finally take root in college, when she learned how to make wine.

"I started out making Gewürtztraminer from Australian extract. I made apple wine and other things. Then I moved to California where good wine was cheap and plentiful, so there was no need to make my own," she recalls.

Her job as systems analysist for Unisys had taken her to San Francisco, where she jumped from making wine to beer. She joined the San Andreas Malts brew club. "San Andreas has produced 10 or 15 professional brewers, more than any other brew club. They were real pioneers and had a huge impact on the micro industry," she says. She was in good company for an accelerated education in beer.

She was interested enough in her hobby to spend money on it and travelled to Denver to attend the 1988 Homebrewers Conference. There, she met many people who were established in the industry, including Charlie Papazian, Don Outterson, and Dan Carey. Carey and Outterson told her about the Siebel Institute in Chicago. "I started thinking and thinking," she recalls.

She wasn't satisfied with her job. Coding was not too exciting for her. She wanted to move into project management, but that was not materializing. The idea of learning to brew professionally kept gnawing at her. She was calculating how she could afford the training and decided that if she ever made the jump, Siebel would be the place. Since it was a shorter program than the University of California at Davis, it would cost less and require less time without an income. Plus, she liked Siebel's multi-disciplinary approach, which brings together experts in malting, engineering,

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CIRCLE 2 ON READER SERVICE CARD

and other specialties as instructors during the course.

Then, fate gave her a shove. "Unisys sent me to Chicago for training. How convenient. I called Siebel and arranged a visit. They said I could (handle the course information) because of my science background," she says. Fahrendorf had started her college career in science, aiming for a career in forestry and wildlife management. Those science courses paid off as her admission ticket to Siebel. She made a decision. She would give brewing a shot.

She asked her employer for a three-month leave of absence. They refused, so she quit her job, much to their surprise.

"Keep in mind: At this point I had 15 extract homebrew batches under my belt. I've met homebrewers who have made 200 all-grain batches and they don't think they're ready to go pro. It's all in your mindset," she says.

French Pete Porter
(you pick the gallons, all-grain)

French Pete Porter is brewed as a dark special at Steelhead locations. It's named for a region in Oregon that memorializes an early-day sheepherder, known as French Pete.

You might think this recipe is a bit, well ... sparse. That's entirely by design. Teri Fahrendorf believes that the best way to learn is to use your head. She wants you to do the math needed to make this recipe work in your home brewery.

Grist Ingredients:
- 70% pale malt (we use Great Western standard pale malt)
- 7% caramel 80° Lovibond (from Briess)
- 7% caramel 60° Lovibond (Briess)
- 7% Munich 10° Lovibond (Briess)
- 10% chocolate malt (Briess)
- <1% roasted barley (Briess)

Hops Ingredients:
- The total bitterness is 40 IBUs
- Bittering addition: Galena
- Varietal/flavor addition: Galena
- Aroma addition: Willamette

Mash/brew Guidelines:
- Mash Temp: 154° F
- Mash Time: 1 hour
- Boil Time: 1.5 hours

Fermentation:
- Fermentation temperature: 68° F
- Yeast: London Ale Yeast

Gravity/strength:
- SG: 1.058
- FG: 1.015
- ABV: 5.8 percent

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CIRCLE 17 ON READER SERVICE CARD

Her enthusiasm made her a shoo-in for class president — the first woman class president in Siebel history. She arranged a style seminar and brewpub field trips for her classmates. "They had never heard of styles. The only thing they knew was yellow beer," she says. She also made some European styles on Siebel's five-gallon pilot brewery: first a doppelbock that nobody liked, then a Munich, which they liked a lot better. "I was lucky that the instructor was from England and knew about styles, so he was supportive," she says.

The contacts she made at Siebel got her foot in the industry's door, too. A few Siebel instructors had opened a brewpub in Chicago, Sieben's River. She took an unpaid apprenticeship, which was her first professional experience.

She started looking for her first real job in the micro industry. "It was tough. There were few micros, and most of them didn't think a woman could do the job," she says.

"I thought I wanted to work in a micro, until I went on an interview at the original Pyramid Brewery in Washington. It was cold and drafty. There was no social interaction, no customer feedback. I decided to concentrate on brewpubs after that."

Portland was a big brewpub town, so she drove there from San Francisco to look for work. On the way, she stopped at every homebrew supply store and left her resume with the owner, wisely thinking that when entrepreneurs start breweries, they look to the homebrew community for help.

Her cleverness paid off. She got a call from the Golden Gate Brewing Co. in Berkeley, Calif. The owners had received three copies of her resume as a result of her networking. She had her first job, but it would prove to be disastrous.

After two months at Golden Gate she was seriously injured, soaked by a flood of boiling water that severely burned her legs and feet. "The previous brewer had left on bad terms and refused to train me. The equipment manufacturer assured me it was 10-barrel system. It was seven. I was left to figure it out on my own and got hurt," she says.

Things went from bad to worse. While she was in the hospital having skin grafts to repair the second- and third-degree burns, the place went under, the owners canceled the workman's compensation insurance, and the paychecks started bouncing.

In spite of that horrific experience, she persevered, and never gave up being a brewer. She got on the phone from her hospital bed to call around, looking for work. She landed a new position at Triple Rock in Berkeley. She was happy to be back on her feet — literally — and stayed more than a year.

She wasn't planning to leave Triple Rock, but she went to a brewers' festival in Portland, where she saw a guy wearing a T-shirt that said "Brewer Wanted, Eugene, Oregon." So she introduced herself.

When she returned to California, she got a phone call from Steelhead, which was in the planning stages. "I interviewed him. I wanted to know everything, the investors, the blueprint, the lab. They were going to build a brewery with no mill. I con-

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CIRCLE 20 ON READER SERVICE CARD



PHILIP L. McCARTY/FREELANCE PHOTOGRAPHER

After attending a 1988 homebrewing conference, Teri Fahrendorf bagged Unisys, studied at Siebel and later landed the top job at Steelhead in Oregeon.

vinced them that it was a bad idea, and showed them how they could finance the mill and silo through the malt company," she says. She made other design suggestions and they were impressed with her experience, smarts, and spunk. They hired her as brewmaster.

She trained her successor at Triple Rock and joined Steelhead in 1990. She brewed in Eugene four years, then coordinated the company expansion to its second location in Burlingame. She designed another brewery in Irvine, then San Francisco. Then Fresno. She became an expert in startups, dealing with the equipment manufacturers, contractors, and architects. Today, she oversees production and a staff of five head brewers and four assistants. She handles training, technical support, production research, recipe design, hiring, and a million other duties, keeping the properties functioning smoothly.

Fahrendorf has become a brewer's brewer. She gets dozens of resumes every month from people who want to work for her. "One of my brewers left and now he wants to come back. That tells me I'm doing something right," she says.

She has won five Great American Beer Festival medals herself, and the brewers she hired and trained have gone on to win seven more GABF medals for Steelhead. "I'm very proud of that," she says.

