Brew Your Own

NOVEMBER 2000, VOL.6, NO.9

THE HO BREW BEER MA



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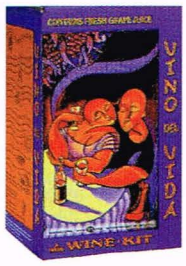
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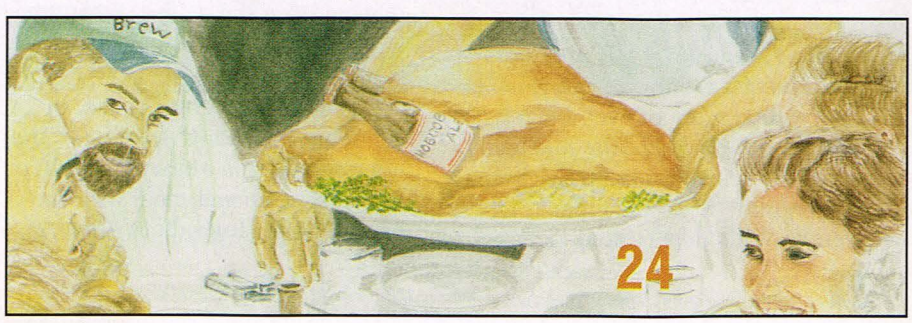
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Cover photo: Charles Parker/Images Plus

Editor's Note

Catch the Belgian Habit!

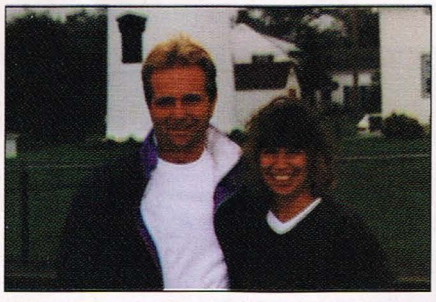
I tasted my first Belgian beer in the late 1980s, at a bizarre bar in Manhattan called Burp Castle. I swear this was the name, though it's no longer listed in the phone directory. As I recall, the bar was somewhere in Greenwich Village and the entryway was barely marked. Once we found it, we had to knock on a heavy wooden door, which was opened by a bald guy wearing a monk's habit (the concensus among our crowd was that he was not a real monk). The rules were strict: Among other things, you could not speak above a whisper. This was all very strange, but the beers made it worthwhile; it was at Burp Castle that I tasted my first Trappist ale and Lindeman lambic.

Flash-forward a dozen years to the birth of our second daughter. I'd packed a little bag with everything I would need at the hospital, including warm clothes for the baby, "fat pants" for me and a big bottle of Hennepin Ale, made by the Brewery Ommegang in Cooperstown, New York. After the delivery, when things had settled down and the doctors and nurses had departed, I leaned back in my hospital bed with my tiny daughter and toasted her arrival with the best glass of beer I've ever tasted.

That's how much I love Belgian beer, and we're betting you feel the same way. With that in mind, we've prepared a special 19-page guide to brewing Belgian beers at home. The centerpiece is "Dubbel Vision" by Scott Russell *(page 32)*, which offers recipes for cloning six classic Belgian beers, from Hoegaarden Wit to Westmalle tripel. The package also includes tips on bottle condition, a guide to Belgian beer styles and glassware, and advice from award-winning brewers who specialize in Belgian beers. We hope you enjoy it!

KATHLEEN

Contributors



Tess and Mark Szamatulski have been important players on the *Brew Your Own* team, writing occasional articles and reading manuscripts as members of our editorial review board. Now they've taken on an even bigger role: In each issue of the magazine, they'll be researching and writing our regular "Style Calendar" column. This department consistently ranks among the magazine's most popular pages; with solid information and step-by-step recipes, it leads readers through a year in fine beer.

Tess and Mark are well-suited for this job. They're the authors of "Clone Brews: Homebrew Recipes for 150 Commercial Beers" (Storey Books) and the newly-released "Beer Captured: Homebrew Recipes for 150 World-Class Beers" (Maltose Press). For the past ten years they've been the owners of Maltose Express, the largest homebrew-supply store in Connecticut.

They're also great cooks. In "A Homebrew Holiday" *(page 24)*, they offer recipes for a tasty Hobgoblin ale and a gourmet meal with the beer as a key ingredient. Cheers!

Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

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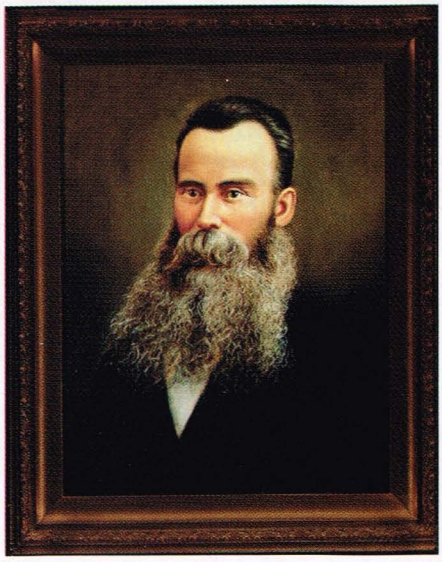
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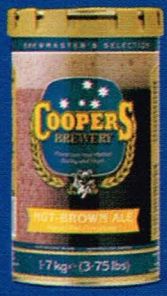
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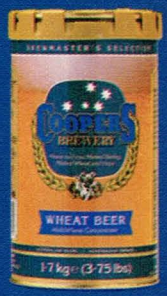
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100% malt
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Color (SRM): 12.2



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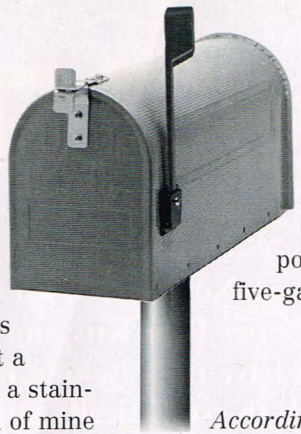
100% malt
Bitterness (IBU): 22.6
Color (SRM): 3.6

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CIRCLE 12 ON READER SERVICE CARD

Mail



Spendy Spigots

I read your article *(May 2000)* about installing a spigot into an existing brew pot. I am considering doing this and was wondering what a reasonable price was for a stainless steel spigot. A friend of mine will do the welding and has given me a price list for various styles of spigots (plastic, brass, cast iron and stainless steel) and I was kind of surprised by how expensive the stainless steel spigots are ($125 to $175). I know some homebrew shops that sell pre-made brew pots at close to $200, so I guess this isn't unreasonable. Any information that you could provide would be greatly appreciated.

Jim Albrecht
Via e-mail

"Projects" guru Thom Cannell replies: "That $175 ball valve must have gold plating or jeweled movements! The spigot we used for our story came from Moving Brews (www.movingbrews.com) and lists for $28 plus shipping. Other suppliers offer similar prices. If price is your concern you could install a stainless steel nipple or coupling and use a less expensive brass ball valve available at any good hardware store for less than $10."

Ten-Gallon Batch of Amber

Just like the reader in the September issue of *Brew Your Own*, I just returned from salmon fishing in Alaska and found the Alaskan Amber to be excellent. I plan to try your recipe, but I have one question. I'm going to do a 10-gallon batch of all-grain. The recipe says to substitute the DME with 8 pounds of pale malt, then add the crystals. Does that include the one pound of two-row pale, for a total of 9 pounds? Or should I use eight pounds of pale, plus the crystals?

To get an OG of 1.054 my computer program shows it should be nine pounds of two-row for a five-gallon batch of beer.

Rick Marzullo
via e-mail

According to "Replicator" author Scott Russell: "Nine pounds of grain (two-row and crystal together) should give you an OG of about 1.054, so use eight pounds of two-row plus one pound of crystal for 5 gallons. For 10 gallons, I'd use 17 pounds of pale and only one pound (1/2 pound each) of light and medium crystal malt."

Too Warm for Alaska

I'm new to homebrewing and I just read the Alaskan Amber recipe in your September issue. I just visited Alaska, where I enjoyed this beverage, and I was really excited to see a recipe. I ran out and bought all of the ingredients and then realized that I didn't read the recipe closely enough. There is no way I can take up space in the fridge to ferment at 40° F. Oops!

The White Labs website also recommends that the WLP029 yeast be fermented at 40° F. Can I still make this beer at room temperature? Any suggestions?

Robert Clements
Webster, Texas

Says "Replicator" Russell: "Find the coolest spot you can, most likely your basement, and keep your beer cool by setting it in a pan of cold water and draping a towel over the fermenter. Let the towel hang just barely in the water. The towel should wick the water up and over the fermenter. This won't exactly be lagering, but it can resemble a pseudo-steam beer — maybe not as smooth and clean as Alaskan, but a nice flavorful beer nonetheless." ■

How To Reach

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TIME TO TIP THE PORTER

BRIESS PORTER

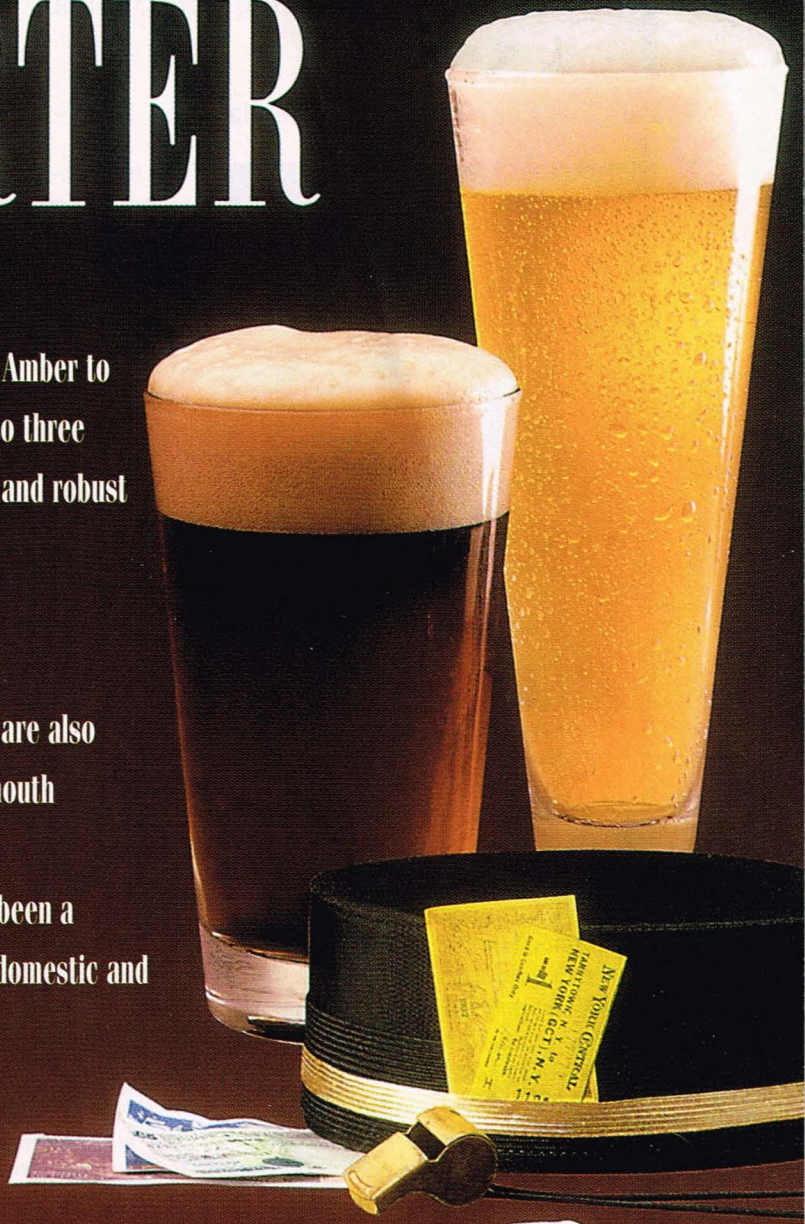
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CIRCLE 10 ON READER SERVICE CARD

Pot Shots

Insul-Jacket

Wrap your brew kettle in the hottest style

Jeff Pereyeda • Fremont, California

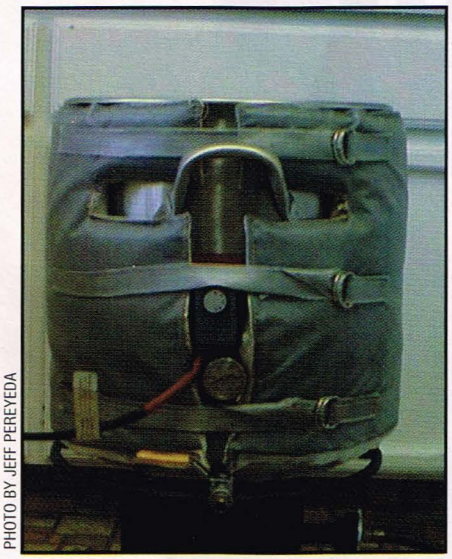


PHOTO BY JEFF PEREYEDA

Jeff's high-tech "Insul-Jacket" keeps his temperatures nice and steady.

I'VE BEEN BREWING FOR FOUR years and have learned that, when it comes to brewing, temperature is everything. Holding that mash temperature steady for a long time can be a monumental task for some homebrewers.

When it came time to design my brewkettle, I had a lot of options: fluid gauges, tilted thermometers, the false bottom with the flush tube ... you get the idea. I decided on the standard thermometer with the 2-inch gauge, the false bottom and the spigot.

But then, as a devout "Noonanite," I decided I needed to design a kettle that would function as a mash vessel, lauter tun and boiler. My mentor (that would be Greg Noonan, who wrote "New Brewing Lager Beer") suggested building an insulated box to surround the kettle so the temperature will hold at certain rests. That meant building a box significantly bigger than my 15-gallon Vollrath, and it also meant explaining to my girlfriend why it had to stay in the house. I thought about putting the kettle in the oven and setting the oven to certain temps, but my oven is too small. Now what?

This dilemma inspired the "Insul-Jacket." I met this guy who works for a plastic injecting company on my delivery route (I used to drive for UPS). He made it and I named it. The gray jacket you see is made from "spun" glass and can tolerate temperatures well over 400° F. It wraps around the kettle and straps together with belts made from the same material. Plastic injection companies use this material to prevent the molds from losing heat.

The small black knob in the middle of the kettle, with the black wire running from it, is a heat belt. I got this from another connection on my old route. It wraps around the kettle almost twice. I put it on the kettle before the Insul-Jacket. The belt maintains a 170° F sparge temperature from the sides, not the bottom. It makes for a cleaner, more efficient sparge. It's made with high-heat rubber and the small grey square is a built-in thermostat.

As you can see, when the whole thing is put together it bears a striking resemblance to an early prototype of the "H" Bomb. I have assured my fellow brewers in other countries that I would only use my kettle for keeping the peace; it's for good and not for evil. →



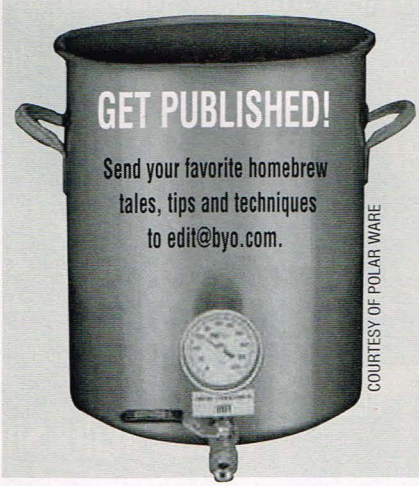
Reader Tip

David Owen
Neptune, New Jersey

I found a neat device in the hardware store. It's called a "Drain Blaster." It's an eight-foot-long plastic tube that attaches to your sink faucet on one end and has a special cap on the other end. The cap is a plastic plug that has a tiny hole drilled in the middle of it. Around the cap is a small free-spinning plastic collar with several holes drilled in it.

If you snake this device into your drain, then turn on the water, the water squirts out of the hole in the center plug and makes the collar spin at a very high speed, creating a high-pressure blast that shoots out sideways. This may be difficult to picture without a photo, but it's great for cleaning carboys. I just put my carboy in the bathtub, hook it up and turn on the water. This device blasts away all of the crud. A little brushing with the carboy brush and your carboy is as good as new.

The device is called the "Drain Blaster." For more information: Jet Blast Products, Fort Smallwood Road, Baltimore, Maryland 21226. Cost: $29.99.





CIRCLE 44 ON READER SERVICE CARD

The next best thing to owning a brewery

Scott Learey • Reno, Nevada

MY ADVENTURE IN BREWing started about six years ago with dreams of owning my own microbrewery. I began with the basics: one brew bucket, a few cases of bottles, help from friends and the local homebrew supply shop (Reno Homebrewer). There was a gravity-fed, multi-tier system at the homebrewing store and they let me use it once. That was the end of my single bucket brewery. One bucket wasn't going to cut it. The only solution was to build my own brew machine.

As you might guess, I was single and had a lot of time on my hands. It took me about five weeks to build the machine. Using 40-quart stainless kettles with thermometers and stainless drain valves, 30,000-BTU burners and a welded steel frame as the basic foundation, I then added a three-way gas manifold to direct propane from one tank to the burners.

I also added an on-board water distribution system, which can be connected to a water source for sparging and for filling each kettle. Stainless-steel "quick disconnects" are a distinctive feature of this unit. Filling spouts can quickly be connected for filling and easily removed for cleaning.

I managed to form a sparge ring from 3/8-inch stainless tubing, which connects to the hot liquor tank with a quick-disconnect fitting for sparging. And, to reduce lag time, there is a Venturi fitting to inject pure oxygen into the wort as it exits the boiling kettle.



PHOTO BY SCOTT LEAREY

See it and believe it. Who needs plastic buckets when you can have a dream home brewery that comes with wheels?

The machine can be transported and helps to spread the homebrewing message. The first reaction upon seeing the machine is usually, "What the hell is that thing?"

The Brew Machine's frame is easily disassembled and has wheels for moving the entire unit around the brew room after assembly. My brew machine sure makes life a lot easier — and more enjoyable too.

The meaning of life and the ultimate brew system

Neil Avdellas • West Palm Beach, Florida

WHAT LENGTHS ONE WILL go to for the perfect pint! It all started nine years ago when my wife Cheryl and I went to an Irish brewpub in our neighborhood. I took one sip of a handcrafted red ale and discovered the meaning of life. The rest is history. Although that brewpub is now closed, that first pint of fresh, hoppy brew had lasting effects. Now beer is my life. I am a homebrewer and a District Sales Manager for a local microbrewery here in Florida.

I had made three or four batches of extract beer and I was ready to mash like the big breweries do. I made all of my own equipment and made some legendary batches but it still wasn't right. Finally, I decided that it was time for the ultimate brewing system.

I provided my friend Chris, an expert metalworker, with the plan and he was able to make every part function and fit on a single stand. We managed to complete it in about three years, working part-time, despite my threats to throw the whole thing into the canal.

Now it's done and it works. We mash using the RIMS (re-circulating infusion mash system) with digital temperature control. Now I can duplicate batches with ease. There's a control panel with four digital thermometers, switches and the RIMS control. There are three pumps, for mash, sparge and clean-out, and a two-stage chiller that can get the wort down to 50 degrees.

I don't know what it all has cost me, nor do I want to know. It was all worth it to get the perfect pint! ■



PHOTO BY NEIL AVDELLAS

All in one. Neil Avdellas' method of getting the perfect homebrew pint.

The Big Drain

Three pros give the lowdown on lautering

by Thomas J. Miller

There's nothing like formulating a recipe, crushing the grain and hitting all the temperatures during the mash, only to be thwarted by problems when you're draining the sweet wort off the mash. Lautering can be a frustrating part of the brewing process.

The term "lauter," a German word for clarify, refers to all of the steps involved with separating the sweet wort from the spent grains after your mash. Ideally, your mash tun is equipped with a straining device and can double as a lauter tun. If there is no straining device in your mash tun, you need to transfer your mash to a lauter tun.

During lautering, the wort is strained off and recirculated back through the grains until it begins to run clear. This process is referred to as "vorlauf." The vorlauf clarifies the wort by filtering out unwanted husks, protein and other debris.

Next, it's time for sparging. As you drain the wort, you add sparge water at approximately 176° F. The water is added gradually to match the rate of the outflowing wort. The sparge water flows through the grains, extracting fermentable sugars as it goes. After this second and final collection of wort, your lautering job is done.

Homebrewers often face challenges when it comes to lautering so we asked some pros for advice.



Brewer: Rick Sanseverino is a brewer at the Valley Forge Brewing Company in Wayne, Pennsylvania. Rick attended the Siebel Institute in Chicago.

The first and most important key to effective lautering is to make sure you keep the grain bed covered with liquid. When the grain bed is uncovered, air gets entrained in the grain bed and dramatically slows the flow of sparge water through the bed.

Next, you need to get the right rate of flow. Too slow will cause a loose grain bed; floating particles will get sucked into your wort and transferred over to your boil. Too slow is anything below a moderate, unbroken flow of wort. If it trickles, the grain bed is probably compacted. Too fast can cause the bed to compact or collapse and can create crevasses in the grain. The right speed is a clear unbroken stream of wort that flows straight down. Be conscious of how much water you are using so that the grain bed doesn't get too loose.

Set the grain bed before you start lautering by raising the temperature to about 168° F. Then examine the quality of the wort as you recirculate it through the grains for a while. As the grain bed settles, it will act as a natural filter, which will help clear the wort. You want nice clarity before you start transferring over to boil.

Take gravity readings as you lauter. It should be high at first, reflecting high sugar content, then will drop as you add sparge water.



Brewer: Jon Graber has been a brewer at Mt. Hood Brewing Company in Government Camp, Oregon since 1995. He did a brewing apprenticeship with Dave Logsdon of Wyeast Labs.

We approach lautering with several thoughts in mind. Too hot or too long are two common lautering mistakes. We don't want to sparge too hot. The goal is to avoid too many tannins in the beer, and hot water (above 176° F) will extract those qualities. It also deactivates the enzymes in the grain and stops the conversion of starches to sugars, fixing the carbohydrate spectrum of the wort.

Don't lauter and sparge for too long or you risk over-extracting your beer. The final runnings will be full of haze and solids, which will be detrimental to your beer. The best way to avoid this is to not use too much water.

Make sure the grist is properly milled. I prefer it to be just barely cracked, with the husks intact and no dust. This isn't easy for the homebrewer but, to get this right, constantly check your mill setting.

Finally, make adjustments to your pH. Many brewers treat their brewing water, but don't consider the quality of their sparge water. Sparge water quality should be consistent with your brewing water.

BAYERN BREWING, INC.

Brewer: Juergen Knoeller joined Bayern Brewing Company in Missoula, Montana in 1987 as the brewmaster. In 1990 he became the brewery's owner. He has a Master's in Brewing from Doemens in Germany.

It's important to get a quality sparge, and there are many ways you can do this. First, the amount of water you use to sparge should be about the same that you use during the mash. If you use four gallons during the mash, you'll circulate this amount during lautering to clear up the wort, then add four more gallons of sparge water to draw off the excess sugars from the grains.

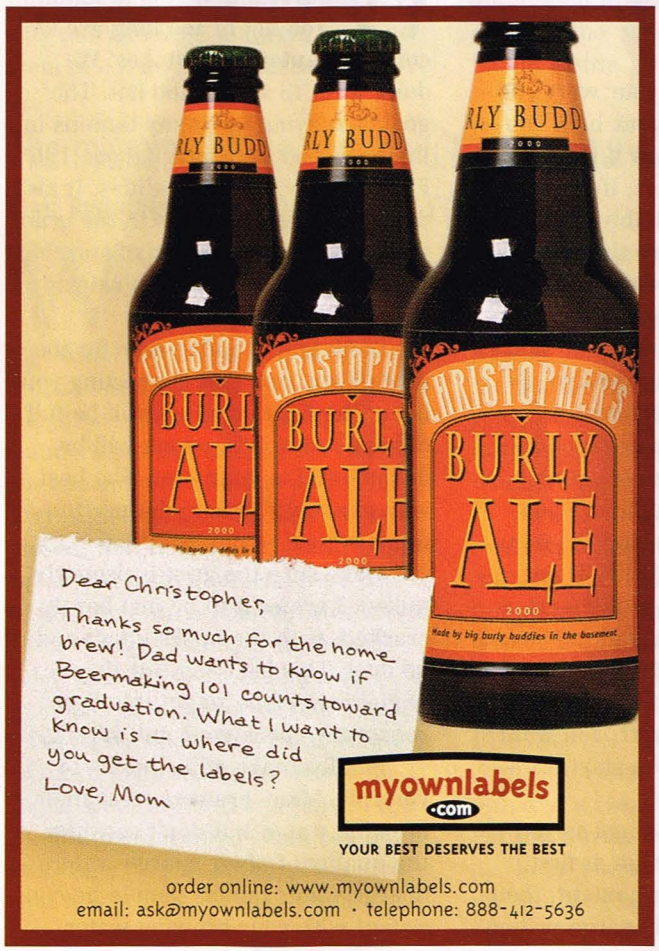
It's important to recirculate the wort long enough so that it doesn't have particles in it. You will run into fermentation problems if you have solids in the wort, since this will slime up your yeast cell surfaces and prevent them from actively fermenting. You hear from lots of homebrewers that they have a perfect brewing system but if they don't lauter correctly, they'll end up complaining that it took three weeks to get an active fermentation. This is because they didn't circulate out enough of the solids.

Ten minutes of recirculation is fine (but you should measure your success by the clarity of the wort). Just remember that brewing is a constant cleaning process, and that lautering is essentially cleaning your wort. You want clarity before you pump it over for the boil.

Also, be sure you don't run the grain bed dry. This will start to oxidize the wort, which will lead to tannic flavors in your beer. Always keep about 1/2 inch of liquid above the grain, and be sure when you start sparging that the water is around 176° F (80° Celcius). The hot water helps deactivate the enzymes in the grain that are involved in sugar conversion. It also reduces wort viscosity and increases yield.

When you're doing small batches, I think it's smart to stick a fork one or two inches into the grain bed and lightly rake through the grain to smooth it out and make it level. Lauter as normal and add sparge water in increments. For example, if you plan to use four gallons of sparge water, add it only one-and-a-half gallons at a time. Before you add each part, again lightly rake the grain. Be sure not to break up the bed, though, or you'll lose the filtering effects of the grain bed.

The goal is to extract as much fermentable sugar as possible. These tips should help you do that. ■



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"Help Me, Mr. Wizard"

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Mr. Wizard

I am a first-time homebrewer and am concerned about my primary fermentation temperature. The maker of the brew kit says to cool the wort to 70° F, then pitch the yeast into the wort in my primary fermenter. I have pitched the yeast into the fermenter but I cannot keep the temperature at 70° F. The lowest I can keep a stable temperature is between 74° to 80° F by wrapping the fermenter with wet towels and keeping a fan blowing on it. The air lock is bubbling nicely and the wort had a starting specific gravity of 1.044, which is right on the mark for the recipe. Will this higher temperature ruin my brew?

John Hallett
Litchfield Park, Arizona

Congratulations on your first brew! If you followed the directions on the kit and only departed from them by using a higher fermentation temperature, your beer should turn out fine. I am assuming you cleaned and sanitized everything properly, used a high-quality kit and fresh yeast. High fermentation temperature alone won't ruin a beer.

Temperature does play a crucial role in flavors generated from yeast during fermentation. As temperature increases, fermentation rate accelerates and with this faster fermentation come more aromatic compounds. The aromas arise because the metabolic rate is going along at such a clip that more metabolic intermediates are excreted from the yeast cell. I liken this to people getting stinky and sweaty during vigorous exercise.

"Fruity" is the most common type of aroma associated with warmer fermentations. This generic term includes aromas reminiscent of banana, pineapple and pear, which belong to a class of compounds called esters. Some esters, like ethyl acetate, smell like solvent (ethyl acetate is used in acetone-free fingernail polish remover). I don't mind fruity beers but I hate smelling fingernail polish remover when trying to enjoy a pint.

Warm fermentation also increases the alcohol concentration. High alcohol levels are known for their spicy, vinous aroma and the propensity to cause headaches. Strong beers normally have detectable levels of higher alcohols but normal gravity beers, like the one you brewed, shouldn't have a detectable level.

If you discover after bottling and aging that your beer smells fruity, solventy and vinous, the warmer fermentation is probably the culprit. You may want to investigate other methods of keeping the fermentation cool. Since you live in the hot, metropolitan area of Phoenix, you probably can't restrict your brewing to the "cooler months" of the year. If you like the hobby and have some extra space in your house, try a used refrigerator. You can buy a temperature controller through various homebrew suppliers that overrides the built-in thermostat and allows you to set the refrigerator to maintain warmer temperatures. (See our story on page 55.)

Mr. Wizard

I brewed a batch of oatmeal stout the other day and one day later, I observed a good, vigorous fermentation. However, after this one day of active fermentation, the activity dramatically slowed (to approximately one bubble every 30 seconds). I am hoping you can tell me how I can un-stick my stuck fermentation?

James Lueking
Oneida, Tennessee

The most common cause of a fermentation that takes off, then quickly slows, is poor wort aeration and/or underpitching. What you have described is actually not consistent with the term "stuck fermentation." A stuck fermentation ferments for several days but the final gravity gets "stuck" at a higher level

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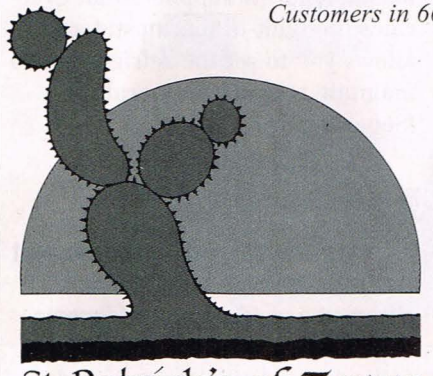
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than the true final gravity of the wort. The only way to properly diagnose a stuck fermentation is to run a forced fermentation, during which the wort is over-pitched and fermented warm. At the end of the forced fermentation you can measure the final gravity and use this number as a benchmark. Though it is effective, this is not a practical method for the homebrewer.

Stuck fermentations are frequently caused by yeast that prematurely flocculate. In most cases, the yeast have been overused and are beginning to lose some of their basic properties. Another possible cause could be nutrient deficiency in the wort (especially low levels of zinc).

Some brewers will try to rouse a stuck fermentation by racking it, or they may kraeusen the beer to try to get it to the proper final gravity. Kraeusening involves adding a small amount of new fermenting wort to a fully fermented lagering wort with the intention of creating a secondary fermentation.

In your case, I am willing to bet that you underpitched. Though you observed bubbling in the first day, this early activity can occur even if you underpitch as long as the yeast carried with it some glycogen or intracellular food. When yeast go dormant, intracellular levels of glycogen increase and this energy reserve is used to get the yeast cell going when the dormant stage is relieved. In a brewery, dormancy is relieved when a stored liquid yeast culture is warmed and tossed into aerated wort.

The other scenario is when dried yeast is re-hydrated and tossed into aerated wort. In either case, yeast will use the glycogen as a source of glucose and all of the telltale signs of fermentation will be observed.

After the yeast uses its glycogen reserve, it will then use the nutrients in the wort to continue fermenting. This is where aeration comes into play. If the wort is poorly aerated, cell growth will be restricted and you can have a very long "lag" phase, during which the popu-

lation of yeast remains flat and the fermentation rate is very slow.

The fermentation rate begins to increase as the yeast cells kick into their growth phase. At some point, yeast cell growth subsides and the fermentation rate begins to trail off. If everything went right, this point should coincide with the final gravity of the beer.

I have beaten the concept of adequate pitching rate to death in the past and I'm sure that many readers of this column are tired of hearing it. I also have harped on aeration, but not quite as aggressively. I have forgotten to aerate brews in the brewery where I work and the results have been astounding — as in "what the heck have I done?" astounding.

Worts can be aerated once fermentation begins and this technique will impact beer flavor. The traditional "Yorkshire Stone Square" method of fermentation constantly recirculates the fermenting wort through a glorified shower head. This method of rousing was apparently developed to deal with brewing yeast that are very flocculent and demand lots of oxygen. Unless you are equipped to do this, the best advice is to let fermentation slog along until it finishes. You could also pitch more yeast or kraeusen with an actively fermenting half-gallon of wort.

My diagnosis may be totally wrong, but the best thing is to learn from this experience and try to avoid repeating this mistake. If you do not currently have some sort of aeration device, such as an aquarium pump, get one. Shaking the carboy is no substitute for an aeration device that actively carries air or oxygen into wort.

If you think that you underpitched, review your pitching methods. A rule of thumb is: one cup of thick yeast harvested from a fermenter or one quart propagation per every five gallons of wort. If you simply follow this advice your future fermentations should, almost always, go off without a hitch.

Mr. Wizard

I have just started all-grain brewing and use plastic buckets for my mash-lauter tun. With my first three batches my efficiency has suffered and I am only ending up with 60 percent yield. Since I can't heat the plastic buckets, I'm only doing single temperature infusion methods. Is there a way to increase the efficiency of my current setup? Would you recommend any different equipment on the market today over what I have?

Brian Altmann
Drexel Hill, Pennsylvania

The easiest way to increase yield is to mill your malt more finely. The problem with this solution, if you're using the double bucket

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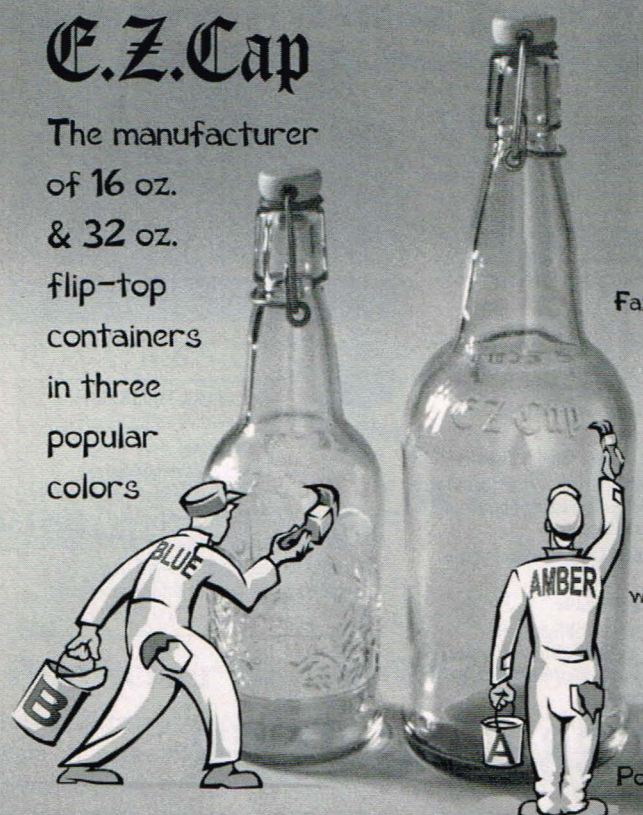


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mash-lauter system, is the holes in your bucket may be large enough to allow mash particles to escape with the wort. Plastic buckets are cheap and you could make a new bucket with smaller holes if this is an issue for you. An alternative is to use a large grain bag as a bucket liner.

Another very important parameter that affects yield is temperature. If the mash cools off during mashing and wort collection, the viscosity of the wort increases and efficiency suffers. This can be remedied by insulating your set-up and minimizing heat loss. You can insulate with an Igloo cooler or you can wrap the bucket with insulation or a blanket. Along the same lines you may find that using hotter sparge water will improve yield. Many brewers are afraid of extracting undesirable compounds, such as tannins, from the husk and sparge with water that is no hotter than 176° F.

In the case of infusion mashing with no mash-off step you can use hotter water since the mash will significantly cool the sparge water. You can use water as hot as 190° F, as long as the temperature of the wort exiting the lauter tun doesn't ever exceed 176° F.

Much of the conventional wisdom about sparge-water temperature comes from commercial breweries that heat their mash to about 168° F before transferring it to the lauter tun. These brewers don't worry about their sparge water being cooled by the mash since the two are at the same temperature and commercial lauter tuns are very well insulated.

Mashing-off, or heating the mash to about 168° F, really improves efficiency since it lowers wort viscosity. You can mash-off in your system by adding hot water to the mash. Simply stir the mash and add enough hot water to heat it to your desired temperature. If you choose to use this technique, you should let the mash settle for 10 to 20 minutes before beginning your wort recirculation. Many small brewers have systems with the same

limitations as the double-bucket method and increase their yield using this technique.

I like gadgets and fancy brewing set-ups, but I would encourage you to work with your existing system and try to improve your yield without spending more money. It is pretty tough to justify spending money on better homebrew equipment simply based on yield improvement. For example, if you brew a five-gallon batch of beer with an original gravity of 1.048, you will require roughly 7.75 pounds of malt if your efficiency is 72 percent, compared to 9.25 pounds if your efficiency is 60 percent. You can easily spend a couple hundred bucks on a fancy set-up but the investment saves you less than $2 in malt per batch. I would rather spend my money on kegs, tapping equipment and a refrigerator for fermentation!

Mr. Wizard

I would like to know if I can use a quaternary sanitizer to sanitize homebrewing equipment. This stuff is used in the food industry as a no-rinse, air-dry sanitizer. I don't want to ruin a batch of beer if it is inappropriate to use in homebrewing.