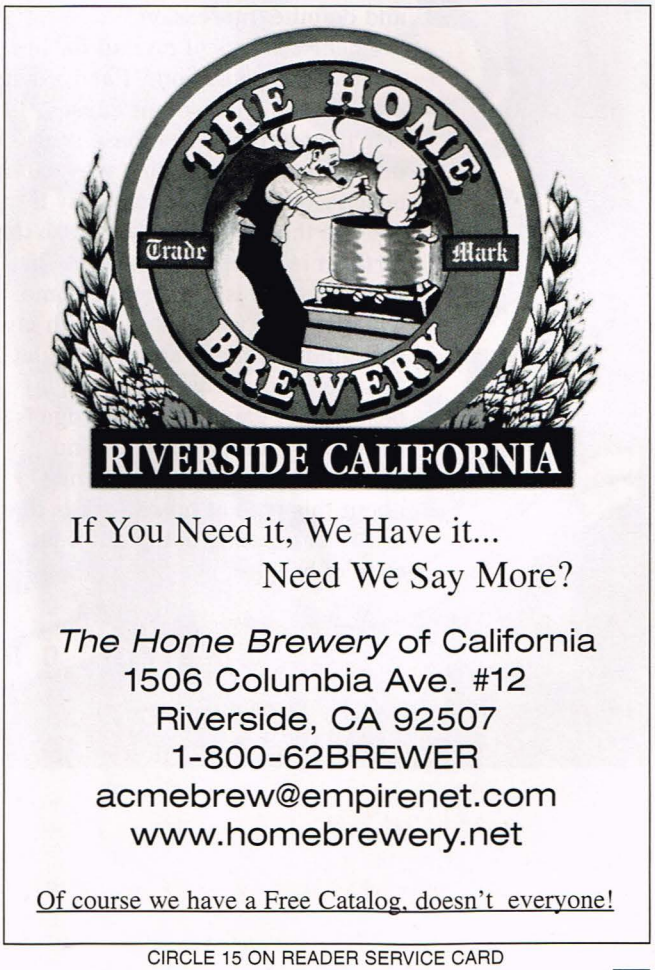
"I'm where I want to be. I have a successful career; my peers and employees respect me. I've been in the trenches and paid my dues. I enjoyed my years hands-on, but this job is right for me," she says.

And she says the injury made her a better brewer. "I would not be as strong today without the injury. I have no regrets," she says. ■

Sal Emma is a New Jersey freelance writer and long-time homebrewer. His last article for BYO was on the Reinheitsgebot, the German beer purity law (December 1999).



CIRCLE 13 ON READER SERVICE CARD



CIRCLE 15 ON READER SERVICE CARD

Practice with Your Palate

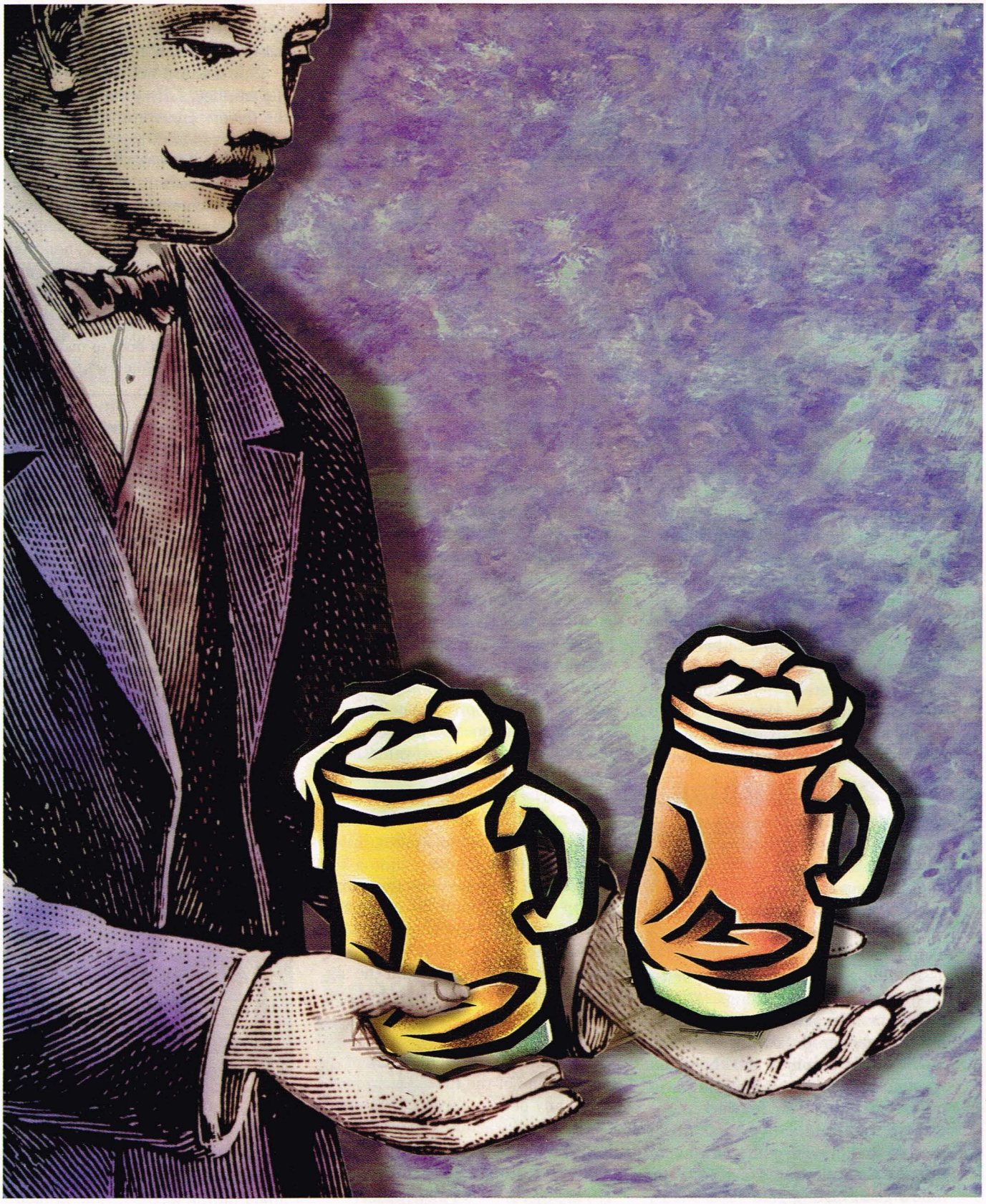
What's one of the best things about homebrewing? For most people, it's tasting different kinds of beer! When you crack open a bottle of homebrew and raise a glass to your lips, you're enjoying an experience that should affect all of the senses and will leave a very clear and definite impression.

Beer consists of myriad flavors, aromas and sensations. Each has its own probable cause—or causes. Learning to recognize these sensations, and understanding why each beer tastes and smells the way it does, is the one skill that will go the farthest in helping you to brew better, more consistent beer at home. It will also help you come up with new thoughts and ideas about formulating your own recipes. The single best way to gain this knowledge is through continual practice and homework, but the great thing about this type of homework is that it involves tasting many different style of beer!