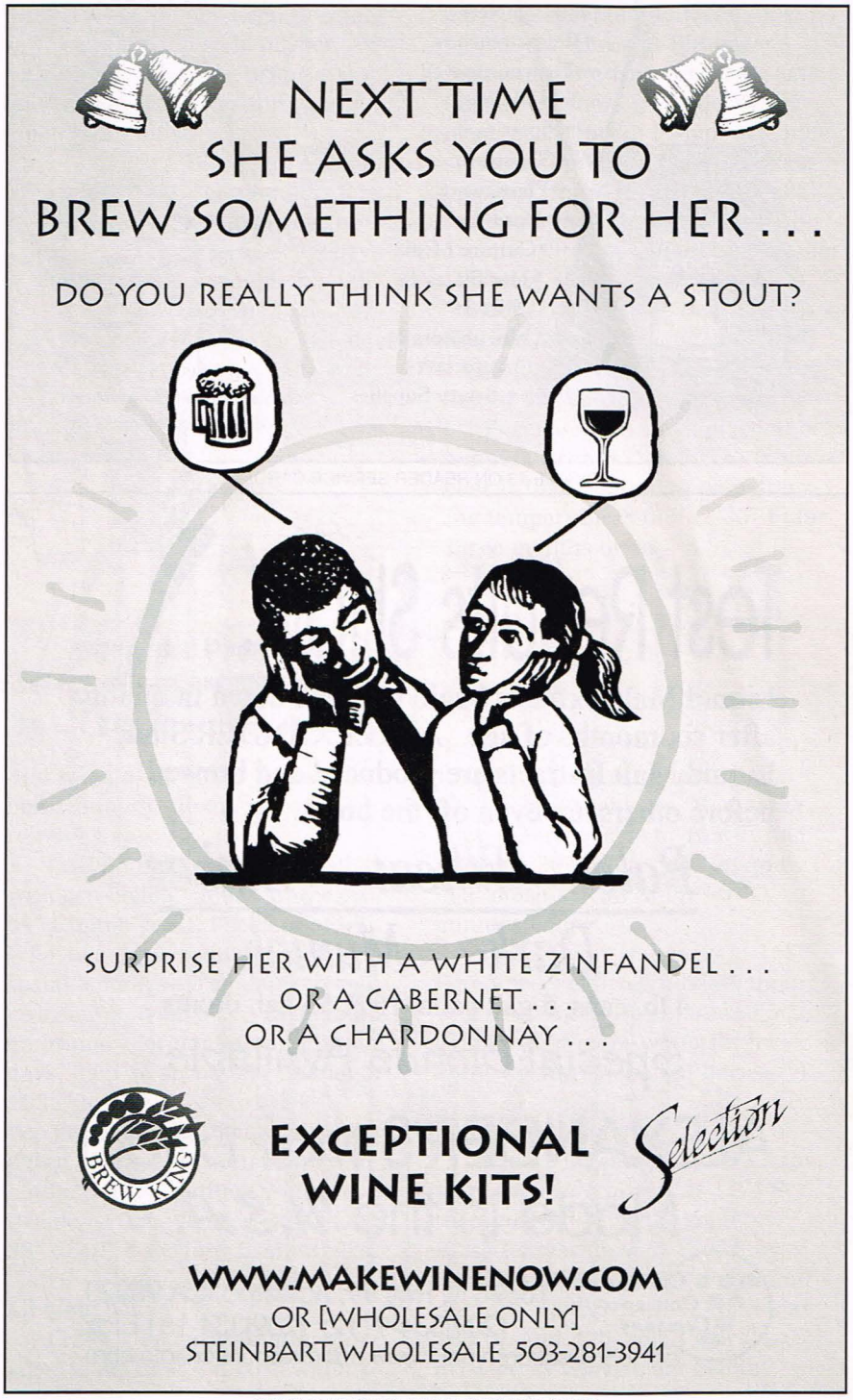
Vic Forgash
via e-mail

Quaternary ammonium compounds, frequently called "quats" or "QAC's," are very effective no-rinse sanitizers and are commonly used in the food industry for a wide range of purposes. Quats are natural wetting agents and are very similar to soap. This means that they are good at penetrating surfaces.

Quats kill a wide range of bacteria and also leave a bacteriostatic film on surfaces. This film prevents microorganisms from re-contaminating a previously cleaned and sanitized surface. Quats are frequently used to prevent the growth of microbes, especially molds and mildews, in food-processing areas. Restaurants also use quats in sinks as the final dip for dishwashing. This practice is commonly used to wash glasses in bars.

Quats are gentle on the skin, stable when stored, and maintain their effectiveness when exposed to organic soils (dirty equipment). They also leave no odor or flavor on equipment or glassware. So far, quats are sounding pretty good, but there's a catch.

In general, brewers don't use quats on beer contact surfaces because quats can ruin beer foam. Unfortunately, many bars and brewpubs use quats in their glass-washing sinks for health-code reasons and to avoid the nasty bleach aroma. When I order beer at a brewpub I ask that the glass be rinsed with water before being filled with beer because any non-rinse

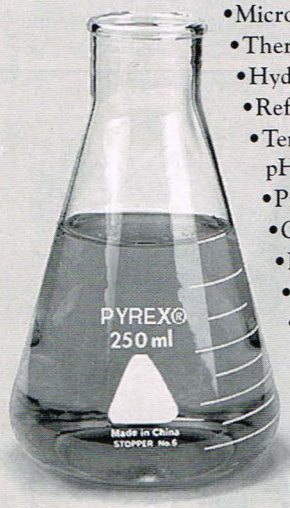


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sanitizer is bound to leave something behind that is great for public safety but lousy for beer.

That said, I do use quats in a fittings soak tank for small items and also use them to sanitize hoses and pipes. When used for hoses or pipes, I also rinse the quats out with clean water before passing beer through the line so the foam won't be destroyed. Have I mentioned how much I love beer foam?

Quats can be used to sanitize fermenters and other beer vessels, but I don't recommend them for these applications. Personally, I use a sanitizer called peroxy-acetic acid for beer vessels because it's effective and leaves nothing but water and vinegar (acetic acid) on the surface. It's also very hazardous if improperly handled. Since acetic acid is volatile, the vessel surface can be allowed to drain and dry without leaving residue. Many brewers use iodophors or chlorine-based sanitizers for beer vessels. Both are effective but also have their disadvantages. Iodophor stains porous items and chlorine can corrode stainless and impart a strong chlorine aroma to the beer.

My advice on sanitizers is to keep more than one type on hand. Quaternary sanitizers are great for certain tasks, while peroxy-acetic acid, iodophors, bleach and hot water work great for others. Just like household cleaners, one sanitizer is never going to be the best choice for all circumstances. ■

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



If you have a question for Mr. Wizard, write to him at Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255. Or send an e-mail to wiz@byo.com. If you submit your question by e-mail, please remember to include your full name and hometown.

The Replicator

Bitburger Pils from Germany

by Scott R. Russell

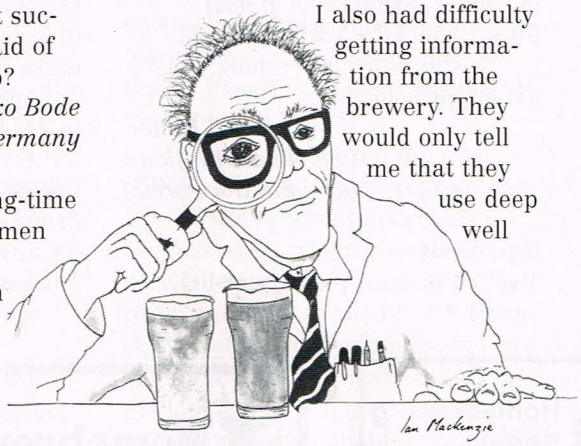


Dear Replicator,

I am a beginning homebrewer in northern Germany and I'm looking for the recipe for my favorite commercial beer, Bitburger. I tried to get information directly from the Bitburger Brewery but wasn't successful. Perhaps they are afraid of the competition. Can you help?

Aiko Bode
Frankfurt, Germany

Ahh, Bitburger. It's a long-time favorite of U.S. servicemen stationed in Germany. This beer is made in the town of Bitburg in the Eifel Lake region of Germany's Rhineland. Bright gold in color, with a flashy carbonation and lasting pearly-white head, "Bit" is a classic northern German and Scandinavian style pilsner. All-malt Bitburger uses a proprietary yeast strain that gives the beer a super-clean finish.



I also had difficulty getting information from the brewery. They would only tell me that they use deep well water, their own yeast, summer barley, Hallertau and local hops.

We can guess at Bitburger's recipe and brewing process. Some German pilsners use a decoction mash procedure. I include a simple step-mash procedure for all-grain brewers who aren't ready to tackle decoction mashing. For those who are, see "Starter Guide to Decoction Mashing" *(BYO, October 1997)* or "New Brewing Lager Beer" by Greg Noonan *(Brewers' Publications, 1996)* for the best general explanation of this procedure.

Fermentation takes place at cold temperatures (45° to 50° F). The beer is then lagered at near-freezing temperatures (33° to 35° F) for three months or so.

Bitburger Premium

(5 gallons, extract and steeping grains)

OG = 1.045 FG = 1.008 IBU = 38

Ingredients

1 lb. carapils malt
6 lbs. Muntons extra-light malt extract syrup
6 AAU Perle hops (0.75 oz. at 8% alpha acid)
6 AAU Hallertau hops (1.5 oz. at 4% alpha acid)
German lager or pilsner yeast (Wyeast 2007 or White Labs WLP830)
7/8 cup corn sugar for priming

Step by Step

Steep the carapils (cracked) in a grain bag in 3 gallons of water at 150° F for 45 minutes. Remove grains, add malt extract and stir well. Bring to a boil, add Perle hops, boil 45 minutes. Add 4 AAU Hallertau hops, boil 40 minutes. Add remaining 2 AAU Hallertau, boil 5 minutes. Remove from heat, remove hops.

Cool and top up to 5.25 gallons with pre-boiled, chilled water. At 68° F, pitch yeast. Ferment at 68° F for two days, or until bubbling is sustained. Move fermenter to cooler location, near 50° F, and continue primary fermentation for seven days. Rack to secondary and lager at 35° to 38° F, for six weeks. Warm up to room temperature for a day, prime with corn sugar and bottle. Bottle condition warm for two days, then lager in bottles at 38° to 40° F for four to six weeks.

All-grain option

Crack 1 lb. carapils and 7 lbs. lager malt. Heat 8 quarts water to 136° F, mix in grains and hold at 127° F for 30 minutes. Meanwhile, heat 5 more quarts to 165° F, add after the 30 minutes are up and hold mash at 150° F for 60 minutes longer.

Sparge with 16 quarts at 168° F and proceed from boiling, timing your boil to reduce volume to 5.25 gallons (add more water to the kettle during the boil, if necesary).

Partial-mash option

Mash 1 lb. carapils and 3.5 lbs. lager malt in 6 quarts at 127° F (heat to 136° F) for 30 minutes. Raise temperature to 150° F by adding 3 quarts at 165° F, hold 60 minutes. Sparge with 12 quarts at 168° F. Add 3 lbs. malt extract, proceed as above from boiling.

reader recipes

Red Rock Ale

(5 gallons, extract with grains)
OG = 1.065 FG = 1.013 IBU = 34

This beer was designed back when the "red" beer fad was in high gear. It's a simple, solid recipe.

Pete Norton
Seattle, Washington
(Liberty Malt Supply)

Ingredients

6 lbs. Liberty light malt extract syrup
1 lb. Liberty light dry malt extract
0.75 lb. Crisp crystal malt (80° Lovibond)
0.5 lb. Maris Otter pale malt
0.5 lb. DeWolf-Cosyns Belgian pale malt
15 AAU Cascade whole hops (2 oz. of 7.5% alpha acid)
American Ale yeast (Wyeast 1056)
3/4 cup corn sugar

Step by Step

Crack the grains and steep them in 2.5 gallons water on medium heat. Remove grains before temp. reaches 180° F. Bring to boil. Remove from heat and add extracts. Bring to boil, add 1 oz. Cascade hops, boil 30 min. Add 0.5 oz. Cascade, boil 30 min. Add 0.5 oz Cascade and steep 10 min. Remove hops. Cool, add to fermenter with enough chilled water to make 5 gallons. Aerate, pitch yeast at 70° F. Ferment at 70° F for 5 to 7 days. Rack to secondary, condition cool (60° F) for 7 to 10 days. Prime with corn sugar, bottle and store warm (68° F) for two weeks.

Maryland Kölsch

(5 gallons, extract with grains)
OG = 1.055 FG = 1.012 IBU = 32

This is a nice, refreshing, not-too-hoppy golden ale.

Don Breton
Columbia, Maryland
(Maryland Homebrew)

Ingredients

Two 3.3 lb. cans plain extra-light malt extract syrup
0.5 lb. malted wheat
1 lb. carapils malt
11.4 AAU of Spalt hop pellets (2 oz. at 5.7% alpha acid)
White Labs German Ale Kölsch yeast (WLP029)
3/4 cup corn sugar or 1-1/4 cup light DME for priming

Step by Step

Steep grains in 1.5 gallons water at 155° F for 30 min. Remove grains and bring to a boil. Remove from heat, add malt extract and stir. Return to boil, add 1 oz. Spalt hops, boil 15 min. Add 1 oz. Spalt hops, boil 25 min. Turn off heat and add to fermenter with enough water to make 5 gallons.

Aerate, pitch yeast when cooled to 74° F. Ferment 5 days at 60° to 65° F, rack to secondary and condition at 50° F for 10 to 14 days. Prime and bottle, condition at 75° F for a week, then age two to three more at a cooler temperature. ■

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CIRCLE 26 ON READER SERVICE CARD

Dunkelweizen and Tripel

A dark German wheat beer and a golden Trappist ale

2000

by Tess and Mark Szamatulski

November is synonymous with Thanksgiving, football games, tailgating parties and the unmistakeable smell of the furnace turning back on. With this in mind, this month we'll brew a luscious, malty dunkelweizen that quenches the thirst, but is substantial enough to stave off the chilly days of November. It's a quick-fermenting homebrew and should be ready to bottle or keg in three weeks, just in time for the Thanksgiving football games. Our golden Belgian tripel is also perfect for this month.The 24-karat color reminds you of the summer sun but the subtle hint of warming alcohol is welcome as the snow starts to fly.

Dunkelweizen

The "DarkWheat" Beer

OG = 1.040 to 1.056
FG = 1.010 to 1.014 IBU = 10 to 20
SRM = 10 to 23

Bavarian dunkelweizen is a spicy, malty wheat-based ale that gets its color from high-kilned barley malts and its character from wheat malt and distinctive yeast. More complex and full-flavored than a Bavarian weizen, this beer is indeed liquid bread.

In Germany, during the late 1500's, a law was passed prohibiting the use of wheat in brewing because more wheat was being used to make beer than bread. This restriction only applied to the lower classes; the clergy and nobility were still allowed to brew wheat beers. In the late eighteenth and early nineteenth century the nobility relaxed its rules and permitted the public to brew wheat beer.

This month's recipe for a dunkelweizen is our clone of Hacker-Pschorr Weisse Dark by Hacker-Pschorr Brewery in Munich. This hazy, copper-colored beer has a long-lasting, off-white creamy head. It is earthy, rich and malty with a wheat-laced aroma. Lush, smooth malt fills your mouth and quenches your thirst with a slightly nutty nuance, while the soft, malty finish leaves you wanting more. This beer tastes best when it's young so plan to drink it as soon as it's carbonated.

Commercial Beers to Try:

Many brewers make an excellent dunkelweizen. Some of the leading brands are Mönschshof Kapuziner Schwarze Hefeweizen, Franziskaner Dunkel Hefe-Weissbier, HB (Hofbräuhaus Royal Court Brewery) and Herrnbrau Hefe-Weissbier Dunkel. The breweries of Schneider, Paulaner, Augustiner, Ayinger, Spaten and Tucher also brew great examples.

The aroma should be of malt supported by fruit — most likely banana — and spicy clove aromas. The color ranges from light amber to light brown. The head should be thick, creamy and long-lasting. Because of the high volume of wheat, an unfiltered beer will be

THE YEAR IN BEER

JANUARY:
Barleywine & Roggenbier

FEBRUARY:
Cream Ale & Dublin Stout

MARCH:
Belgian Dubbel & Pilsner

APRIL:
Maibock & Scotch Ale

MAY:
IPA & Mild Ale

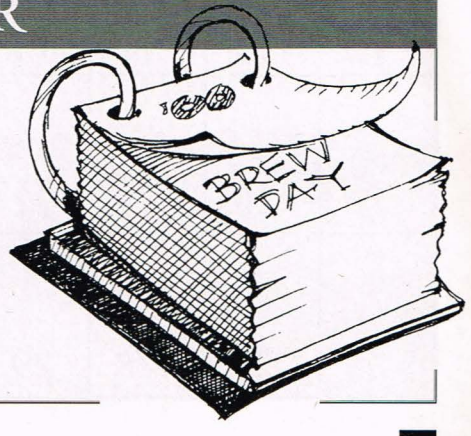
JUNE:
Golden Ale & Oktoberfest

SEPTEMBER:
Dort & Oatmeal Stout

OCTOBER:
ESB & Weizenbock

NOVEMBER:
Dunkel & Belgian Tripel

DECEMBER:
Christmas Ale & Spiced Ale



cloudy. There should be no hop flavor or aroma and the hop bitterness should be low. The wheat flavor should be apparent along with the caramel character of darker roasted malts, such as Munich and Vienna. This beer can also have a spicy, fruity flavor.

Hops, Malt and Yeast:

The hops used are typically from the Hallertau region: Spalt, Hersbrucker or Mittelfrüh.You can substitute Saaz, Tettnanger or Perle.

At least 50 percent of the grist should comprise wheat malt with Munich or Vienna added for color, mouthfeel and depth of flavor. A bit of chocolate malt (not more than 1 ounce per five-gallon batch) can be added for additional color.

The best yeast choices are Wyeast 3638 (Bavarian Weizen) for a slightly sweeter dunkel or Wyeast 3068 (Weihenstephan) for more clove, apple and banana notes. You can also use White Labs WLP300 (Hefeweizen Ale). Prepare a yeast starter and aerate the wort vigorously. Wheat yeasts will ferment very sluggishly below 65° F, so be sure to keep the temperature at approximately 68° F.

Serving Suggestions:

Serve dunkelwiezen in a traditional wheat beer glass at 48° F (9° C) with a grilled bratwurst sandwich piled high with caramelized onions, sauerkraut and a spicy German mustard.

Hacker Pschorr Weisse Dark

(5 gallons)
OG = 1.055 to 1.056 FG = 1.011 to 1.012 IBU = 13

Ingredients

8 oz. German Munich malt
7 oz. Belgian cara-Munich malt
1 oz. British chocolate malt
6.25 lbs. Muntons wheat dry malt extract (DME)
4 AAUs Tettnanger bittering hops (1 oz. at 4% alpha acid)
1 pt. starter of Wyeast 3068 (Weihenstephan Weizen)
1-1/4 cups Muntons wheat dry malt extract for priming

Step by Step

Bring one gallon of water to 155° F, add crushed grain and hold for 30 minutes at 150° F. Strain the grain into the brewpot and sparge with one gallon of 170° F water. Add the dry malt and bittering hops. Bring the total volume in the brewpot to 2.5 gallons. Boil for 60 minutes then remove pot from stove.

Cool wort for 15 minutes in an ice bath or chill with wort chiller. Strain into the primary fermenter and add water to obtain 5-1/8 gallons. Add yeast when wort has cooled to below 80° F. Oxygenate-aerate well. Ferment at 68° F for 7 days. Rack into secondary (glass

November 2000

S	M	T	W	THURSDAY	F	SATURDAY
			1	PREP DAY • Prepare starter for dunkelweizen	2	3
4	BREW DAY • Brew dunkelweizen • Record original gravity • Ferment in primary for 7 days • Check ESB, prime and bottle if ready					
5	6	7	8	PREP DAY • Prepare starter for tripel	9	10
11	BREW DAY • Rack dunkelweizen to secondary • Brew tripel and record OG • Check FG on wiezenbock, prime and bottle if desired gravity is reached.					
12	13	14	15	16	17	TRANSFER DAY • Rack tripel to secondary
18						
19	20	21	22	23	24	BOTTLE DAY • Check gravity of dunkelweizen • Prime and bottle if desired gravity is reached
25						
26	27	28	29	30		

carboy). Ferment until target gravity has been reached and beer has cleared (approximately 3 weeks). Prime and bottle. Carbonate at 70° to 72° F for 2 to 3 weeks. Store at cellar temperature.

Partial-Mash Option: Mash 1.25 lb. German two-row pilsner malt, 1 lb. German wheat malt, 4 oz. rice hulls or oat hulls and the specialty grains in 1 gallon water at 150° F for 90 minutes. Sparge with 2 gallons water at 168° F. Then follow the extract recipe, omitting 1.75 lb. of Muntons wheat dry malt extract from the boil.

All-Grain Option: Mash 4 lb. German two-row pilsner malt, 5.67 lb. German wheat malt, 8 oz. rice hulls or oat hulls and the specialty grains in 3 gallons of water at 149° F for 90 minutes. Then sparge with 5 gallons of water at 168° F. The total boil time is approximately 90 minutes. Add 1 oz. of Tettnanger (bittering hop) for the last 60 minutes of the boil.

Belgian Tripel

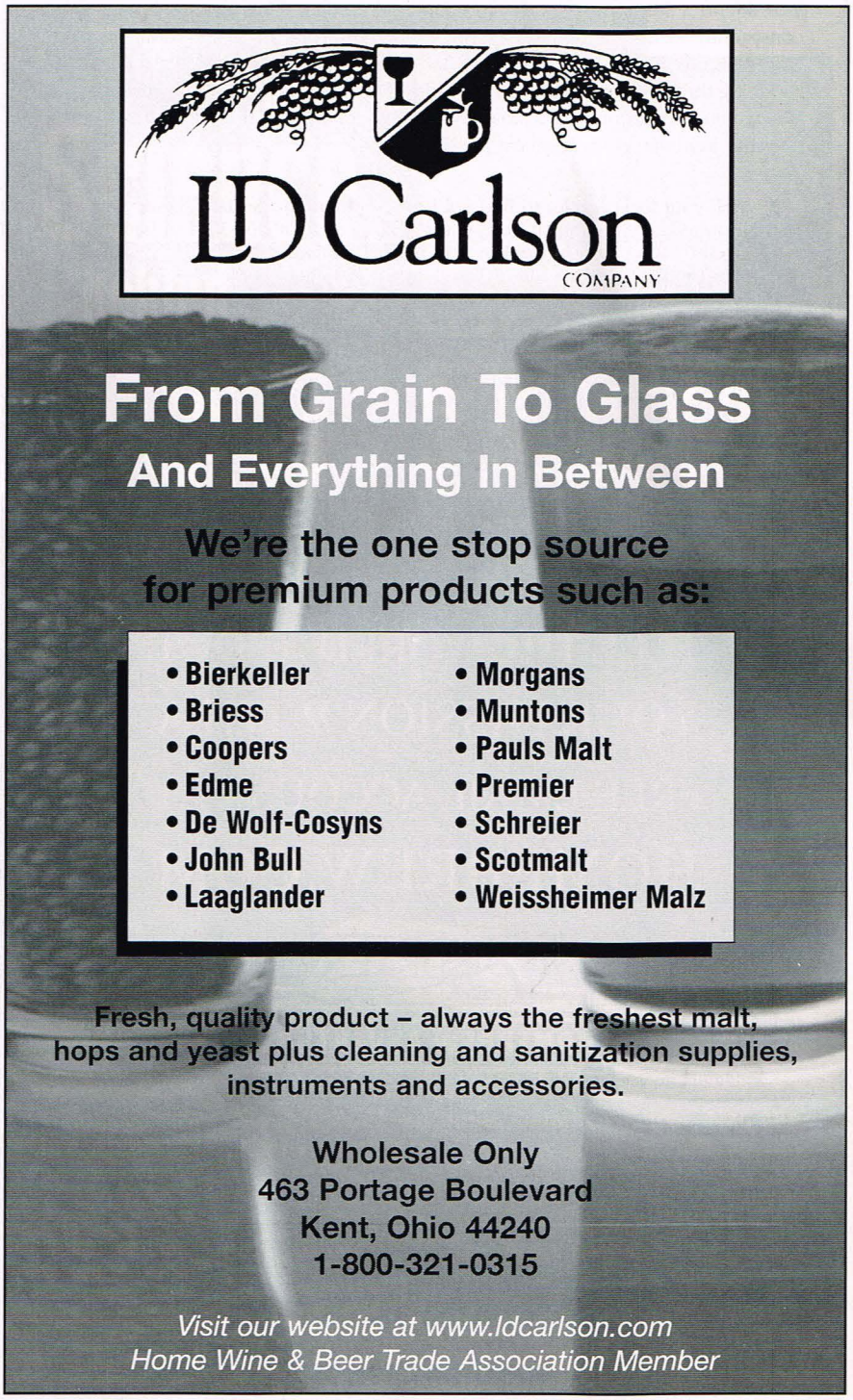
A Popular Abbey Beer

OG = 1.065 to 1.095
FG = 1.013 to 1.020 IBU = 20 to 35
SRM = 3.5 to 6

Belgian tripel is a pale to deep gold beer with good clarity. Head retention is good and long lasting with intricate Belgian lace, except in the higher-alcohol versions, in which the alcohol can affect the head. The aroma is well-balanced and complex with malt, citrus-like fruity esters and a mild to moderate clove-spice character. Hop aroma is moderate to little with no diacetyl. The flavor is crisp and moderately fruity. Malty sweetness is balanced by mild hop bitterness and high carbonation to provide a dry finish and sweet aftertaste. Some examples have a clove-like spiciness. There will be a subtle to apparent alcohol presence depending on the strength of the beer. The use of candi sugar gives it a medium body, though it appears to be light. Warming alcohol and high carbonation does not disturb the smoothness of a tripel.

This style was developed by the monks from the abbey of Westmalle, which dates back to 1794. Their tripel is a classic, copied by many breweries. By Belgian law, only beer brewed at a Trappist monastery may be called a Trappist beer. All other commercial reproductions must be called "abbey beers."

Our recipe is in the vein of Westmalle. It has a creamy head with crystalline sheets of Belgian lace. The color is a brilliant gold with orange highlights. The complex aroma is redolent of spicy Saaz hops and aromatic malt, leading to a lively palate with notes of spicy hops, orange fruit, malt and a subtle alcohol suggestion. The finish is light with restrained hops. Tripels



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CIRCLE 25 ON READER SERVICE CARD

are at their best 3 to 6 months after fermentation is complete.

Commercial Beers to Try:

The classic is Westmalle, but there are many more. A few of our favorites are: Bosteels Tripel Karmeliet, a very complex, creamy tripel; a lovely spicy version called Bruges Tripel; the Corsendonk Abbey Pale (Agnus Dei); and Tripel Petrus, a darker example with a sweet palate.

Hops, Malt, Yeast and Adjuncts:

Many varieties of hops can be used in tripels. Czech Saaz and Styrian Goldings are popular, along with the German Tettnanger. English Fuggles have also been used.

Pale pilsner malts, Belgian two-row pale malts, Belgian aromatic and biscuit malts are the typical malts used in this style.

Yeast plays a very distinctive role with strains that are alcohol tolerant and impart some spiciness to the beer. Some strains that work quite well are: Belgian Abbey and Belgian Abbey II (Wyeast 1214 and 1762), Trappist High Gravity (Wyeast 3787) and Belgian Strong Ale yeast (Wyeast 1388).

Clear candi sugar is added, giving a smoothness to the beer and adding undertones of alcohol. You can also use small amounts of spices, such as coriander, grains of paradise and sweet or bitter Curacao orange peel.

Serving Suggestions

Serve at 50° F in a Belgian chalice glass with lobster and asparagus crepes bathed in a delicate sauce of shallots, cream and tripel.

Classic Belgian Tripel

(5 gallons)
OG = 1.084 to 1.086 FG = 1.017 to 1.019 IBU = 25

Ingredients

4 oz. Belgian aromatic malt
3 oz. Belgian biscuit malt
8.5 lb. Muntons extra light dry malt extract (DME)

1.5 lb. Belgian clear candi sugar
7 AAU of Styrian Goldings bittering hops (1.5 oz. at 4.7% alpha acid)
2.5 AAU Styrian Goldings flavor hops (0.5 oz. at 5% alpha acid)
1 tsp. Irish moss
1 AAU Czech Saaz aroma hops (0.25 oz. at 4% alpha acid)
1 pt. starter of Belgian Strong Ale yeast (Wyeast 1388) or Abbey Ale yeast (White Labs WLP530)
1 cup corn sugar for priming

Step by Step

Bring one gallon of water to 155° F, add crushed grain and hold for 30 minutes at 150° F. Strain the grain into the brewpot and sparge with one gallon of 170° F water. Add the dry malt, candi sugar and bittering hops. Bring the total volume in the brewpot to 3.5 gallons. Boil for 45 minutes then add the flavor hops and Irish moss. Boil for 13 minutes and add the aroma hops. Boil for 2 more minutes then remove pot from stove.

Cool wort for 15 minutes. Strain into the primary fermenter and add water to obtain 5-1/8 gallons. Add yeast when wort has cooled to below 80° F. Oxygenate-aerate well. Ferment at 70° to 72° F for 7 days.

Rack into secondary (glass carboy). Ferment until target gravity is reached and beer is clear (approximately 5 weeks). Prime and bottle. Carbonate at 70° to 72° F for 3 to 4 weeks. Store at cellar temperature.

Partial-Mash Option: Mash 2.75 lb. Belgian two-row pilsner malt and the specialty grains in 1 gallon water at 150° F for 90 minutes. Sparge with 2 gallons water at 168° F. Follow the extract recipe, omitting 2 lb. of Muntons extra-light dry malt extract from the boil.

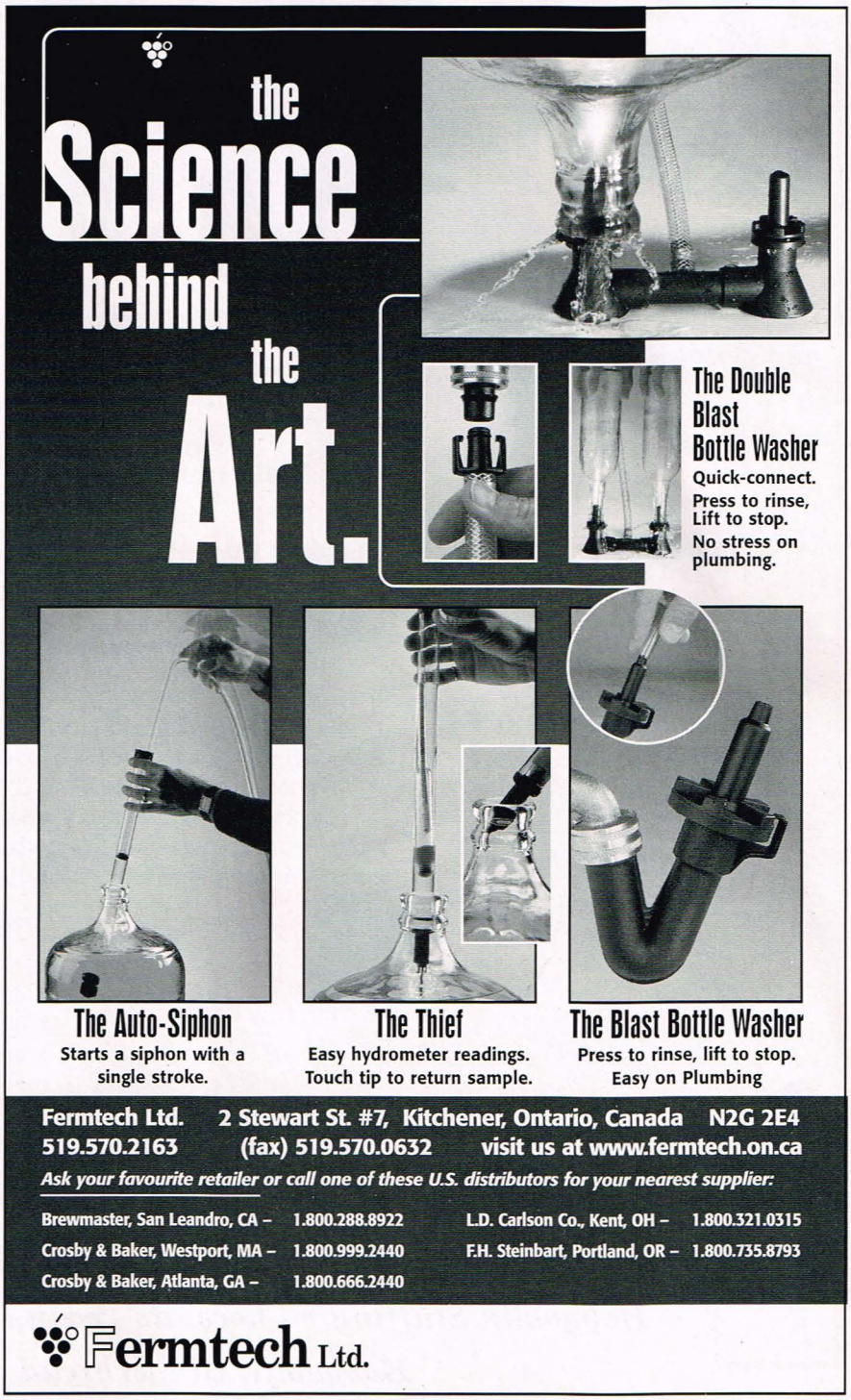
All-Grain Option: Mash 13.75 lb. Belgian two-row pilsner malt and the specialty grains in 3.5 gallons of water at 150° F for 90 minutes.

Sparge with 6 gallons of water at 168° F. The total boil time is approximately 150 minutes. Add 5 AAU of Styrian Goldings (bittering hop) for the last 90 minutes of the boil. Then add flavor hops and Irish moss for the last 15 minutes of the boil and add the aroma hops for the last 2 minutes.

If you don't happen to have the capacity to mash this amount of grain, omit 5 lbs. of the German pilsner malt and add 3 lb. Muntons extra-light dried malt extract (DME) to the boil.

You will then need only 2.5 gallons of water for the mash and 5 gallons of sparge water. This will also reduce your boil time to approximately 90 minutes. *(For another tripel recipe, see "Dubbel Vision" on page 32.)* ■

Tess and Mark Szamatulski are the owners of Maltose Express in Monroe, Connecticut.



CIRCLE 16 ON READER SERVICE CARD



Hobgoblin Ale

Sweet Potato Biscuits • Beer-Basted Turkey • Beer Gravy

Hobgoblin Stuffing • Chocolate Pecan Hobgoblin Pie

Hobgoblin Gingerbread

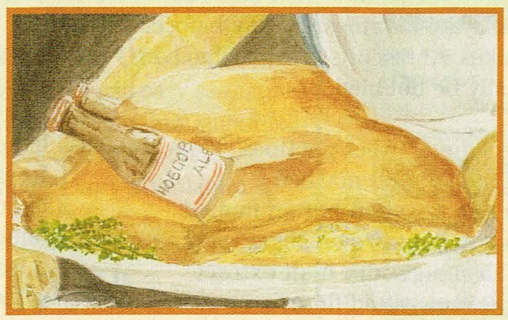
ILLUSTRATION BY IAN MACKENZIE

A Homebrew HOLIDAY

By Tess and Mark Szamatulski

Thanksgiving is a day to celebrate our family and friends, good health and all the wonderful things that have happened in the past year. It is a traditional holiday for us, from holding hands around our dining room table and expressing our thanks, to brewing and enjoying a special holiday beer. It is a day of festivity, activity and relaxation; everyone is welcome and the house is always full.

Of course, homebrew is the drink of choice. The only criteria we have for our holiday beer is that it must appeal to a wide range of family and guests and be a good beer to cook with, since all of our favorite recipes include beer as a key ingredient. This year we have found the perfect Thanksgiving beer: Hobgoblin, a deliciously malty English ale that should please all of your holiday guests. The malt profile and mild bitterness make it a perfect beer to cook with. It has a long-lasting head and a copper color with plum highlights. The nose is malty; roasted grains and a hint of spicy hops lead to a mouth-watering bloom of malt on the palate, followed by rich dried fruit and hops. The finish is a well-balanced blend of malt and hops.



Plan ahead to make sure you have plenty of this beer available on Thanksgiving Day. Hobgoblin will take approximately three weeks to ferment. You can keg it to be sure that it will be ready for your feast, or bottle and keep it at an even 72° F until carbonated (ten days to two weeks).

Brew a batch of ***Hobgoblin Ale,*** *then use the beer to create a Thanksgiving feast.*

Here are our recipes for Hobgoblin Ale and a mouth-watering holiday feast. As you'll see, almost every dish is accented by a dash of homebrew.

Hobgoblin Ale (5 gallons)

OG = 1.059 FG = 1.016
SRM = 17.5 IBU = 28

Ingredients

6 oz. British crystal malt (55° Lovibond)
1 oz. British chocolate malt
0.5 oz. British black malt
6.5 lbs. Muntons extra light dry malt extract (DME)
4 oz. malto dextrin
7 AAUs Progress bittering hops (1 oz. of 7% alpha acid)
3.4 AAUs Styrian Goldings flavor hops (0.66 oz. of 5% alpha acid)
2.5 AAUs Styrian Goldings aroma hops (0.5 oz. of 5% alpha acid)
1 tsp. Irish moss
London Ale yeast (Wyeast 1028) or English Ale yeast (White Labs WLP002)
0.75 cup corn sugar for priming

Step by Step

Heat 1 gallon of water to 155° F. Add grain and steep at 150° F for 30 minutes. Strain the grain water into the brew pot. Sparge the grains with 0.5 gallons of 150° F water. Add the malt extracts, malto dextrin and bittering hops. Add water until the total volume is 2.5 gallons. Boil for 45 minutes then add 0.66 oz. of Styrian Goldings flavor hops and Irish moss. Boil for 13 minutes and add 0.5 oz. of Styrian Goldings hops. Boil for 2 minutes. Remove the pot from the stove and cool for 15 minutes. Strain the cooled wort into the primary fermenter and add cold water to obtain 5 gallons. When the wort is below 80° F, pitch the yeast and aerate well. Ferment in the primary at 68° to 72° F for 5 to 7 days.