All of us have varying levels of sensitivity to the different compounds that make up beer, from hops to yeast to malted barley. So it's not at all unusual for one person to be able to detect something in the aroma or flavor of a finished beer that another person can't. This variance in different peoples' ability to detect certain smells or flavors is one excellent reason that critical tasting, done with a group of fellow beer aficionados, is usually more productive than tasting beer alone. The more experienced tasters can help everyone else identify different aromas or flavors in each beer, and they should also be able to explain the reasons why each beer tastes and smells the way it does.

Does this mean that the only way to hone your tasting skills is to attend formal events with experienced tasters? Not at all! While group tasting with an expert is a great way to learn, there are many simple beer samplings that you can

by John Oliver



do alone, or with a few homebrew friends. It doesn't take much preparation: The study materials can be found as close as your nearest beer emporium, provided it's stocked with a good selection of domestic and imported craft beers.

Commercial beers, due to the nature of the market, need to be tremendously consistent in terms of their flavor, aroma, and appearance. When Joe Sixpack picks up a bottle of Whammo Kiwi Dopplebock, he's expecting it to be exactly like the last bottle. Without this consistency and "repeatability," consumer loyalty is soon lost — usually along with sales — and many times the entire brand may fade into obscurity.

There are many well-made commercial beers that as their trademark or signature exhibit flavors that occur throughout homebrewing. By buying some of these widely available beers and engaging in a careful evaluation, you can experience an instructive range of tasting sensations. Then you can take the lessons you've learned and look for similar characteristics in your latest batch of homebrew! If you can find Sierra Nevada Pale Ale and Guinness Stout, for example, you can taste for hops, yeast and roasted barley.

One thing to remember: In critical judging, some of these identifying sensations might be considered flaws. But as beer styles vary, what might be considered a flaw in one type of beer is an essential part of the flavor profile in another. In the examples listed below, the flavors associated with them are most definitely intended to contribute to the overall taste experience, and should not be considered flaws.

Most of the commercial beers we mention are nationally distributed, and with a little legwork, samples in good condition shouldn't be hard to find. The most important thing in the following exercises is to follow good tasting guidelines such as the ones outlined in "The Five-Sense Beer Test" (August 1999 BYO). Take notes during the session, and since you're sampling, remember to have fun!

Hops



What hops add: bitterness, flavor and aroma.
Best beer to taste: Sierra Nevada Pale Ale.

Hops are chiefly responsible for contributing bitterness, flavor and aroma to the finished product. Just as different roses will have a different color, appearance, and fragrance, different varieties of hops will likewise contribute varying degrees of bitterness, aroma, and flavor, depending on their usage. With the countless varieties of hops available today, it would truly be a Herculean task to attempt to brew with all of them. But you can start to learn about different hop varieties simply by checking bottle labels when you're shopping for samples to taste at home.

Some craft brewers, such as Rogue of Oregon, will explain at length most of the ingredients that go into the creation of their products, and many other craft brewers are likewise open. With hops, by smelling the raw product or by steeping hops cones or pellets of a particular variety in hot water, it's possible to experience some of the characteristics of that variety. But the very best way to get to know a hop is by smelling and tasting it in an actual finished beer.

The one beer that is known for its hop signature, and the one generally considered the benchmark of the American pale ale style, is Sierra Nevada Pale Ale. And the signature hop for this ale is one of the most widely used hops in homebrewing: Cascade.

By inhaling the rich aroma of this ale, one of the first sensations that many people perceive is a subtle citrusy character, sometimes described as being grapefruity, lemony, or orange-like. This sensation is closely associated with the Cascade hop and its genetic relatives, such as Centennial. The bitterness and flavor of the hop certainly dominate the flavor profile, but are in balance with the finished beer. The hops are not overpowering the malt and body of the beer.

For diehard hopheads, Sierra Nevada beers are great examples of the flavors and complexity that can be achieved with high hopping rates. Pale Ale has about four or five times the hops of standard American commercial beers.

Malt



What malt adds: body and color
Best beer to taste: MacAndrew's Scotch Ale

Malt is the primary ingredient for providing body and color to a finished beer, and one of the beer styles that relies heavily on malt character is Scotch ale. MacAndrew's Scotch Ale provides a fine example: The blending of malts provides a rich, sweet character that's balanced by the subtle use of hops to prevent the beer from becoming overly sweet or cloying.

Malt is one of the ingredients in beer that we will perceive differently depending on the temperature at which the beer is consumed. Begin by trying this beer cold, straight out of the refrigerator, and then allow it to warm up in the glass for several minutes. In most cases, malt body and sweetness seem to increase as the temperature of the beer warms.

Alcohol



What alcohol adds: flavor and sensation
Best beer to taste: Paulaner Salvator dopplebock

Generous use of malt usually also results in somewhat elevated levels of alcohol in the finished beer. Alcohol content has a very definite effect on the flavor profile of beer; just as strong distilled spirits can create a burning sensation in the mouth and throat, so can beers with elevated alcohol levels.

Dopplebock is a rich lager style

that balances malt complexity with elevated levels of alcohol. Being a lager, any of the flavor and aroma that can be contributed by yeast in a warmer environment, such as with a barleywine, are not present. Paulaner Salvator is the original doppelbock, a rich lager with deep garnet color and residual sweetness provided by the blend of malts. While hops are used to offset the tremendous sweetness of the beer, look for a sensation of mild warming that is usually detected on the sides or back of the throat while swallowing. The rich maltiness of the beer will tend to increase as the sample is allowed to warm in the glass, as will the vapors and intensity of the presence of the alcohol, well over 7% ABV by law.

Yeast



What it adds: flavor and aroma
Best beer to taste: Fuller's London Pride ale

The effects of yeast in finished beer can be seen in several of the commercial beers that I already listed. Sierra Nevada uses a yeast strain that has probably been used to create more homebrew than any other liquid yeast, because it is very distinctive and it is widely available in liquid form. A slight fruity character that's typical of many ale yeasts can be detected in the background of the aroma of Sierra Nevada Pale Ale. It is important not to confuse this "fruitiness" with the citrusy character imparted by the Cascade hops. Most ale yeasts, at warmer fermentations, will exhibit some of this character. Fuller's London Pride, made with Fuller's own proprietary yeast strain, has many rich, fruity aromas. Fermentation byproducts are dependent upon the yeast strain and the conditions under which it was used.

One style of beer that relies heavily on yeast to provide its defining characteristics is Bavarian hefeweizen. Many great examples are commercially available, such as Spaten Club Weisse, Paulaner Hefeweizen, and Franziskaner. These true German hefeweizen usually have an aromatic signature that is heavy with clove, vanilla and banana characters. They're the direct result of the unique yeast strains and the temperatures at which they are fermented. The clove aroma, for example, is called "phenelic," while the banana aroma is called "ester." These compounds are natural byproducts that are created by the yeast strains; there are no bananas, cloves, or vanilla used in the recipe of an authentic German hefeweizen!

While the wheat malt that comprises more than 50 percent of the malt bill of these beers does contribute some characteristic dryness and snap to the flavor, along with spectacular head retention, it is the yeast strains that make these beers truly unique. For comparison, Widmer Hefeweizen is the benchmark of the American hefeweizen style, a tremendously popular product produced in the Northwest. The wheat character in this beer is prominent, but the yeast used is a much more neutral ale yeast. It imparts nothing more than a somewhat yeasty character along with cloudiness, as opposed to the rich and complex flavors and aromas that can be found in the Bavarian examples.

Roasted Barley



What it adds: color, flavor and aroma
Best beer to taste: Guinness Stout

The yardstick in this category is the original dry stout, Guinness. Available in many different forms around the world, with multiple recipes tailored to local conditions and packaging, this product can be found on draught, in bottles, and in cans that use the cutting-edge "widget" devices (pioneered to help create a draught-style head on a canned or bottled product). Regardless of the packaging, all forms of Guinness share the defining characteristics of a dry stout, primarily the color, flavor and aroma imparted by the use of unmalted, roasted barley.

This extremely dark barley lends a distinct roasty, coffee-like aroma and flavor to the finished beer. In many periods in history, this dark grain has been used as a substitute or adjunct for coffee beans in grain-producing regions of the world. In some instances, the dry, sharp character imparted by roasted barley can be described as "iron-like." Since the kilning and roasting process that dark grains undergo will contribute to a mild acidification or drop in pH in the beer, this will also serve to alter the flavor profile accordingly. Other dark grains—such as black barley, black malt or patent malt, and chocolate malt—will also contribute to this process with varying degrees of these flavors.

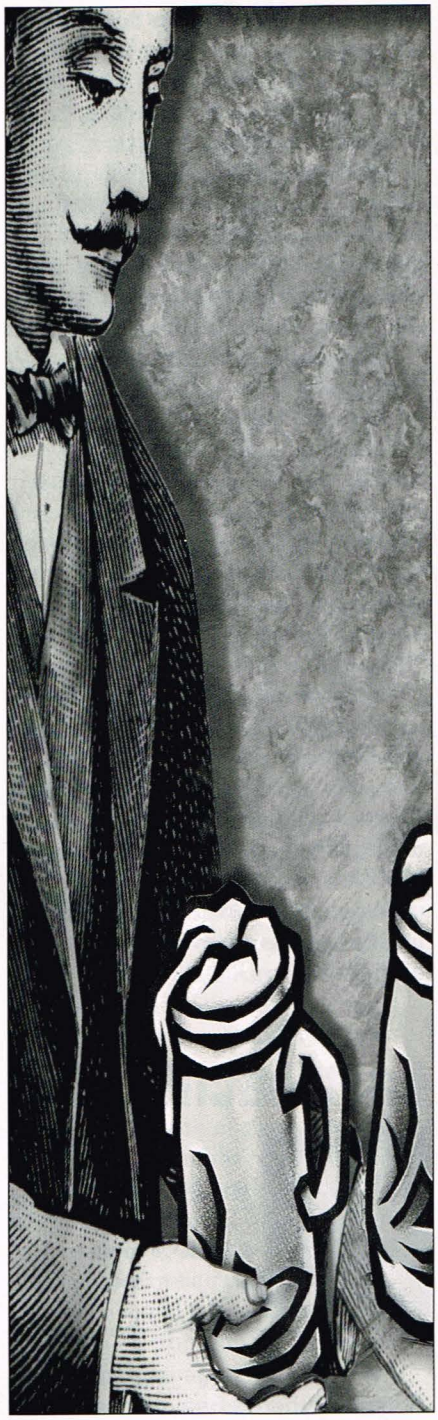
Lactobacillus



What it adds: a tang on the tongue
Best beer to taste: Guinness Stout

While you're enjoying that Guinness, there's one other subtle characteristic that you should notice. At the very end of the flavor profile, Guinness will exhibit a very slight sourness or "tang" that will be detected by the sour receptors on your tongue. While this is in small part due to the acidification provided by the judicious use of dark malts, Guinness also blends a small amount of intentionally soured beer with every batch prior to packaging.

The bacteria used to facilitate



this souring process is lactobacillus, and it's a common contamination encountered in homebrew. Guinness intentionally and very carefully controls and monitors the degree to which this reaction takes place, and the result is a mild sour-lactic character that enhances the overall flavor profile of the beer.

Unfortunately, precise control is beyond the means of most homebrewers, and when lactobacillus makes itself known, it is not intentional and certainly doesn't enhance the flavor! The best approach to ensure that this bacteria will not destroy an entire batch of beer with a pungent, overpowering sourness is to maintain strict sanitation and keep unused grains away from post-boil or fermenting wort.

DMS and Acetaldehyde



What it adds: corn and apple aromas
Best beer to taste: Rolling Rock (DMS) and Budweiser (acetaldehyde).

The sulfur compound DMS is usually detected in finished beer as a sweet, corn-like aroma similar to creamed corn. While DMS can be the byproduct of a bacterial contamination, it is more often associated with shortened boils or poor boiling performance. This is because it is a very volatile compound, present in all wort, that is easily driven off in the steam from a good, solid rolling boil that lasts at least one hour.

Rolling Rock employs sound boiling and wort-handling techniques, but the brewery also has a proprietary yeast strain that results in a level of sulfur production detectable in the finished beer. This slight corn-like character is an intentional part of the flavor signature of this extremely popular East Coast lager.

Acetaldehyde is a compound present during fermentation in all beers to varying degrees. But it usually doesn't make its presence known in the finished beer. Why? Because toward the end of the fermentation process, it's reduced by the yeast into compounds that are not as distinctive or easily detectable. When present, acetaldehyde results in an aroma similar to green apples. It's usually the result of an abbreviated fermentation or conditioning time, during which the beer did not sit in contact with the yeast long enough, or in situations where yeast health is diminished and the compound is not completely reduced in the conditioning process. Also, some yeast strains simply produce beers with a higher residual acetaldehyde than others.

In very slight amounts, this profile can be detected in the aroma of Budweiser, especially if the beer is allowed to warm slightly.

Take-Home Test

While having fun tasting the wide variety of samples discussed here, it's important to remember that each of the flavors pointed out in their particular beer are the intentional result of carefully monitored and controlled brewing practices, and are a definitive part of the flavor profile of the beer.