Rack to the secondary and let ferment at 70° F for 2.5 to 3 weeks until target gravity is reached. Bottle and let prime at 70° to 72° F for 2 weeks. Store at cellar temperature. Serve in a pint glass at 50° F.

Partial-Mash Option

Mash 2 lbs. Maris Otter two-row pale malt with specialty grains at 150° F for 90 minutes. Then follow the extract recipe, omitting 1.5 lb. Muntons extra light dry malt extract at the beginning of the boil.

All-Grain Option

Mash 10.75 lbs. Maris Otter two-row pale malt with the specialty grains at 150° F for 90 minutes. Add 5.3 AAU Progress bittering hop (24% less than the extract recipe) for 90 minutes. Add the Irish moss, flavor and aroma hops as indicated in the extract recipe.

Fast Fermentation

Here are some tips to ensure a speedy fermentation, so your Hobgoblin is ready for the holiday. Oxygenate-aerate your wort very well. This will ensure that your yeast will get off to a quick start. Use one of Wyeast's ready to pitch XL packs. If you keg this beer it will be ready to drink in 24 hours. If you are priming, make sure the beer is kept at 72° F for 2 weeks so that it will carbonate.

Sweet Potato Hobgoblin Biscuits

When our children were little, this was the only way we could convince them to eat sweet potatoes. If you want to maintain the tradition of sweet potatoes on the holiday table, try these delicious biscuits (just don't tell the kids what's in them). These are quick and easy to make. Just boil and mash the potatoes the day before. Makes 12 biscuits. This recipe can easily be doubled.

2 medium sweet potatoes, boiled and mashed
1/2 cup unsalted butter, melted
1/4 cup light brown sugar, packed
1 Tbsp. light dry malt extract
2-1/4 cups sifted flour
1 Tbsp. baking powder
1/2 tsp. baking soda
1/2 tsp. ground cinnamon
2/3 cup buttermilk
1 Tbsp. Hobgoblin Ale
1 Tbsp. pure maple syrup

Heat oven to 375° F. Measure 1 cup of sweet potato puree into a bowl. Add butter, brown sugar and malt and beat until smooth. Sift dry ingredients together and add alternately with the buttermilk to the potato mixture, beginning and ending with dry ingredients. Transfer the dough to a well-floured board. Knead 5 to 6 times and roll to 1-inch thickness. Cut out with a round or fluted cookie cutter of roughly 2.5-inch diameter. Place on a parchment-covered baking sheet.

Combine the beer with the maple syrup and brush onto the biscuits. Bake for 20 to 25 minutes until golden and puffed. Serve warm with whipped butter and drizzled with maple syrup.

Hobgoblin Turkey

This is one of the most delicious recipes you will ever make. We use a Cajun injector, available at Metal Fusion (800-783-3885) for $6.45. They also are sold at Walmart and K-Mart stores. This is optional, but it's a great way to have a butter (and beer) basted turkey. If available, purchase a natural, free-range bird. Don't count on many leftovers from this turkey! Serves 10 to 12.

One 20 lb. fresh turkey
Kosher salt
1 tsp. freshly ground black pepper
1 large head of garlic, roasted with olive oil and salt and puréed with 1 tsp. salt
16 oz. Hobgoblin Ale or a malty, English substitute (Fullers ESB or Young's Special London Ale)
10 oz. best-quality apricot jam (substitutions can be made, such as orange marmalade or blackberry jam)
3 lemons
1 fresh sage leaf (optional)
2 oz. unsalted butter
1 lemon sliced thin and 6 sage leaves for garnish
(Optional injecting mixture: 4 oz. unsalted melted butter, 2 oz. Hobgoblin and 2 oz. strained apricot jam).

Inject the turkey before cooking by plunging the needle into the turkey

and slowly pulling it out, injecting the mixture little by little so that all layers of the turkey receive the jam mixture. Inject the turkey's breast, thighs and legs.

Heat the oven to 375° F. Rinse the turkey and pat dry. Salt the turkey inside and out. Rub the garlic puree over the turkey, in the cavity and under the skin. Tuck the sage leaves and one thinly sliced lemon under the skin of the turkey.

Cut the remaining two lemons in half. Stuff them into the cavities of the turkey. Transfer the turkey to a rack in the roasting pan. Heat the butter, beer and jam until the jam is melted; do not boil. Cook the turkey for 45 minutes. Then pour one half cup of the jam sauce over the turkey. Keep basting with the jam sauce until it is finished.

Cover the turkey if it begins to brown too fast. If the juices in the pan start to caramelize, add turkey or chicken stock to de-glaze. The turkey is done when it registers 180° F in the thickest part of the thigh (the cooking time should be approximately 12 minutes per pound). Cover the roasted bird and let rest 20 minutes before carving. Garnish with sage leaves and lemon slices before serving.

Stock for Gravy

Neck and giblets from the turkey
1 Tbsp. unsalted butter
1 tsp. kosher salt
1 small onion chopped (with skin)
1 carrot, chopped
1 stalk celery, chopped
1 clove garlic, crushed
6 cups cold water

While the turkey is in the oven, make the stock for the gravy. Melt the butter in a saucepan, add the turkey neck and giblets, and sauté them until brown. Next add the onion, carrot, celery, garlic, salt and 6 cups of water.

Simmer for two hours. Strain and skim off fat and set aside.

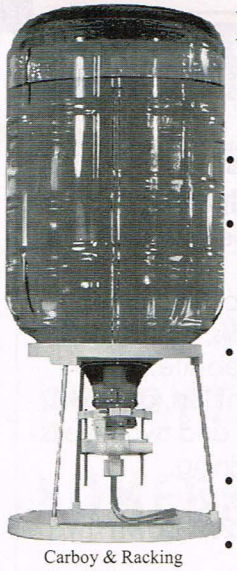
Hobgoblin Gravy

Pan drippings from the turkey with fat skimmed
1/2 cup unbleached flour
4 Tbsp. unsalted butter
5 cups turkey stock, heated
1/4 cup Hobgoblin Ale
2 Tbsp. apricot jam
Salt and pepper to taste

Melt the butter in a saucepan. Add the flour and whisk for two minutes. Stirring constantly, add the gravy stock, Hobgoblin Ale and jam. Simmer for five minutes and add pan drippings with the brown bits scraped from the bottom of the pan. Simmer until thick. Serve in a pre-heated gravy bowl.

Hobgoblin Stuffing

This is our basic turkey stuffing recipe. Feel free to use some of the options that we list below — or substitute your own favorite ingredients. We love to put hot Italian sausage in ours!


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CIRCLE 9 ON READER SERVICE CARD

24 slices country white bread, cut into 1/2-inch cubes
8 Tbsp. butter
1-1/2 cups onions, chopped
1 cup celery, chopped
1/2 cup carrot, chopped
2 Granny Smith apples peeled, cored and chopped
2 cloves of garlic, minced
1-1/2 tsp. sage powder
1-1/2 tsp. kosher salt
1/4 tsp. black pepper
1/4 cup flat leaf parsley, minced
1 tsp. fresh thyme leaves, minced
1/8 tsp. cayenne pepper
1/2 cup Hobgoblin
Hot turkey or chicken broth to moisten
Options: Substitute corn bread for white bread, add sautéed sausage, mushrooms (sautéed with the vegetables), chestnuts, pine nuts, dried cranberries or dried apricots.

Sauté the onion, celery and carrot in butter until soft. Add the apples and garlic. Sauté for three minutes and add the herbs and spices. Sauté two minutes longer, add the beer and cover. Simmer until vegetables are tender. Add the bread and enough broth to moisten. Bake covered in a 350° F oven until heated through. Uncover for 10 minutes. To serve, spoon on gravy, sprinkle with parsley and paprika.

Chocolate Pecan Hobgoblin Pie (makes two 9-inch pies)

Make your own crust or purchase them ready-made and frozen.

6 large eggs
1 cup dark corn syrup
1/2 tsp. cinnamon
1 tsp. pure vanilla extract
1 cup whipping cream
1/2 tsp. salt
2 cups sugar
4 Tbsp. unsalted butter
4 oz. bittersweet chocolate, melted
1 Tbsp. Hobgoblin
7 cups pecan halves (24 oz.)

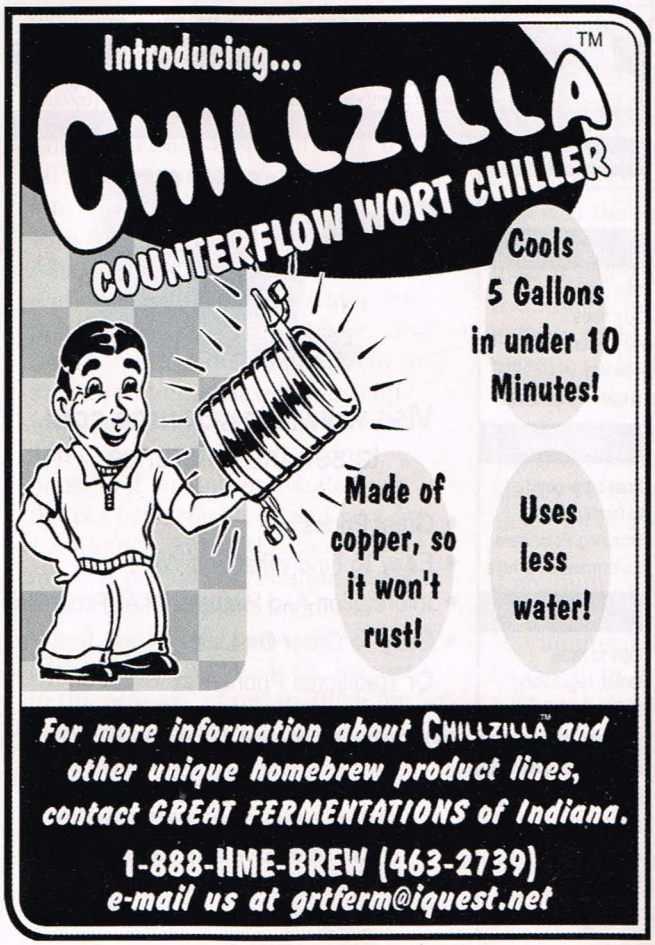
Preheat oven to 350° F. Add to a blender, in order: 3 large eggs, 1/2 cup cream, 1/2 cup corn syrup, 1/4 tsp. salt, 1/4 tsp. cinnamon, 1 cup sugar, 1/2 tsp. vanilla, 2 Tbsp. butter.

Blend for 5 seconds and add 2-1/2 cups pecans. Blend until nuts are coarsely chopped. Pour filling into one pie shell. Repeat for the second pie. Arrange 1/2 of reserved pecans on top of each pie. Bake for 20 minutes. Drizzle chocolate mixture over each pie and bake for approximately 15 minutes, until crusts brown and fillings puff. (Cover with foil if they brown too quickly). Pies should be firm around edges and slightly soft in the center. Cool on racks.

Hobgoblin Gingerbread

This holiday dessert is spicy, moist and delicious!

1 cup unsalted butter, softened
1 cup dark brown sugar
2 large eggs
1 cup molasses (not blackstrap)



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1 tsp. pure vanilla extract
3 cups sifted, unbleached flour
1-1/2 tsp. salt
1-1/2 tsp. baking soda
1 tsp. ginger
1 tsp. cinnamon
1/4 tsp. ground cloves
1 cup Hobgoblin, heated to 140° F
1 cup raisins (heat them with the beer so they plump)
Optional: 1/4 cup chopped crystallized ginger, 1 cup dried cranberries in place of the raisins, 1/2 cup chopped walnuts.

Heat oven to 350° F. Cream the butter and sugar until fluffy. Beat in the eggs, molasses and vanilla. Sift dry ingredients and add to molasses mixture alternately with heated beer and raisins, beating after each addition. Stir in raisins. Pour into a greased 9 x 12 inch pan and bake 40 to 45 minutes. Serve warm with heavy cream whipped with superfine sugar, vanilla extract and a pinch of ginger. ■

Appetizers

APPETIZERS SHOULD BE simple. A crudité platter is perfect and can be prepped the day before and assembled just before guests arrive. Line the platter with kale, then garnish with fresh flowers and gourds for a beautiful presentation.

Choose an assortment from the following list: broccoli and cauliflower florets, carrots, green beans, snap peas, button mushrooms, sliced red, green, yellow and orange peppers, celery, jicama, cherry or grape tomatoes, English cucumbers, endive, yellow and green squash, radishes, different varieties of olives, Italian cured sausage (soppressata), assorted cheeses, crackers and breadsticks.

Make some delicious roasted red pepper, smoky tomato or hummus dips and serve them in hollowed-out peppers or cabbage.

Veggies on the Side

Try these dishes to round out your feast. We serve a salad and one or two vegetable dishes.

Tossed salad of baby greens with a lemon-mustard vinaigrette
Broccoli and cauliflower in a brown butter sauce
Roasted root vegetables with a maple glaze
Spinach, tomato, feta cheese and kalamata olive casserole
Sautéed celery, corn and red pepper medley
Whipped butternut squash, sweet potato or yam
Buttered turnips
Brussels sprouts and baby carrots topped with Canadian bacon

Tess and Mark Szamatulski own Maltose Express in Monroe, Connecticut. They are the authors of the newly released "Beer Captured" (Maltose Press) and "Clonebrews" (Storey Books).

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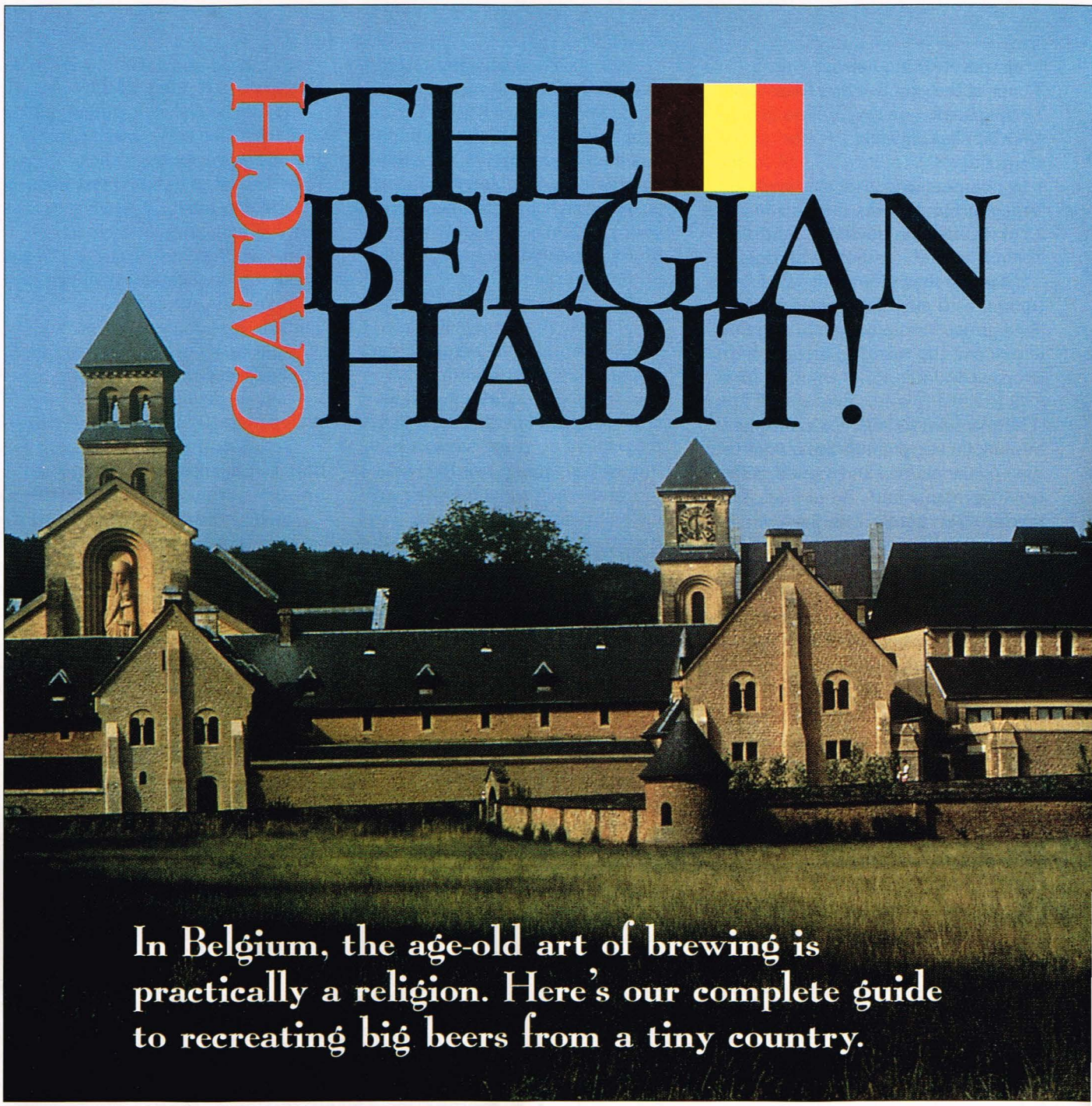
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CATCH THE BELGIAN HABIT!

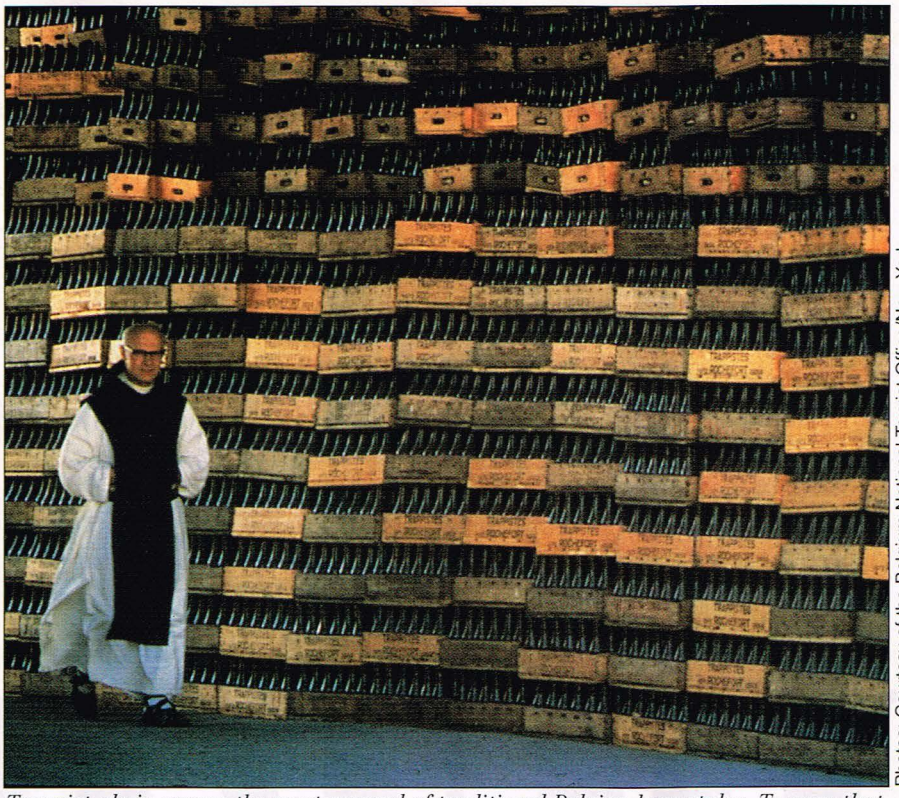
In Belgium, the age-old art of brewing is practically a religion. Here's our complete guide to recreating big beers from a tiny country.