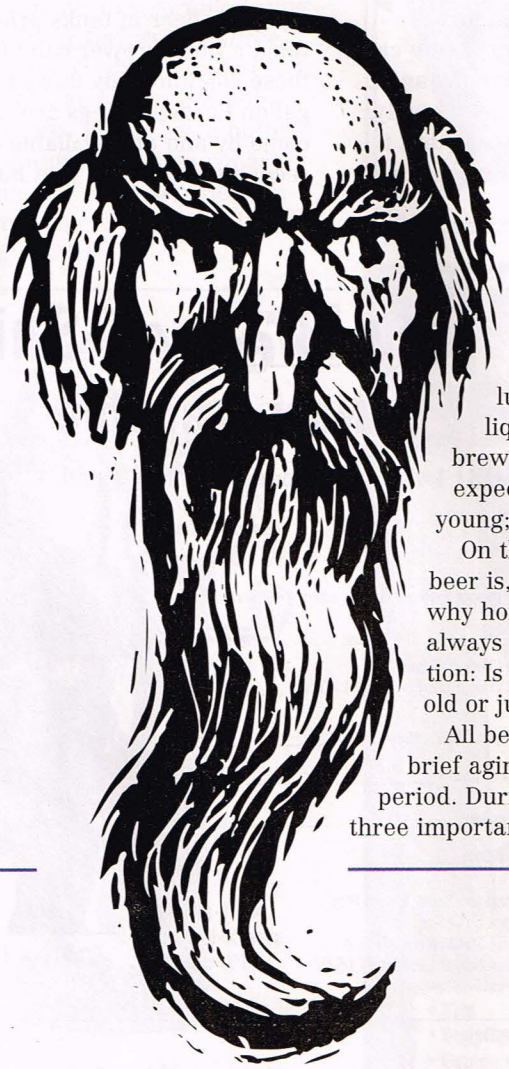
Unfortunately, as homebrewers most of us lack the means or equipment to precisely control these factors. So most of the time, when these characteristics make themselves known in our homebrews, it's likely an overpowering and unpleasant part of the flavor and aroma that detracts, not enhances, the final product. By being able to identify these flavors through palate practice and knowing their causes, you can take steps to keep your future homebrews tasting great.

For the truly adventurous palate practitioners, the wide variety of truly unique Belgian beers becoming available in the market today provides experiences unlike any other. Flavors and aromas from bacteria, wild yeasts, spontaneous fermentations, aging, blending and adjuncts such as candi sugar or fruit all provide complexity in the finished product. Unfortunately, many of these products are imported in very limited quantities with minimal distribution, so if you're lucky enough to buy a few bottles, be prepared for a pretty wild beer-tasting experience. ■

John Oliver is a BJCP National Judge and Head Brewer for BJ's Brewery in Brea, Calif.

The Age-Old Question

IS YOUR BREW TOO YOUNG? TOO OLD? OR JUST RIGHT?



It's nice to think we all improve with age. Our favorite malt beverage is no exception — to a point. Uncap a beer before its time and you'll pour a lackluster, hazy, flat liquid, not the sparkling brew you've come to expect. The beer is still young; give it time.

On the other hand, old beer is, well, old beer. That's why homebrewers should always ask the age-old question: Is my beer too young, too old or just right?

All beers require at least a brief aging or "conditioning" period. During this critical time, three important things happen: The beer carbonates and clarifies, and the flavors mature.

Different styles have different conditioning requirements. This is dictated by the yeast strain used, and also by fermentation temperatures. For most ales, two to three weeks is sufficient, although some brewers swear that four weeks is the minimum requirement. (Of course, many impatient homebrewers have consumed their entire batch by then.) Some lagers and strong, high-gravity ales — such as Scotch and Trappist ales — benefit from much longer aging periods. More about these styles later.

Homebrewers may think the aging process begins once beer has been bottled or kegged. Actually, the aging process starts with fermentation, when flavor development begins. As yeast flocculates, the beer starts to clarify. And as beer sits on

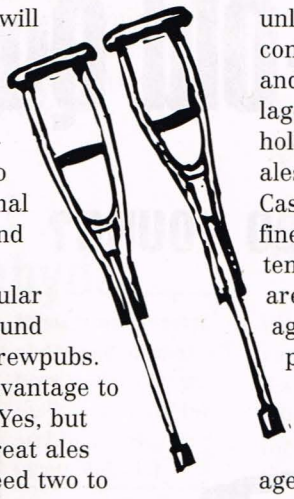
by Gretchen Schmidhausler

old, dead yeast, it's already beginning to grow old. Because old yeast can impart off-flavors to your young beer, transferring to a secondary fermenter is recommended, especially if you're not planning to rack for a while.

SLOW LAGERS AND SPEEDY ALES

Most homebrewers associate aging with lager beers. In fact the German word "lager" means "to store." Traditionally, lagers are aged for up to three months at 32° F. These conditions are considered ideal to accomplish the goals of maturation.

In today's competitive beer market, few breweries can afford to age beer for that long. With modern advances, fine lagers can be created in three weeks. For example, filtering beer removes yeast and protein molecules, eliminating the need to wait out a long clarification period. Manipulating temperatures shortens the time needed for flavor development. Homebrewers can also imitate these techniques.



Most ales fermented at 65° F or warmer will be drinkable after a short fermentation and conditioning period, as little as two weeks. The minimal aging period — and rapid turnover — makes ales a popular and financially sound choice for most brewpubs.

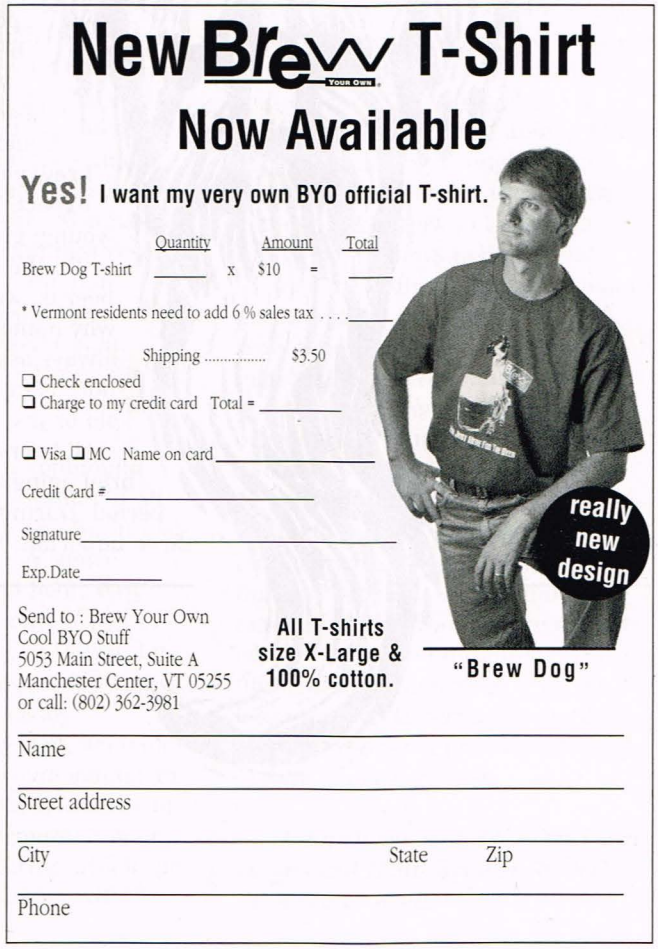
Is there an advantage to aging most ales? Yes, but aging times for great ales usually don't exceed two to three weeks. In fact, over-aging can have negative effects. For instance, yeast autolysis can impart a meaty, brothy flavor to your beer. Also, if you leave too much headspace in the bottles at filling, the beer will become oxidized before you have a chance to enjoy it.