Belgium has more breweries per capita than any other country in the world. The tiny European nation is no larger than the state of Ohio, yet it supports 60,000 cafes and more than 150 breweries. Belgians rank in the top ten for beer consumption by population, rivaling such beer-loving nations as Germany, Ireland and the United Kingdom.

The nation's passion for beer is linked with a love for fine food. "Even the most basic café will stock Belgian beers in five or six styles," writes Michael Jackson in *The New World Guide to Beer*. "There are also restaurants devoted to 'cuisine a la biére.' Each course of the meal has been prepared with a different beer; yet another beer will be suggested to accompany each course." Each spring, hop shoots are savored as a seasonal delicacy; the hop vines are culled, trimming the weak to favor the strong. The young, bristly hop shoots are then steamed and sautéed, served as a vegetable that resembles asparagus in flavor.

Belgians have been brewing since long before the advent of hops, which weren't added to beer until the late 1300s. The patron saint of beer in Belgium is St. Arnold the Strong, who lived and worked in what's now France in the 7th century. According to legend, St. Arnold was a great promoter of beer for health reasons, warning



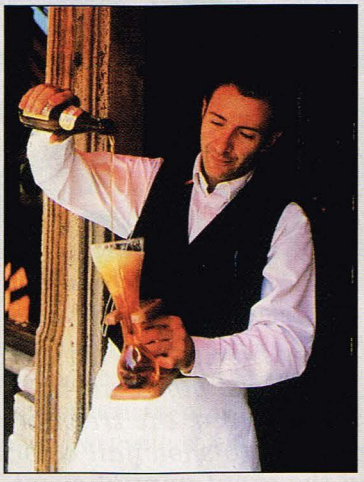


Photos: Courtesy of the Belgium National Tourist Office/New York

Trappist ale is among the most revered of traditional Belgian beer styles. To earn that coveted designation, the beer must be brewed by monks in a Cistercian abbey.

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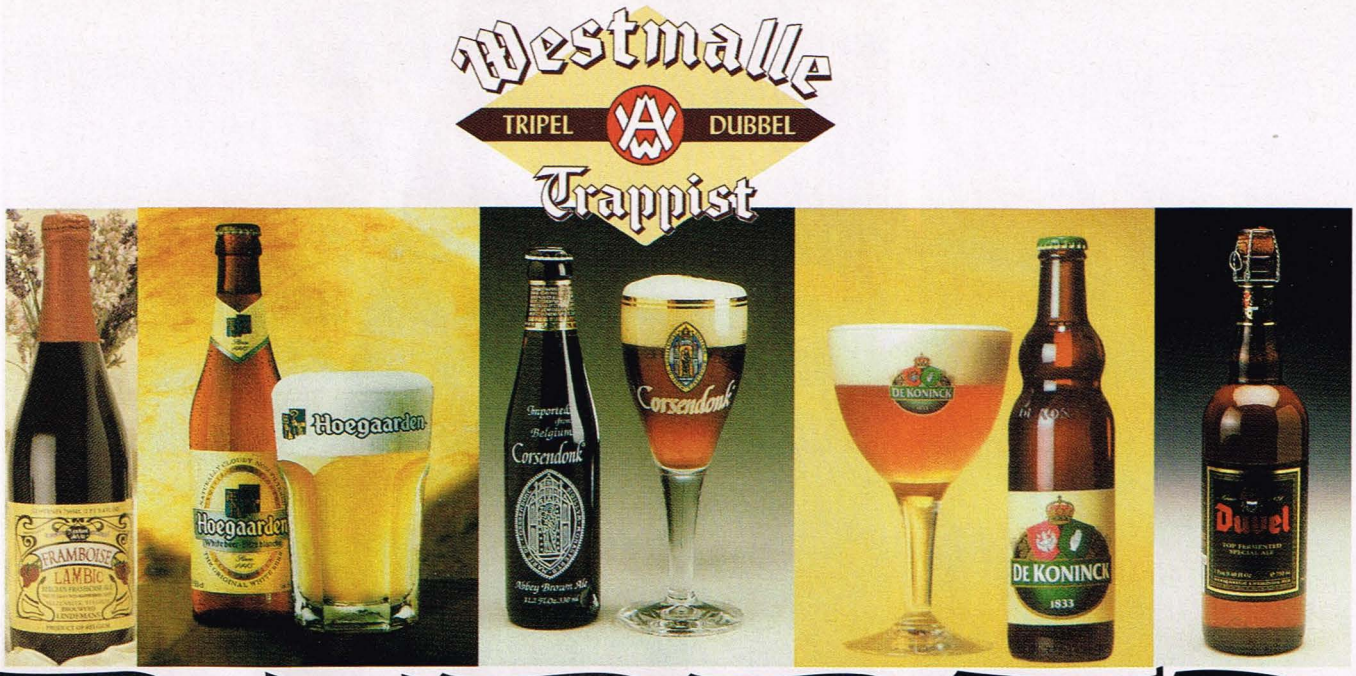


peasants to choose the barley brew over water, which was always of dubious quality in the Middle Ages. Because it was boiled, beer was safe and a healthier choice.

St. Arnold is reported to have written, "From man's sweat and God's love, beer came into the world." That sentiment is echoed in an inscription on the wall of the Confederation of Belgian Brewers in Brussels' Grand Palace: "From the boundaries of heaven and earth, by grace of Saint Arnold, and through human skill was born beer, a gift of the gods." Several beer miracles are attributed to Saint Arnold, each reminiscent of Jesus' miracle of wine at the Canaan wedding.

St. Arnold's likeness appears in painting, sculpture and stained glass throughout Belgium's brewery community. Beer is also featured in the festive peasant celebrations so famously portrayed by the Flemish artist Pieter Breughel the Elder. The libation of choice in "Peasant Wedding" is beer — mostly likely, some sort of spontaneously fermented precursor to modern lambic.

In Belgium, beer is something to celebrate. We're honoring that long tradition with a 19-page collection of articles that will help you make authentic Belgian beers at home. Remember, as the words above one Belgian monastery read: "In heaven, there is no beer. Therefore we must drink it here." *—Sal Emma*



DUBBEL Vision

By Scott R. Russell

As I write this article, the summer air is cooling, the trees are beginning to show fall colors and the great annual event known as "Back to School" is upon us. My wife and I are high school teachers, so this time of year is of particular significance in our house. What more logical way to discuss Belgian beers and how to clone them, than from the perspective of a teacher?

GEOGRAPHY: GOOD GRAIN, CLEAN WATER AND NARROW VALLEYS

Okay, easy subjects first. Look at a map and you will see that Belgium lies in northwestern Europe — due north of France, due west of Germany and south of the Netherlands. The country is located too far north to be a major player in the wine industry, but the spot is not bad for growing grain, particularly barley. Most of Belgium's major cities (other than the capital, Brussels) are seaports, which is the reason behind Belgium's long tradition of international trade and commerce. This easy access turned many "local" breweries into regional and international companies.

The topography of Belgium adds some elements to the country's brewing profile as well, with deep, clean water supplies and mountain springs and many long, narrow valleys that maintain relatively cool and consistent temperatures year-round. Some of these valleys are "closed environments," meaning they are so deep and narrow that airborne bacteria and yeast cannot escape. Case in point: The Senne River valley, around the village of Lembeek, has a unique combination of airborne fauna that has long been used to ferment the valley's legendary "lambic" beers. In Belgium, the beer from one valley will not be like the beer made in the valley next door.

HISTORY: WHERE THE MELTING POT MEETS THE BREW KETTLE

Belgium as a sovereign nation is a relatively new concept, dating to the beginning of the 19th century. Before that, what is now Belgium was overrun, conquered and divid-

Step-by-step recipes for recreating six legendary Belgian beers.

ed among its neighbors. From Julius Caesar to Napoleon Bonaparte, everyone in Western Europe at one time or another set his sights on the territory that lies at the crossroads of critical east-west and north-south trade routes. Undoubtedly, the influence of Austrian, German and Dutch rulers and merchants favored the tradition of beer-making. In medieval times, the Brewers' Guild was one of the most powerful political associations in Belgium.

LANGUAGE: WHERE WITBIER ALSO MEANS BIÉRE BLANCHE

Until very recently, one of the biggest obstacles to Belgian unity has been language. As close as they are, ethnically and philosophically, the Belgians have long been divided over their native tongue. To the north, most people speak Flemish, very much like the language of the Netherlands. To the south, close to the border of France, French is the more common language. You can see this in the names of beers and of beer styles: a "witbier" or "tarwebier" in the north is called a "biére blanche" in the south, for example. Realistically, there is very little difference between the brewing traditions of Flemish Flanders and French Wallonia. And in Brussels, the ultimate multi-lingual and multi-cultural city, beer is a shared universal language.

RELIGION: AWE-INSPIRING BEER FROM CISTERCIAN ABBEYS

Beer is practically a religion for most Belgians. It is a major part of every celebration — personal, local and national. Brewers in Belgium enjoy the cult status that we give to rock stars and movie stars.

Many of the great Belgian beers and beer styles originally were developed as an agricultural product of Catholic monasteries. Six Trappist monastery breweries in Belgium — and a seventh, in the Netherlands — still produce beers that are considered by connoisseurs to be among the best in the world. Many other formerly brewing monasteries have now licensed their name (and in some cases their old recipes) to commercial secular brewers, in exchange for a percentage of the revenue.

MATH AND SCIENCE: BEER CALLED DUBBEL, TRIPEL AND XXX

My weak subjects, I'll admit, but there are a few numbers and formulas that matter. Many Belgian breweries list their beer's strength on the label not in an ABV (alcohol by volume) percentage, but in degrees. These degrees are based on a scale similar to, but not exactly like, the Plato scale.

The Westmalle and Rochefort Trappistenbiers, for example, are labeled 8, 10 and 12 degrees, based on their original gravities (8 is the "weak" one, at about 6.8 percent ABV, while the 12's are the strongest, rating as high as 11 percent ABV). They also use the terms "dubbel," "tripel" and even "quadrupel" to rank their beers by alcohol strength, but remember: A dubbel does not have twice the alcohol of a normal beer, nor do the tripel and quadrupel have three or four times the alcohol.

To make matters even more confusing, in some breweries these designations may reflect only how many X's were marked on the vat during fermentation to distinguish one batch from the next. In others, the same grain was mashed a couple of times, so the first wort was marked XXX, the second XX and the third — the weakest — with a single X. Basic math, right?



Science-wise, one cannot discuss Belgian brewing without talking about yeast. Early Belgian brewers may have been among the first to harvest yeast and repitch it. They also may have been the first to scientifically plan out fermentation schedules rather than wait for happy accidents. Let us not leave out the role, though, of happy accidents: If not for serendipity, there would be no Belgian lambics.

Traditionally, these beers are fermented "spontaneously" after cooling in vessels open to the night air; they depend on wild yeasts and bacteria for their unique sourness and other flavors. These bacteria and wild yeasts are now often added as cultures at specific, controlled times in the brewing process, but originally they were just there — in the air, in the oak fermenting vessels, in the brewery's atmosphere and equipment. These days, even the Trappist monasteries have modern, white-tile-and-stainless brewhouses, proving religion can co-exist with science.

ART: BEER IN ITS HIGHEST FORM, SERVED WITH A FLOURISH

Belgian beers are works of art in themselves, and they are improved by the way they are packaged and served. Many Belgian beers have uniquely shaped bottles, some screen-printed, some with logos or names embossed in the glass itself, most identifiable even when empty and de-labeled. The labels are often very creative, with reproductions of famous Belgian and Dutch paintings or pictures of monasteries, villages, monuments

and landscapes. The names can be quite clever as well, from Mannekin Pis (The Peeing Little Boy) to Forbidden Fruit to a whole series of strong ales in imitation of Duvel, with names like Satan and Lucifer.

There's also the glass that each beer should be served in. Each beer has its own shape, artistically and scientifically designed to emphasize certain characteristics of the beer. I am always impressed when I find a pub that serves Belgian beers, either on tap or in bottles, and has the appropriate glass for each one. The best I've ever seen is the Saint Alexander in Old Quebec City — I have never stumped them yet! *(For more on Belgian glassware, see page 48.)*

HOME ECONOMICS: CLONING SIX LEGENDARY BELGIAN BEERS

First lesson: The right ingredients make better beer. I haven't specified brand names, but I can make some recommendations on grains and extracts.

Belgian beers are generally brewed with grain grown and malted in Belgium, or nearby in France and Germany, and you should try to do so at home as well. There are two excellent brands of Belgian malted grains available in the United States and Canada, DeWolf-Cosyns and Malteries Franco-Belges. They both make most of the same basic malts (pale, pilsner, different caramels, amber, dark grains and more) but have slightly different specialty malts. Ask your retailer what they have and what they can get; your Belgian-style homebrew will be better for having used the best and most authentic ingredients you can find.

As far as extracts go, there are currently no Belgian extracts marketed in North America (that we know of) except those made by Brewferm, which are prehopped and preflavored kits. They are very high-quality kits, but they don't work in these recipes *(For tips on making Belgian beers from prehopped kits, see page 37.)* My advice on malt extracts for these recipes is to go with Scottish (Telford's) or Dutch (Laaglander) extracts, which generally ferment out and finish a bit more full-bodied and full-flavored than their English and German counterparts. Yeast is, of course, the make-or-break choice for Belgian beers.

When cloning a bottle-conditioned beer, it is worthwhile to try to reuse that brewery's yeast. Unfortunately, many commercial breweries filter out their main yeasts and repitch an ordinary yeast for bottling. For the recipes here, I have avoided this question and suggested a commercial yeast slurry that will work. You can, of course, use an alternative yeast. All six of the beers below are bottle-conditioned, and all are reported to contain their main yeast.

To reculture yeast from a bottle, gently pour out the beer, leaving the sediment at the bottom. Boil a starter with dried malt extract and water; while it's cooling to 78° F, carefully sanitize the mouth of the bottle, a stopper and an airlock. Then pour the starter into the bottle. Keep it at room temperature and give it a few days to get going.

A large number of respected Belgian beers contain brown sugar, molasses, corn sugar and, especially, the crystallized beet sugar called "candi" sugar. I have tried to simplify the issue and have only used candi sugar in my recipes. *(For more on candi sugar, see page 43.)*

Fruits and spices have a more prominent place in Belgian beers than in any other country's brewing traditions. Two of the recipes given, the Lindemans and the Hoegaarden, rely on them for their uniqueness. Rarely will a Belgian brewer use an extract — if a beer is a fruit beer, it is made with real fruit; spiced beers have very carefully measured amounts of characteristic (and sometimes secret) spices.

These recipes are all for five U.S. gallons, and are formulated as partial mash brews, with options for all-extract and all-grain.

DE KONINCK

OG = 1.048 FG = 1.010 IBU = 27
Brouwerij De Koninck, Antwerp

A family brewery founded in 1833, De Koninck really produces only one beer (a second brew, Cuvée De Koninck, was launched in 1993 but hasn't caught on).

A typical Belgian pale ale, it is a smooth copper beer with a flavor profile that lies somewhere between a Düsseldorfer Alt and a British pale ale. Soft and dry, creamy smooth, De Koninck has a balanced flavor with some mild floral hop notes in the aroma.

The De Koninck bottle is unique — tall and narrow, it swells to a bubble just below the crown. Its signature glass is a "bolleke," which resembles a bowl-shaped, tall-stemmed wine glass.

Ingredients:

2.5 lbs. lager malt
1 lb. Vienna malt
1/8 lb. chocolate malt
3 lbs. unhopped amber dry malt extract
6 AAU Saaz hops (1.5 oz. at 4% alpha acid)
Belgian ale yeast slurry (White Labs WLP530 or Wyeast 1214)
1 cup unhopped light dry malt extract (DME) to prime

Step by Step:

Heat 6 quarts water to 163° F. Crush grains and add to liquor. Hold



A QUICK GUIDE TO BELGIAN BEER STYLES

Belgian brewers are renowned for creativity and innovation, which makes the phrase "Belgian beer styles" a bit of an oxymoron. It's difficult to define the country's myriad beers by strict style guidelines. "No other nation has a more colorful, individualistic or idiosyncratic assortment of beers," writes Michael Jackson in *The New World Guide to Beer*. "There are to some extent regional styles, but many towns and breweries like to think of their style of beer as being exclusively their own."

Still, there are some common beer categories. The information below is adapted with permission from **www.breworld.com**, Europe's largest beer and brewing Internet site and a member of the Real Beer Network. For more information on Belgium and its beers, visit www.breworld.com/belgium.

LAGER: Bottom-fermented beer

Pilsner: Pilsner-style lagers represent 75 percent of total beer production in Belgium. Three big breweries make most of it: The Interbrew group produces Stella Artois and Jupiler, Alken-Maes brews Maes-Pils and Haacht makes Primus.

ALE: Top-fermented beer

Trappist: "Trappist" is the popular name for monks belonging to this very strict Cistercian order. A Trappist beer is brewed by monks and is produced inside an abbey. Only seven abbeys in the world are entitled to use this registered designation, and six of these are in Belgium (the seventh is in the Netherlands). "Trappist" is a loose style category, since the beers are all very different.

Abbey: In the past, many abbeys had their own brewery, but historic events such as the French Revolution and the World Wars resulted in the destruction or closure of many. But because Trappist beers were so successful, many Belgian breweries began to produce "abbey beers." These breweries often use an old abbey recipe or license the name of a still-functioning abbey that no longer produces beer. In addition, many beers do not bear the name of an abbey but are linked by religious names like "Triple Moine" (monk) from Du Bocq.

Within the monastery and abbey family, there are three common varieties: the singel (though it's not often called that), the dubbel and the tripel. These designations refer to the beer's alcoholic strength.

Strong Golden: These ales can be paler than some pilsners; they are soft but strong with several fruity and perfume aromas. The best-known example is Duvel. This beer has a host of imitators, many with similarly devilish names.