There are some notable exceptions. Scotch ales, for example—unlike traditional English ales—are conditioned at lower temperatures and for longer periods of time, like lagers. The same long aging time holds true for barleywines, Trappist ales, and any other high-gravity ale. Cask-conditioned ales, which are fined and served at slightly warmer temperatures to enhance clarity, are also exceptions, although the aging period is still short in comparison (about seven to 10 days).

THE ABCs OF AGING

Carbonation: While breweries age their beer in tanks prior to bottling, a homebrewer can mimic these conditions by using kegs. Five-gallon Cornelius kegs are easy to come by and are available new or reconditioned. Beer that has been





kegged can be force-carbonated by injecting bottled CO_2 into the keg.

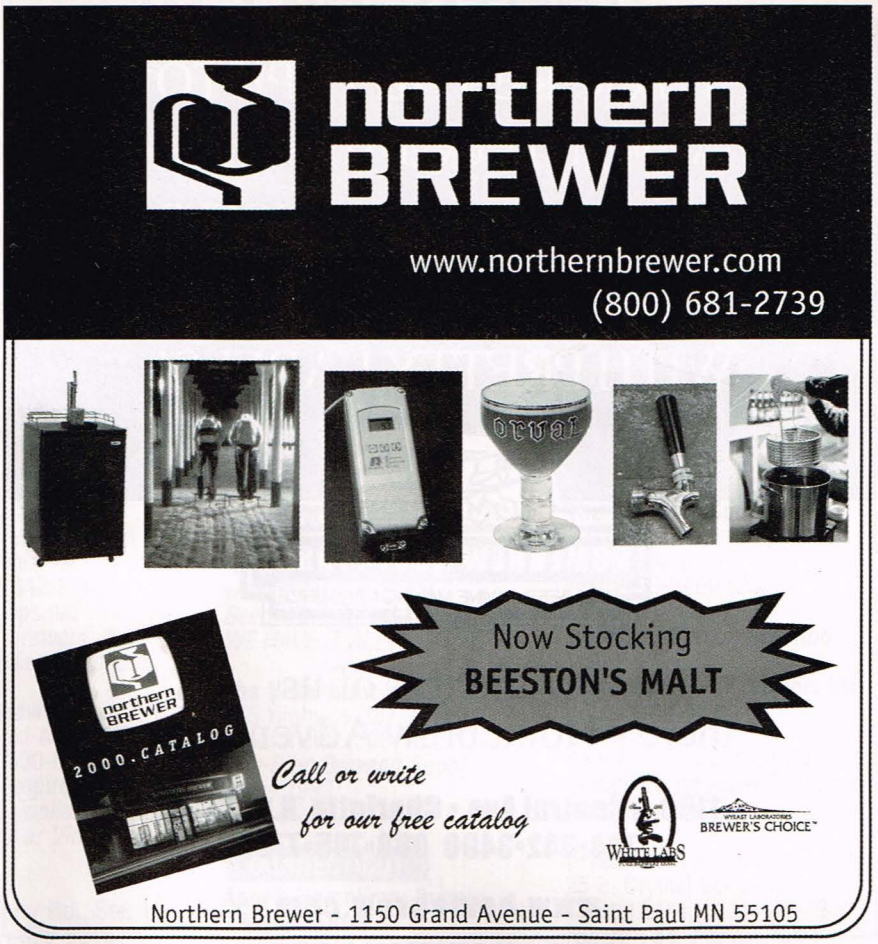
Bottled beer must be primed using corn sugar, dry malt extract, or even honey. Adding sugar to the fermented beer will cause the remaining yeast to become active, gobbling up this new food source and producing CO_2.

Clarification: During this stage of the beer's life, clarification also occurs. As the beer sits quietly, the solid particles still suspended in the beer, including yeast and large protein molecules, will eventually settle to the bottom. This process, like natural carbonation, does not happen overnight but over the course of several weeks.

Maturation: Aging beer also serves to remove undesirable young or "green" beer flavors, the three most common of which are diacetyl, acetaldehyde, and hydrogen sulphide. Diacetyl, which has a buttery taste, is produced during primary fermentation. The higher the fermentation temperature, the higher the diacetyl level.



Is your ale over the hill? All beers require a conditioning period, during which three important things occur: the beer carbonates and clarifies, and the flavors mature.



CIRCLE 27 ON READER SERVICE CARD



CIRCLE 29 ON READER SERVICE CARD

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Acetaldehyde, which produces a green-apple flavor, is also produced early in fermentation. Warmer fermentation temperatures, a high pitching rate, and poor wort aeration also contribute to this off-flavor. Both diacetyl and acetaldehyde are reabsorbed by healthy, active yeast, which in turn produces ethanol.

Hydrogen sulphide, which has sulphury, rotten-egg smell, also diminishes as beer matures. One way to reduce these characteristics is to ferment at cooler temperatures, although they will be removed more rapidly at higher temperatures. Hydrogen sulphide is also vented from the beer if the headspace of a lagering tank is periodically purged during secondary fermentation.

Maturation also fixes flavors such as alcohol and esters. Fermentation and conditioning temperatures will, again, be determined by the yeast. Generally, ales are conditioned at room temperature, around 65° F, while lagers are conditioned at about 45° F.

The aging process is also a good time to experiment with dry hopping or other techniques. If you're feeling adventurous, you might consider the old process of oak aging. Your best bet is to use a small, very clean wooden barrel in good repair (with no leaks.) Or you can buy wood chips and introduce them into your keg. Keep in mind that not all beers are suited to oak aging. Dark, malty beers are a better choice than lighter-bodied beers. You should sample the beer at frequent intervals to monitor its progress.

In Good Taste

Monitoring your beers for oak level is not the only reason to check the progress of your beer. There will be a window of opportunity during which your beers will taste their best.

You'll never really know how your beer's doing until you open a bottle and try it. Young beers may taste green and appear hazy. Old beers may taste meaty or yeasty and have oxidized notes, which are similar to cardboard or sherry. Properly aged beers taste just right. ■

Gretchen Schmidhausler is head brewer at the Ship Inn in Milford, New Jersey.

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Official Entry Blank

Deadline: March 21, 2000

Categories (Enter as many times as you like!)

- ❑ **Professional** *(Designers, Illustrators, etc.)*
- ❑ **Amateur** *(The rest of us!)*

Name

Company (if applicable)

Mailing Address

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Send your entries to the official label judging gnomes:

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Grapes or Not.

It's Still Good Wine

by Alison Crowe



Ask ten different people for a definition of "wine" and you'll get just as many different answers. A stockbroker in New York will have visions of fine Bordeaux Grand Crus, a surfer in California will be dreaming of a local Chardonnay, a couple in Vermont will pour you a glass of their homemade blackberry cordial, while a gentleman farmer in England will bring out a dusty bottle of last year's rather "experimental" turnip "wine."

"Wine," such as it is, means many different things to those who collect, consume, make, and enjoy it. Folks associated with the commercial or scientific side of the wine industry may define wine as those beverages made only with grapes. They may even go further and stipulate that these grapes may only belong to the classic European family of winemaking grapes, the *Vitis vinifera* species. This train of thought is inherently blasphemous to another class of winemakers and wine-appreciators, those people who believe that practically anything — from cucumbers to grass clippings to dandelions — can be fermented into a beverage recognizable as "wine."

It's easy to take a viewpoint somewhere in the middle. Drive through one of this nation's wine-growing regions and you're bound to see a bumper sticker that says it all: "Wine Happens." It's no mistake that Mother Nature imbued grapes (and certain varieties, at that) with just the right amount of sugar, water, acids, flavors, and tannin to make a dry, crisp, aromatic, and clear beverage that humankind has improved upon and enjoyed over the millennia. Wine made from these *Vitis vinifera* grapes sometimes does just seem to "happen." Dump some yeast in if you want, don't let it get too hot or too cold, and more likely than not you'll end up with a clear, dry beverage that's got about 10 percent to 12 percent alcohol and is pretty similar to the table wine that you can buy on the shelf at your local supermarket.

No matter what you call it, home winemakers the world over have always used ingredients other than wine grapes to make their fine homemade beverages. You can divide these ingredients into the following categories: *Vitis vinifera* grapes, French hybrid grapes, berries, soft fruits, hard fruits, tropical fruits, dried fruits, herbs and flowers, and vegetables. Pertaining to each category are special techniques that must be employed and certain additives that must be used to give the yeast a healthy, happy environment in which to conduct its fermentation.

Vitis vinifera grapes naturally provide the best combination of factors (acid, sugar, and nutrient levels) for wine yeast to grow in. The tannins and flavors in wine grapes also tend to give the most pleasing results when it comes to the aesthetics of the finished product. All of this notwithstanding, it is certainly possible, if not inevitable, to produce fine non-grape wines if a little extra attention to detail is paid.

Vitis Vinifera Grapes

These grapes are some of the best materials with which to make dry table wines. Varieties traditionally used in France but now grown around the world include: Chardonnay, Riesling, Sauvignon Blanc, Chenin Blanc, and Viognier for whites as well as Cabernet Sauvignon, Merlot, Pinot Noir, Malbec, and Syrah on the red side. These grapes and their concentrated juices can be purchased for use by the home winemaker.

For making dry table wine, the "ideal" components of a wine grape juice are: 22% sugar and 6.5 grams per liter total acidity for reds and 21 percent sugar and 7.5 grams per liter total acidity for whites. In these conditions wine yeast (which also can be bought through home winemaking supply stores and catalogs) are generally the happiest and will conduct the healthiest fermentation possible. Vary a lot below or above these guidelines and winemakers should add a little sugar or grape juice concentrate, add a bit of water, or add some tartaric acid to bring the acid up. When using any other fruit besides grapes, add yeast nutrients (purchased through home winemaking suppliers) at the rate of one-half to one ounce per five-gallon batch. Wine grapes are usually abundant in the nitrogen, vitamins, and minerals necessary for a healthy alcoholic fermentation while other fruits can lack adequate amounts of all three.

French Hybrid Grapes

French hybrid grapes are a cross between a *Vitis vinifera* species and native American grape species. Traditional European wine grapes flourish in a Mediterranean climate and immigrants to the New World noticed that the vines they brought over with them didn't do too well in their new home. In the 19th century crosses were made (and some are suspected to have occurred naturally) between the European *Vitis vinifera* grapes and native American grapes such as *Vitis labrusca* and *Vitis rotundifolia*.

These hardy crosses have become collectively known as "French hybrids" and are used by many viticulturalists, professional and amateur, throughout the United States and Canada. The most popular hybrids in use are, for whites, OK Riesling, Verdelet, and Müller-Thurgau. For reds, Rougon and Chancellor seem to be good choices.

When using French hybrids for winemaking, it is wise to remember that, especially given the colder, damper areas in which they thrive, they'll end up being lower in sugar and higher in acids than traditional winemaking varieties. That being so, winemakers using hybrids will need to add sugar or *Vitis vinifera* concentrate to make up for the sugar deficiency. At the same time, it is important that the acids aren't too high, so diluting hybrid juices and musts with water (and adding sugar) or using a proportion of lower-acid *V. vinifera* concentrate is usually necessary.

Berries

Since berries are small, often round, and can be bright purple like many grapes, some people assume that they can substitute one for the other and make a fine beverage.

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This may be the case, if fortune smiles upon you, but these two fruit types are inherently different and must be treated as such.

First of all, berries can be very high in acid — they can take the enamel right off your teeth. Especially since this high acid content usually goes hand-in-hand with lower sugar content, supplementing a berry fermentation with wine grape concentrate is almost always necessary. Berries are also high in pectin, a complex carbohydrate in fruits that makes them jelly-like if cooked, as in the making of jam. It is always a good idea to add about two teaspoons of pectic enzyme per five-gallon batch of any fruit other than grapes to break down the pectin molecules and cut down on the haze and instabilities that the natural pectin in fruit can cause. This enzyme is commonly available in powder or tablet form at home winemaking and brewing supply stores. The great thing about using berries for making wine is that they are very aromatic and usually highly colored, two things that contribute to wines that look, smell, and taste great. Many have a lot of tannins in their skins, which, like the skins of wine grapes, contributes to the slightly astringent mouthfeel that you expect from a fine red wine.

Soft Fruits

In the soft fruits category are things like apricots, plums, and peaches. Apricots make some of the best white and sparkling wines around, though like berries and most other fruits, must have pectic enzymes added to them since they can easily make hazy wines. Soft fruits, depending upon their stage of ripeness, can have high sugars and low acids, so both of these parameters may need to be adjusted. Luckily, apricots make for healthy, alcoholic fermentations as they are abundant in the nutrients needed for yeast to reproduce and complete the fermentation. Plums are good fruits to use for the same reason, but the strange, spicy flavor they acquire when they age recommends them for use only in blends and in port and sherry-style dessert wines.

Hard Fruits

Hard fruits include things like apples, pears, and rhubarb. These fruits usually don't have enough of their own sugar to create the alcohol content associated with what we call wine, so they need to be supplemented by sugar, honey, grape juice concentrate, or any combination of the above. Apple cider is a often thought of as the realm of home brewers, but home winemakers can make delicious apple or pear wine that is crisp, pleasant, and flavorful at about 11 percent alcohol.

Again, pectic enzyme is an important additive to making wine with hard fruits. Hard fruits also may need a small hand-press to extract their juice, a specialized piece of equipment that many people may not own. Luckily, these can often be borrowed from local home winemaking clubs or rented from home winemaking or home brewing stores. Hard fruits make good bases for dry white-wine styles as well as sweet dessert or social wines.