Red Flemish: Reddish-brown beers, the specialty of West Flanders, have a flavor reminiscent of iron or passion fruit. They are initially tart until an underlying sourness takes over. The archetypal red beer is Rodenbach, nicknamed "The Burgundy of Belgium."

Brown Beer: These beers come from Oudenaarde and Zottegem, and are typically Flemish: The body is smooth and the mouthfeel is fluffy. The taste is a mixture of sweet and sour. The classic brown beer, Goudenbond, is made by Liefmans brewery.

White Beer: Also called witbier or biére blanche, the white beers of Belgium are named for their cloudy color, which derives from sediment and a healthy portion of unmalted wheat. White beers are full of character and refreshing. This is a very old style of beer that fell out of fashion but was revived in recent decades, most notably by brewer Pierre Celis. The classic Belgian wit is Hoegaarden.

Saison: These seasonal beers are produced in the Hainaut and Wallonia provinces. The beer was created to quench the thirst of harvest workers; these days, it is made year-round and considered a traditional style. The beer is user-friendly and not too strong, with a bitterness in the back of the mouth.

Amber Ale: These are specialty beers hopped in varying degrees. Caramelized malt is used as a basic ingredient and takes the edge off the bitterness of the hops. Amber ales are copper-colored and generally have the word "ale" on the label.

LAMBICS: Spontaneous-fermented beer

To be a true lambic beer, the brewery must be in the "Patjottenland," a part of the Senne Valley near Brussels. The spontaneous fermentation that takes place in open vessels needs a micro-flora called "Brettanomyces bruxellensis" that is only found in and around Brussels. Spontaneous fermentation is the bridge that links beer-making with wine-making; it is the oldest brewing technique of all, dating back some 5,000 years. This family of beers consists of:

Lambic: Fermentation takes place over three to six months for a young beer and as long as two or three summers for a mature lambic.

Gueuze: The best old lambics are mixed to produce gueuze. Further fermentation in the bottle means gueuze becomes as sparkling as champagne.

Fruit lambic: The second fermentation of this lambic takes places after fruit has been added. The traditional forms are kriek (cherry) and framboise (raspberry), but other varieties have emerged, such as peche (peach) and fraise (strawberry).

Faro: By adding candi sugar to lambic beers, brewers produce a sweet and soft beer called faro.

mash at 152° F for 90 minutes. Runoff and sparge with 8 quarts water at 170° F. Add DME, stir well, bring to a boil. Add Saaz hops, boil 60 minutes. Remove from heat. Add to fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons. Cool to 70° F, pitch yeast. Ferment at 68° F for two weeks, rack to secondary and condition cool (50° F) for three to four weeks. Prime with DME, bottle and age three to four weeks at 45 to 50° F. Serve at 50° F in a "bolleke."

All-grain option: Replace the DME with another 4 lbs. lager malt and 1/2 lb. light crystal malt (30° Lovibond). Increase mash water to 12 quarts and sparge water to 15 quarts. Mash time and temperatures will be the same. Proceed as above from boiling.

All-extract: Omit lager malt and reduce Vienna malt to 0.5 lb. Steep Vienna and chocolate malts in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 5 lbs. Proceed as above from boiling.

DUVEL

OG = 1.070 FG = 1.012 IBU = 30

Brouwerij Moortgat, Breendonk

"Devil" is the archetypal Belgian Strong Golden ale. In fact, most of Duvel's imitators make some reference to the devil in their name or label. Strong, pale amber in color, Duvel's flavor is a unique balance of alcohol, hops and sweet malt.

Founded in 1871, Moortgat is still owned by the same family. The present-day version of Duvel has only existed since 1970, replacing a darker version developed after World War I by Belgian brewing scientist Jean De Clerck using McEwan's Scotch Ale yeast. Moortgat malts its own barley; its brewers were unable to brew as pale a beer as they liked by using commercial malt.



Duvel's unique flavor is due, in part, to a cycle of cool-cold-cool-warm fermentation temperatures. Duvel is often served chilled as an aperitif, in its own wide, distinctive, tulip-shaped glass.

Ingredients:

4 lbs. pale malt
0.5 lb. CaraVienne malt
4 lbs. unhopped light dry malt extract (DME)
1 lb. clear candi sugar
6 AAU Saaz hops (1.5 oz. at 4% alpha acid)
Belgian Strong Ale yeast (White Labs WLP570 or Wyeast 3787)
1 cup unhopped light dry malt extract to prime

Step by Step:

Heat 8 quarts water to 163° F. Crush grains and add to liquor. Hold mash at 152° F for 90 minutes. Runoff and sparge with 10 quarts water at 170° F. Add dried malt extract and candi sugar, stir well, bring to a boil. Add Saaz hops, boil 90 minutes. Remove from heat. Add to fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons. Cool to 70° F, pitch yeast. Ferment at 68° F for two weeks, rack to secondary and condition cool (50° F) for two weeks and then an additional week at 68°. Prime with dried malt extract, bottle and age three to four weeks at 45° F. Serve in a tulip-shaped snifter at about 45° F.

All-grain option: Replace the DME with another 5 lbs. pale malt and 0.5 lb. carapils malt. Increase mash water to 16 quarts and sparge water to 18 quarts. Mash time and temperatures will be the same. Add candi sugar and proceed as above from boiling.

All-extract option: Omit pale malt. Steep CaraVienne in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 6.5 lbs., add candi sugar and proceed as above from boiling.

WESTMALLE TRIPEL

OG = 1.082 FG = 1.012 IBU = 35

Brouwerij Westmalle, Malle

Our Lady of the Beloved Sacred Heart at Westmalle was founded in the wake of the French Revolution, in 1794, by Royalist monks fleeing the guillotine. They began brewing in the 1830s and the brewery became more commercial in the early years of the 20th century.

The quintessential Trappist tripel, Westmalle is very pale, very strong and wonderfully smooth. One of the brewhouse techniques that makes the Westmalle beers unique is the use of direct gas flames on the copper kettles. This creates hot spots that may caramelize the wort slightly, giving a faint burnt-sugar taste to the beers. The beers are also brewed with very hard water, which certainly contributes to the character of the tripel.

The Westmalle beers are bottled in a custom-designed, raised-letter brown bottle. They're served at cellar temperatures in a typical stemmed, wide-mouthed goblet, with a row of dimples around the base of the bowl.

Ingredients:

5.5 lbs. pale malt
1 lb. light caramel malt (10° Lovibond)
4 lbs. unhopped extra-light dry malt extract (DME)
1 lb. clear candi sugar
3 AAU Styrian Goldings hops (1 oz. at 3% alpha acid)
3 AAU Tettnang hops (0.75 oz. at 4% alpha acid)
3 AAU Fuggle hops (0.5 oz. at 6% alpha acid)
2 AAU Saaz hops (0.5 oz. at 4% alpha acid)
Belgian Trappist yeast slurry (White Labs WLP500 or Wyeast 1214)
1 cup unhopped light dry malt extract (DME) to prime

Step by Step:

Heat 12 quarts water to 163° F. Crush grains and add to liquor. Hold mash at 152° F for 90 minutes. Runoff and sparge with 15 quarts water at 170° F. Add DME and candi sugar, stir well, bring to a boil. Add Styrian Goldings hops, boil 30 minutes. Add Tettnang hops, boil 30 minutes. Add Fuggle hops, boil 25 minutes. Add Saaz hops, boil 5 minutes (90 minutes total boil). Remove from heat. Add to fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons (if necessary). Cool to 70° F, pitch yeast. Ferment at 68° F for two weeks, rack to secondary and condition cool (50° F) for three to four weeks. Prime with DME, bottle and age eight to ten weeks at 45° to 50° F. Will improve with more aging, up to about a year. Serve at 50° F in a wide-mouthed, stemmed chalice.



All-grain option: Replace the DME with another 6 lbs. pale malt. Increase mash water to 18 quarts and sparge water to 20 quarts. Mash time and temperatures will be the same. Add candi sugar and proceed as above from boiling.

All-extract option: Omit pale malt, reduce caramel malt to 0.5 lb.. Steep caramel malt in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 8 lbs., add candi sugar and proceed as above from boiling.

CORSENDONK MONK'S BROWN ALE

OG = 1.066 FG = 1.012 IBU = 26

Brouwerij Bios, Ertvelde

A reddish-brown beer with a fruity, caramel nose and a lingering bitter-chocolate aftertaste,

THE EXTRACT FILE

Tips and techniques for making Belgian beers from malt extract

While brewing Belgian-style beers with malt extract is not difficult, there are a few factors to keep in mind.

1. Use the lightest, freshest unhopped extract available. Because so many of the flavors unique to Belgian beers come from the yeast or specialty ingredients, the extract needs to be as light and clean as possible to prevent these flavors from being overwhelmed.

2. Use pure adjuncts. Belgian brewers regularly use adjuncts like candi sugar. While any source of sugar — such as molasses, demerara or cane sugar — can be used, make sure it's free of sulfurs and preservatives that can taint the finished beer.

3. Use enough extract to hit the target gravity. Adjunct sugars will help boost gravity and alcohol levels, but to hit the high target gravity typical of many Belgian styles, you'll also need large amounts of malt extract. If you rely on sugar alone, the finished beer may be cidery.

4. Use Belgian specialty grains. While true malt extracts made from Belgian malts can be difficult to find, by steeping Belgian grains before the boil you can add many of the flavor, color and aromatic compounds to the finished beer.

Making the most of your prehopped Belgian beer kit

Brewferm Products of Belgium makes some of the best Belgian beer kits on the market. The master brewers who design the kits use authentic Belgian beer recipes along with Belgian malt, herbs and fruits. The kriek and framboise kits may seem costly, but they consist of pure cherries or raspberries, with no artificial flavors or colors. When using a prehopped kit, Brewferm's Bart Balis suggests following these standard guidelines:

1. Do not boil Brewferm beer kits. Boiling will caramelize the sugars, lead to a darker beer and affect fermentation by reducing the amount of oxygen in the wort. These factors will alter the taste of the beer so that it no longer meets the desired style characteristics.

2. You can add dried malt extract to the kits, but Brewferm recommends against it. The master brewers who built the kits created stand-alone products with balance. Any additions may tip the beer over the scale and turn it into something other than the ideal Brewferm beer.

3. Use the suggested amount of priming sugar for packaging. If kegging, only use stainless-steel soda kegs with tight seals. Plastic kegs won't hold pressure. Since these beers call for a high amount of carbonation, a lack of pressure will steal some of the beer's luster.

4. Practice patience when letting the beer mature! The stronger beers need six or more weeks' conditioning to maximize complexity, flavor and balance. Most will improve and age for up to a few years.

5. Do not toss out the yeast sachet! Brewferm provides durable, good-quality dry yeast suited for the beer style. You can experiment with appropriate liquid yeast. In either case, make sure to prepare the yeast according to instructions.

6. For a drier beer, make sure to prepare the yeast correctly before pitching or use a different yeast strain. Also, let the beer mature for a few additional weeks or months so that the sweetness tapers off.

Corsendonk Brown is a recent entry into the Belgian market, dating only back to the 1980s. The Corsendonk beers are a rarity in Belgium because they're brewed in compliance with the "Reinheitsgebot," the strict German beer code that allows only barley, hops, yeast and water to be used in the making of beer.

Corsendonk is an Abbey beer, not a Trappist beer. This designation means the beer is brewed not at an abbey, but under license from — or at least in the style of — a Trappist monastery. In the case of Corsendonk, the name is taken from an Augustine priory that produced beer from the 1600s until the 1780s. Whether the Augustine brothers brewed anything remotely resembling modern Corsendonk is debatable, but they have licensed their name to the beer since 1982.

Corsendonk has a unique screen-printed bottle, white on brown, giving the effect of stained glass or medieval manuscript illuminations. The preferred serving glass is a stemmed narrow tulip shape, sometimes with a large hexagonal "bead" halfway up the stem.



Ingredients:
4.25 lbs. pale malt
0.5 lb. dark caramel malt (90° Lovibond)
0.5 lb. Special B malt
0.25 lb. kilncoffee malt
4 lbs. unhopped amber dry malt extract (DME)
4 AAU Styrian Goldings hops (1.33 oz. at 3% alpha acid)
4 AAU Saaz hops (1 oz. at 4% alpha acid)
Belgian abbey yeast slurry (White Labs WLP530 or Wyeast 1214)
1 cup unhopped light dry malt extract (DME) to prime

Step by Step:

Heat 8 quarts water to 163° F. Crush grains and add to liquor. Hold mash at 152° F for 90 minutes. Runoff and sparge with 12 quarts water at 170° F. Add DME, stir well, bring to a boil. Add Styrian Goldings hops, boil 60 minutes. Add Saaz hops, boil 30 minutes. Remove from heat. Add to fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons. Cool to 70° F, pitch yeast. Ferment at 68° F for two weeks, rack to secondary and condition cool (50° F) for three to four weeks. Prime with DME, bottle and age three to four weeks at 45° to 50° F. Serve at 50° F in a tall, fluted, stemmed glass.

All-grain option: Replace the DME with another 5 lbs. pale malt and 1 lb. medium caramel malt (60° Lovibond). Increase mash water to 16 quarts and sparge water to 18 quarts. Mash time and temperatures will be the same. Proceed as above from boiling.

All-extract option: Omit pale malt. Steep caramel, Special B and kilncoffee as above in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 7 lbs., and proceed as above from boiling.

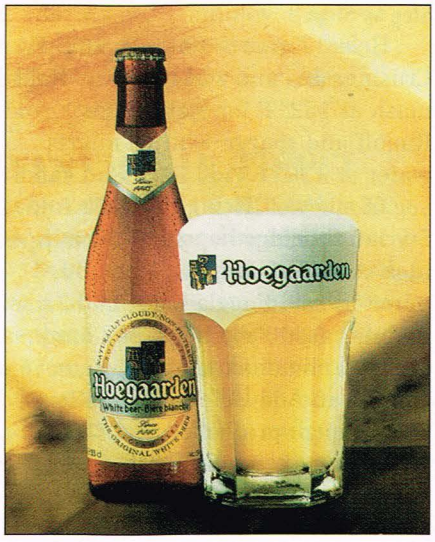
HOEGAARDEN WIT

OG = 1.048 FG = 1.011 IBU = 16

Brouwerij De Kluis, Hoegaarden

This is the standard by which all witbiers are measured. Hoegaarden Wit is cloudy and very pale golden in color, with a restrained white head and aromas of coriander and wheat that are impossible to ignore.

Brouwerij De Kluis was founded in the mid-1960s by Pierre Celis,



who went on to promote the witbier style internationally and then moved to the United States to found his own brewery in Austin, Texas. At the time of its revival, the witbier style was all but forgotten. Now, it is brewed in several countries by dozens of different breweries.

Traditionally, the grain bill is half malted barley, half unmalted raw wheat and up to ten percent rolled or flaked oats. In addition to the orange peel and coriander, some people speculate there may be a third spice, such as cumin seed.

The bottle is custom-made, with the Hoegaarden name in raised letters. The glass is a heavy, thick tumbler like those used for pastis drinks in Provence.

Ingredients:
2 lbs. pale malt
2 lbs. malted wheat
1 lb. flaked wheat
1 lb. flaked oats
2 lbs. unhopped wheat dry malt extract (DME)
3 AAU East Kent Goldings hops (0.75 oz. at 4% alpha acid)
2 AAU Saaz hops (0.5 oz. at 4% alpha acid)
1/8 oz. lightly crushed coriander seed
1/4 oz. dried Curacao orange peel, shredded
Belgian witbier yeast slurry (White Labs WLP400 or Wyeast 3944)

1 cup unhopped light dry malt extract to prime

Step by Step:

Heat 9 quarts water to 163° F. Crush whole grains and add, with flaked grains as well, to liquor. Hold mash at 152° F for 90 minutes. Runoff and sparge with 12 quarts water at 170° F. Add DME, stir well, bring to a boil. Add East Kent Goldings hops, boil 45 minutes. Add Saaz hops, boil 15 minutes. Remove from heat, remove hops if possible. Add coriander and orange peel, steep 30 minutes.

Pour into fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons. Cool to 70° F, pitch yeast. Ferment at 65° F for two weeks, rack to secondary and condition cooler (45° F) for three to four weeks. Prime with DME, bottle and age three to four weeks at 45° to 50° F. Serve at 40° F in a heavy glass tumbler.

All-grain option: Replace the dried malt extract with another 1.5 lbs. each of pale malt and malted wheat. Increase mash water to 12 quarts and sparge water to 15 quarts. Mash time and temperatures will be the same. Proceed as above from boiling.

All-extract option: Omit pale and wheat malts. Steep flaked wheat and oats in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 5 lbs., proceed as above from boiling.

LINDEMANS LAMBIC

OG = 1.050 FG = 1.012 IBU = 18

Brouwerij Lindemans, Vlezenbeek

Lindemans was founded in 1869 and has a solid reputation as a blender and brewer of traditional, authentic lambics. The brewery produces four fruit lambics: kriek (cherry), cassis (black current), peche (peach) and framboise (raspberry). This same basic recipe also can be used to emulate other fruit lambics, from fraise (strawberry) to druiven (muscat grape).

As lambics go, Lindemans' products tend to be less sour, more sweet, more mainstream (compared with Boon or Cantillon, for example) and thus more approachable for the amateur homebrewer.

Not all lambics are made with fruit, of course — if you sweeten the finished product with candi sugar, you have faro; if you blend old and new lambics, you have gueuze (pronounced "geuz" with a hard "g"). All are based on a wheat beer that has been allowed to ferment more or less spontaneously, with naturally occurring local yeasts. Like Champagne, lambic is a geographic designation: Beers made in this style outside of the Senne valley should not be called lambics. Many American homebrewers have taken to calling their own versions "pLambic," with the lower-case "p" standing for "pseudo."

The alcohol content will not necessarily correlate to the gravity readings on this beer, because the addition of fruit in the secondary fermenter will increase the sugar content and restart fermentation. Lindemans and many other lambic brewers bottle their products in small champagne-style bottles, with a cork-and-wire top. Lindemans' labels and glassware exhibit ornate art-deco lettering, and they prefer a tall, footed flute glass.

Ingredients:

3 lbs. pilsner malt
2 lbs. malted wheat
1 lb. flaked wheat
2 lbs. unhopped light dry malt extract (DME)
4 AAU well-aged aroma hops: such as Saaz, East Kent Goldings or Tettnang (1 oz. at 4% alpha acid)
Belgian ale yeast slurry (White Labs WLP550 or Wyeast 1762)
Lambic yeast or bacteria culture (recultured yeast from a commercial lambic, Wyeast 3278 or both)
6 to 9 lbs. cherries, raspberries, peaches or other fruit (picked fresh, washed, cut up and frozen until ready to use)
1 cup unhopped light dry malt extract (DME) to prime

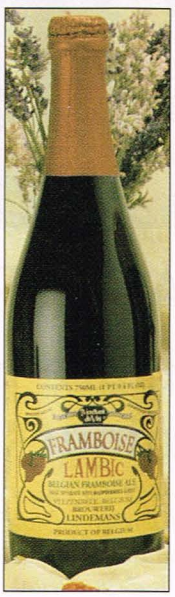
Step by Step:

Heat 9 quarts water to 163° F. Crush whole grains and add, with flaked wheat, to liquor. Hold mash at 152° F for 75 minutes. Runoff and sparge with 12 quarts water at 170° F. Add DME, stir well, bring to a boil. Add hops, boil 60 minutes. Remove from heat. Add to fermenter along with enough pre-boiled and chilled water to make up 5.25 gallons.