Tropical and Dried Fruits

These fruits are in one category because they usually take on a supplemental role. Rarely do they supply all the sugar, or serve as the main ingredient around which a wine is centered. Tropical fruits are used sparingly, mainly because they are expensive and difficult to obtain for most people in North America. Typical tropical fruits include pineapple, kiwi, and starfruit. These fruits are usually very high in acid and impart flavors many people would consider "strange" in most wine styles. However, they can be used with some success as flavoring agents in sweeter white wines when the bulk of the juice comes from white wine grapes, apples, or a similar source.

Dried fruits are usually used either as a quick source of a sugar and nutrient boost (raisins being very popular) or as a flavoring agent in port or sherry-style wines. The oxidized flavor of dried fruits does not recommend them for crisp, clean white-wine styles, though they can sometimes be used as a sugar and flavor source for dry and sweet red-wine styles.

Herbs, Vegetables, and Flowers

Last but not least, it's time to give some credence to everyone who likes to make a good parsnip wine now and then. When most people think of wine, they don't think of vegetables, flowers, or herbs. But these things have been used to give special flavor, aroma, and character to wines throughout history. There is a good reason, however, that wines are most likely to be made with fruits — these plants are high in sugar and will ferment very well.

Vegetables, on the other hand, don't have much natural sugar that is immediately available to the yeast and it is always necessary to supplement your vegetable musts with grape concentrate, juice, or with dried fruit such as raisins or elderberries. The same thing could be said of herbs and flowers — they don't really have any fermentable material of their own and usually are used only to contribute aromas or flavors to the finished product. Elderflower wine and dandelion wine are prime examples of wines that rely on herbs and flowers for their distinctive characteristics.

Purist or not, wine snob or not, you must admit that it is always possible to make wonderful, tasty beverages out of fruits, vegetables, and other materials that are not grapes. You might even be able to say that those winemakers who use only grapes to make wine are taking the easy way out — and those who dare to be different are the truly talented among the winemakers of the world. ■

Alison Crowe is a graduate of the University of California at Davis, Department of Viticulture and Enology. A commercial winemaker in the Santa Cruz mountains, she writes the "Winemaking" column in each issue of BYO.

"Honey, It's Just a Hobby"

by Mike Crawford

Well, it seems like just yesterday when my neighbor, Mike "The Plumber," and I headed off to the local homemade beer and wine store. Albeit with two completely separate agendas. Mike's was to get a simple homebrew kit. Me? I wanted more. I wanted to produce a world-class Chardonnay!

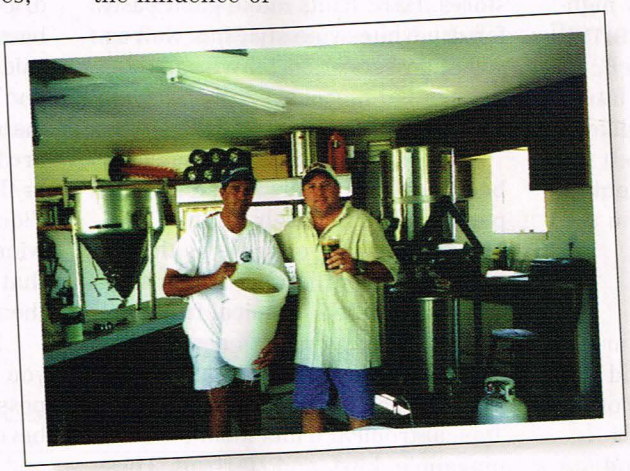
As fate would have it, we agreed on a beer-making kit with a couple of upgrades. So, you ask, "upgrades?" We purchased your basic five-gallon plastic fermenter kit. After considering our options to cook the wort, we purchased a 175,000-BTU outdoor cooker and a 50-liter pot. When we returned home to our ever-inquisitive wives, we assured them that this is "just a hobby."

On October 19, 1998 we proudly began to make our first batch of CrawBo Red Ale. Wow! It sure was good. Now that we had our fans in the neighborhood to encourage our new hobby, we decided in short order that we needed to increase our capacity. We purchased two more plastic fermenters and made 10 gallons of beer for our second batch.

That's when we realized that we would need a wort chiller. Then we realized we had to bottle 10 gallons. Not a good idea. Time to purchase a kegging system. More fermenters. Shoot! Now we can't keep our beer at a constant temperature during fermentation!

By December 1998 we had seven five-gallon fermenters, a one-door visi-cooler with a 0° to 100° F thermostat, three CO_2 tanks, 10 five-gallon stainless soda kegs, and a two-door visi-cooler with three tap handles! Oh yeah, I forgot to mention the cooler with the double standard at my house.

It was about this time that two significant events occurred. First, the "Doublewood Brewing Process" was invented along with Russ' Smokeless Red Ale. First, "The Doublewood Brewing Process." It started with a simple brew night that turned ugly. "Firestone" Russ showed up with a bottle of Balvenie Doublewood Scotch. We drank it. All of it! Hence, the "Doublewood Brewing Process." Then disaster struck: As the wort cooled and we prepared to rack-off the wort to the fermenter, we noticed the pack of cigarettes in the wort! Considering the influence of



My friend Mike Bobosky (right) and I just want our wives to understand this hobby. Is that too much to ask?

the "Doublewood Brewing Process" we had no idea where the pack of cigarettes came from. So we reheated the wort, cooled it down, racked it off, and pitched the yeast around 3 a.m. the next morning! Hence, "Russ' Smokeless Red Ale"! It was damn good if I do say so myself!

Now we proudly serve a red ale, porter, and a pale ale! I think by now you're getting the picture that this beer-making thing is out of hand! Now for the rest of the story.

While all of this was going on, Mike and I made two decisions. First we decided that we needed to upgrade to an all-grain system. Partial mashes were just not good enough. Second (after purchasing our first issue of *Brew Your Own*), we set a brewing goal. It was not to win a contest or to make the best beer possible; no, it was much shallower than that! We aspired (and still do) to have our garage brewery on the cover of *Brew Your Own*!

After several attempts to design our own all-grain system, and many a night spent surfing the Web for information, we happened upon an ad in *Brew Your Own* that changed our lives forever. Not to mention our spouses' lives! We are now the proud owners of the ultimate all-grain brew system! Three 100-liter pots, two pumps, site tubs, stainless parts, and more. *Wow*! (Honest, honey, it only cost $250.)

To sum it up, in less than a year we have gone from five-gallon partial mashes to 20-gallon all-grain brew sessions. Oh yeah, did I forget to tell you about the 27-gallon stainless steel conical fermenter mounted in our one-door visi-cooler?

And remember, honey, "It's just a hobby!" Honest! ■

Do you have a 750-word story for Last Call? Mail it with a color photo to Last Call, c/o Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255.

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She doesn't want to hurt his feelings, but...

Jim's been brewing for years now. In his garage, at any one time, he'll have as many as 6 different beers on the go.

In Jim's eyes, he's done everything right. But when it comes to the taste, something is very wrong. Karen knows. And so she should. She's been his guinea pig for the last 8 years.

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