Cool to 70° F, pitch ale yeast. Ferment at 68° F for two weeks, rack onto fruit in your secondary and add lambic culture. Condition cool (50° F) for three to four weeks. Rack into third vessel to clarify at 50° F for two weeks. Prime with DME, bottle and age at least three to four weeks at 45° to 50° F. Serve at 40° F in either a heavy glass tumbler or a champagne-style flute.

All-grain option: Replace the DME with another 1.5 lbs. each pilsner and wheat malt. Increase mash water to 13 quarts and sparge water to 16 quarts. Mash time and temperatures will be the same. Proceed as above from boiling.

All-extract option: Omit pilsner and wheat malts. Steep flaked wheat in 3 gallons at 150° F for 30 minutes. Remove grains. Increase DME to 5.5 lbs., proceed as above from boiling. ■



Scott Russell is the author of "North American Clone Brews," a new collection of homebrew recipes published this summer by Storey Books. He wrote "Four Classic British Clones" in the Summer 2000 issue of Brew Your Own, and also writes the "Recipe Exchange" column in each edition of the magazine.

THE MASTERS

Celis Brewery
AUSTIN TEXAS

BY JOHN OLIVER



PHOTO COURTESY OF BELGIAN NATIONAL TOURIST OFFICE / NEW YORK

Praise the perfect pint! If you want to make authentic Belgian beer, the kind that will draw an admiring crowd, follow these expert tips.

FOUR AWARD-WINNING BREWERS

who specialize in Belgian beers share their best tips, techniques and advice for homebrewers.







SPEAK

Belgian brewing dates back centuries, yet the techniques that make Belgian beers among the finest and most unique in the world remain similar to this day. Belgian brewing has greatly influenced many of today's American homebrewers. Among other things, it has taught us that the most excellent beers may not fit into strict style guidelines.

Thanks to the modern-day craft-brewing revolution, many Belgian artisan breweries have found a new, appreciative audience in the United States. Some of these breweries produce no more beer than your average American microbrewery, yet most of their bottles are shipped and sold overseas. And true to the roots of the homebrewing movement, Belgian beer fans have been inspired to recreate these excellent beers at home.

Replicating a beer can be a formidable proposition. This is particularly true for Belgian styles, many of which derive their character as much from the local environment as from the way they're produced. In the Senne River Valley near Brussels, wild yeast and bacteria are used to ferment the valley's famous lambic beers. Many purists argue that for a beer to be called a true lambic, it must be made in this valley — even if the same microbes are put to work elsewhere to make a similar beer. For many of the recognized Belgian beer styles, there may only be a handful of commercial beers that represent the category. Or one particular beer may have inspired many imitations; by doing so, a "style" was created. A good example is Duvel, the strong golden ale that defines that style.

That said, it's not difficult to recreate Belgian beers. You just have to make a few minor adjustments to your homebrewing process. For advice, we turned to four professional brewers who are renowned for their fine Belgian beers. Here are their top tips.

Find Fresh Spices And the Finest Herbs

Pierre Celis almost singlehandedly revived Belgian witbier, a distinctive wheat beer that flourished in the 1700s but slowly fell out of fashion. Celis created the classic Hoegaarden Wit at the De Kluis brewery in the mid-1960s. After moving to Texas in the 1970s, he launched the Celis Brewing Company in Austin and used his knowledge to create Celis White. It was quickly accepted as one of the world's finest witbiers.

In addition to unmalted wheat, this style requires such exotic spices as Curacao (bitter orange peel) and coriander (the seeds of the cilantro plant). "The freshness of the spices is critical," says Lenzie Kinyon, the plant manager at Celis. "Most homebrewers have learned to look for fresh ingredients; they routinely check for signs of staling in their hops and malt. But this same care is not always applied to homebrewing spices and herbs."

For many homebrewers, the only source of herbs and spices may be the local supermarket or health-food store, where freshness and quality may be hard to gauge. Experienced homebrewers know to look for refrigerated, vacuum-packed hops that are not brown in color; they know how to taste malt for stale flavors. But they may not be able to judge whether a spice is fresh or stale.

Over time, the oils and organic compounds begin to oxidize; this breakdown can be exacerbated when the spices come from remote locations, where processing, storage and shipping conditions may not be ideal. "Most Curacao orange peel comes from either Spain or Haiti, and just getting it in good condition can be a challenge," says Kinyon. "When not properly stored, the bitter orange will exhibit a musty or even moldy aroma when it's ground. If you use it anyway, these undesirable characteristics can find their way into the finished beer."

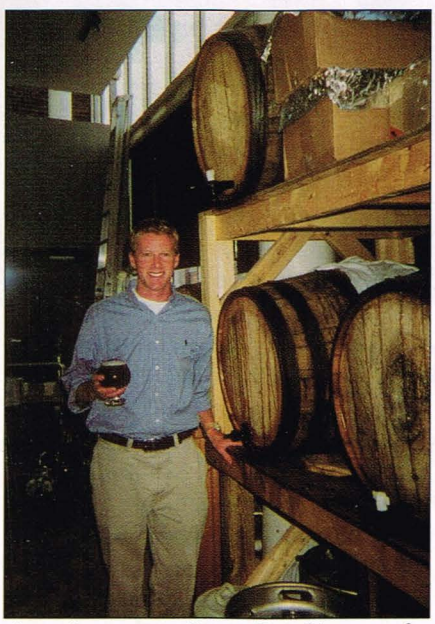
The best way to become familiar with quality is to sample herbs and spices from a wide variety of sources and note the differences. Once you find excellent ingredients,

storage is critical. "Much like hops, herbs and spices should be stored in a sealed container in a cold environment. "This will prolong their life," says Kinyon. "Exposure to heat and oxygen are two of the biggest staling culprits. But if you use the best suppliers and take good care of the herbs and spices once they arrive, you'll be able to taste the subtle nuances of these unique ingredients in the finished beer."

Be Patient: Let Your Beer Develop Over Time

The Brew Moon Restaurant and Microbrewery in Boston won two medals at the 2000 World Beer Cup: a gold medal for Caveat Emptor, a Belgian Strong Pale Ale, and a bronze in the Lambic category for Cranberry Tart Oulde Ale. Scott Hutchinson, the director of brewing operations, was quick to point out that it took years — not weeks or months — to develop these award-winning beers.

"There are many Belgian yeast and lambic strains available, and learning their characteristics takes continual experimentation," he says. Many homebrewers already experiment; they brew different batches to compare the similarities and differences. But when brewing Belgian beers, especially lambics, one of the greatest variables is time. "What you taste this year will be entirely different from what you taste next year, and it'll be different again two years down the road," says Hutchinson. So the key is: taste and wait, taste and wait.



A patient man: Scott Hutchinson of Brew Moon Microbrewery in Boston.

The lambic styles use a wide variety of yeast and bacteria, and it can take years to develop a balanced beer. The AHA National Homebrew Competition provides a prime example: The winner of the lambic category is almost always a beer that's more than a year old! With so many organisms involved, the Brew Moon brewers spend a great deal of time learning how a certain yeast or bacteria will react under different conditions.

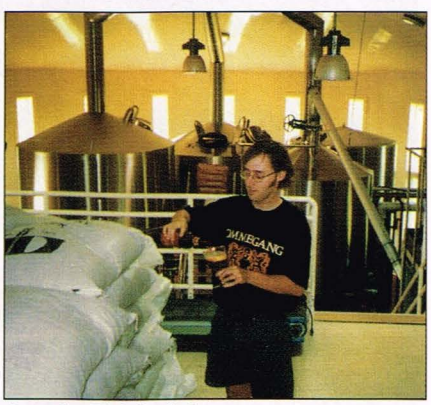
Lambic brewing is full of surprises. A beer that's undrinkable today might become world-class twelve months down the road. In addition, the beer may be changed by blending or adding fruit during the aging process. "Periodic tasting is a must with these types of beers," says Hutchinson. "During the tasting process we make decisions about blending different beers or adding fruit to change the flavor."

While sanitation is critical in any brewing process, Hutchinson says homebrewers should be particularly meticulous when recreating Belgian styles that incorporate unusual yeast strains or bacteria. "Since the flavor profile develops over such a long period of time, even the slightest contamination will have ample opportunity to grow," says Hutchinson. "This can ruin a promising batch."

"Many of these yeast and bacteria strains are very tenacious," he says, "and just having them in the brewery creates the possibility of cross-contamination." Cross-contamination occurs when a batch of beer is accidentally inoculated with the yeast or bacteria from another batch. This can happen when you use the same equipment or even brew a new batch in the same room. For a homebrewer who uses the same set of equipment to produce many different batches, this can mean disaster. After brewing a lambic, for example, your standard ales and lagers may start to exhibit sour and lactic characters. If you plan to dive into lambic brewing, it might be well worth your money to purchase specific equipment for the task, particularly when it comes to hoses and carboys.

Select Your Yeast Strain with Special Care

Brewery Ommegang in Cooperstown, New York has developed a reputation for brewing world-class Belgian ales. Head brewer Randy Thiel used to be a microbiologist; that career prepared him admirably for his position at Ommegang, where the selection and use of yeast strains is a high priority. Each of the brewery's leading authentic Belgian ales — Hennepin, Rare Vos and Ommegang — feature complex, natural flavors from the yeast. Randy is emphatic on one point: "Regardless of how strong the wort is, the primary fermentation should be done in three to four days." To achieve these results, he offers two simple tips: Pitch a large quantity of healthy yeast and oxygenate the wort well.



Randy Thiel of Ommegang pours a pint and ponders yeast strains.

When selecting a strain, Randy

looks for one that has good attenuation characteristics. Attenuation is the yeasts' ability to convert the sugars in the wort into alcohol; a yeast with good attenuation will convert a high percentage of the available sugars into alcohol. "Whether the beer is starting with a moderate or high original gravity, a good Belgian yeast strain should still result in a low terminal gravity," says Thiel.

Randy says many homebrewers mistakenly believe that a low terminal gravity results in a thin beer with little mouthfeel, something that's definitely not a hallmark of a good Belgian beer. "A big malt bill will still leave a big malt flavor, even if the terminal gravity is low," he says. "Big beers that finish with a high gravity tend to be sweet and cloying, and the only way to balance the flavor is with large doses of hops. The end result would be closer to a barleywine than a Belgian ale." To further illustrate this point, Randy cites a classic Belgian beer, Scaldis. This Belgian ale contains 12 percent alcohol by volume and has a terminal gravity of 1.008. Yet the beer exhibits a big, rich malt character that finishes cleanly, free of any lingering sweetness.

"Remember that alcohol contributes more than just a warming sensation," says Thiel. "Alcohol also creates the perception of body and mouthfeel."

Fermentation temperature is another area in which Belgian beers tend to differ from their more traditional counterparts. "Belgian yeasts tend to prefer warmer temperatures, some as high as 80 degrees Fahrenheit," says Thiel. Higher temperatures will usually result in more vigorous fermentations, which help achieve the four-day primary that Randy looks for. "More importantly, the warmer fermentations help create esters and fusels, compounds that add complexity to the beer's flavor and aroma." The fruity, spicy and earthy characters that define traditional Belgian beers do not always come from fruits, spices or herbs. Instead, they can be a natural byproduct of the fermentation process. "If you have to err with fermentation temperature in a Belgian beer, it is usually better to go high," says Randy.

When selecting an actual yeast strain, there are a number of great sources, beginning with liquid-yeast suppliers such as Wyeast and White Labs. For every strain, the manufacturer can provide the relevant statistics on attenuation, optimum fermentation temperature, alcohol tolerance and ester production. *(For a rundown on Belgian yeast strains, see the chart on page 45.)* In addition, since so many Belgian ales are bottle-conditioned, a great source of authentic yeast can often be found in the bottles on the local liquor-store shelves.

When culturing a yeast strain from the sediment at the bottom of a bottle, Randy does have a note of caution: "All of Ommegang's products are bottle-conditioned using our primary yeast, but many

A BELGIAN BREWING LIBRARY

"Belgian Ale" by Pierre Rajotte (Brewers Publications, 1992).

"Lambic" by Jean-Xavier Guinard (Brewers Publications, 1990).

"The Good Beer Guide to Belgium and Holland" by Tim Webb (CAMRA and Storey Books, 1999).

"The Classic Beers of Belgium" by Christian Deglas and Guy Derdelinckx (G.W. Kent, 1998).

"The New World Guide to Beer" by Michael Jackson (Running Press, 1988).

"Michael Jackson's Great Beers of Belgium" by Michael Jackson (Running Press, 1998).

WHAT IS CANDI SUGAR?

Forget the Reinheitsgebot: Besides malt, water, hops and yeast, many respected Belgian brewers add sugar to their beer. The most traditional form is "candi sugar," a pure beet sugar that comes either as a syrup or a solid.

The solid variety looks a lot like old-fashioned "rock candy." It's made by slowly heating a concentrated sugar solution. As the liquid evaporates, the almost-pure sucrose crystallizes on cotton strings that dangle down into the tank.

The translucent chunks of sugar are easy to weigh and use; they simply melt in your brew kettle. Candi sugar increases alcohol content without making it apparent; it also smooths out a beer. One pound of candi sugar yields 1.036 degrees of specific gravity in one gallon of water.

Depending on whether it's allowed to caramelize, candi sugar ranges in color from roughly 0.5° Lovibond (clear) to 75° Lovibond (amber) and 275° Lovibond (dark). Clear candi sugar is used in tripels, amber in dubbels and dark in brown beer and strong golden ales.

Many homebrew supply shops and mail-order outlets carry crystallized candi sugar.



CHEESY HOPS

Many a homebrewer has discovered a bag of old hops, forgotten in the brew closet. Our instinct is to open the bag and give it a whiff, hoping they have weathered the ravages of time. Depending on your perspective, the smell can be described as ripe gym socks or aromatic Italian cheese.

While we wrinkle our noses at such cheesy lupulins, Belgian lambic brewers prefer them. Lambic brewers schedule their hop purchasing carefully, because they let their hops age up to three years. The goal of the lambic brewer is to derive only flavor from the hops, without extracting bitterness or hop aroma.

Yes, they're cheesy. But that pungency is lost in the brew kettle. And the same oxidation process that turns hop aroma into something that smells like last month's laundry also neutralizes the fresh hop's bittering power. This is important because lambic can be boiled up to six hours.

Brew Moon Microbrewery forcefully abuses some of its hops to recreate this cheesy character. "We leave hops stored in the boiler room, exposed to heat and oxygen," says Scott Hutchinson.

This does not mean that any old, out-of-date hops will work. Hops that are moldy or spoiled will not make authentic Belgian beer. They will simply result in beer that tastes moldy or spoiled!

To give it a try, age your hops with a little respect: in a sealed container with as little oxygen as possible and at cool temperatures. When it's time to brew, choose aged hops that show no signs of browning (if using cones) and no signs of moisture pick-up (damp, moldy or spoiled).

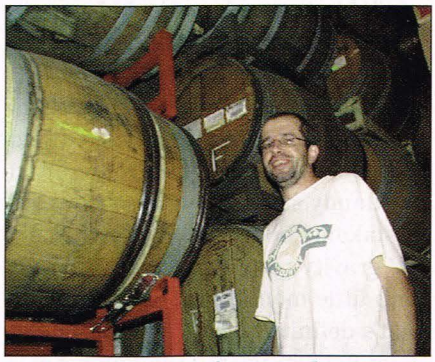
imported Belgian ales use an entirely different yeast, such as a lager strain, when packaging. This gives the beer greater stability and a longer shelf life." In other words, a strain cultured from a bottle may be a perfectly good brewing yeast ... but it may not lend any authentic characteristics to your beer!

When it comes to spices, Randy echoed many of the tips offered by Celis' Kinyon. "Herbs and spices need to be used in moderation," he says. "They should accentuate, but not overwhelm, the flavors and aromas from the malt and the unusual yeast strains. Too often homebrewers add a special ingredient to the point where the beer doesn't taste like a beer anymore!" A good rule of thumb, Thiel says, is to use just enough spice so the flavor shows up in the final beer but remains so subtle that it's hard to identify.

Forget Style Guidelines and Get Creative!

When Peter Bouckaert became the brewmaster for New Belgium Brewing Company in Fort Collins, Colorado, he arrived with more than ten years' experience as a brewmaster for Rodenbach Brewery in Belgium. When he first came to America, Peter was taken aback by the American preoccupation with defining beers by strict style guidelines. "In Belgium, brewing is an art," says Peter. "There is no Reinheitsgebot and no limitation on how anyone makes a particular beer." As a result, many Belgian beers that are considered classics, such as Rodenbach, are really the only examples of a particular "style." Local brewers adapted to local conditions and created their beer by relying on taste. So when Peter develops a new recipe, he begins by envisioning the taste profile of the finished product, then uses his knowledge of methods and ingredients to arrive there.

An example of this thinking is illustrated by one of New Belgium's most recent offerings, "1554," Peter's reproduction of a traditional sixteenth-century Belgian beer. Peter started by researching the brewing techniques of that time period. Since the malting process



Peter Bouckaert of New Belgium says: Forget the style guidelines!

was still fairly primitive, Peter surmised that most beers would be very dark. The beer would probably have been brewed to drink in a very short time, stored in oak barrels. After wrapping up his research, he then conducted three test brews.

Even though hops were not widely used in the 1500s, they were incorporated in this dark beer of moderate gravity. Lager yeast had not yet been isolated, but Peter used it to make 1554 — even though the beer is fermented at temperatures warmer than a standard lager.

"All of this adds a personal accent, and the beer sells by tasting it!" says Peter. "Freedom is unique to Belgian brewing, and homebrewers need to think like that. Andy Warhol never worried about what style he was working in. He simply painted. Brewers in America need to think the same way, to get away from style guidelines and cookbook recipes. When they are doing this, then they will truly be practicing authentic Belgian brewing." ■

John Oliver is a BJCP National Judge and head brewer for BJ's Brewery in Brea, California. He wrote "Five Tips from the Rogue" in the September issue of Brew Your Own and "Hard Facts About Water" in our May issue.

BELGIAN YEAST STRAINS AT A GLANCE

When making an authentic Belgian beer, it's critical to choose the proper yeast strain. Here's an overview of the most common strains currently available to homebrewers from North America's leading yeast suppliers, who provided all the information for this chart. Though we made every attempt to be accurate and comprehensive, this list may not include every strain and yeast supplier. To find a particular strain, ask your favorite homebrew supply shop or mail-order company.

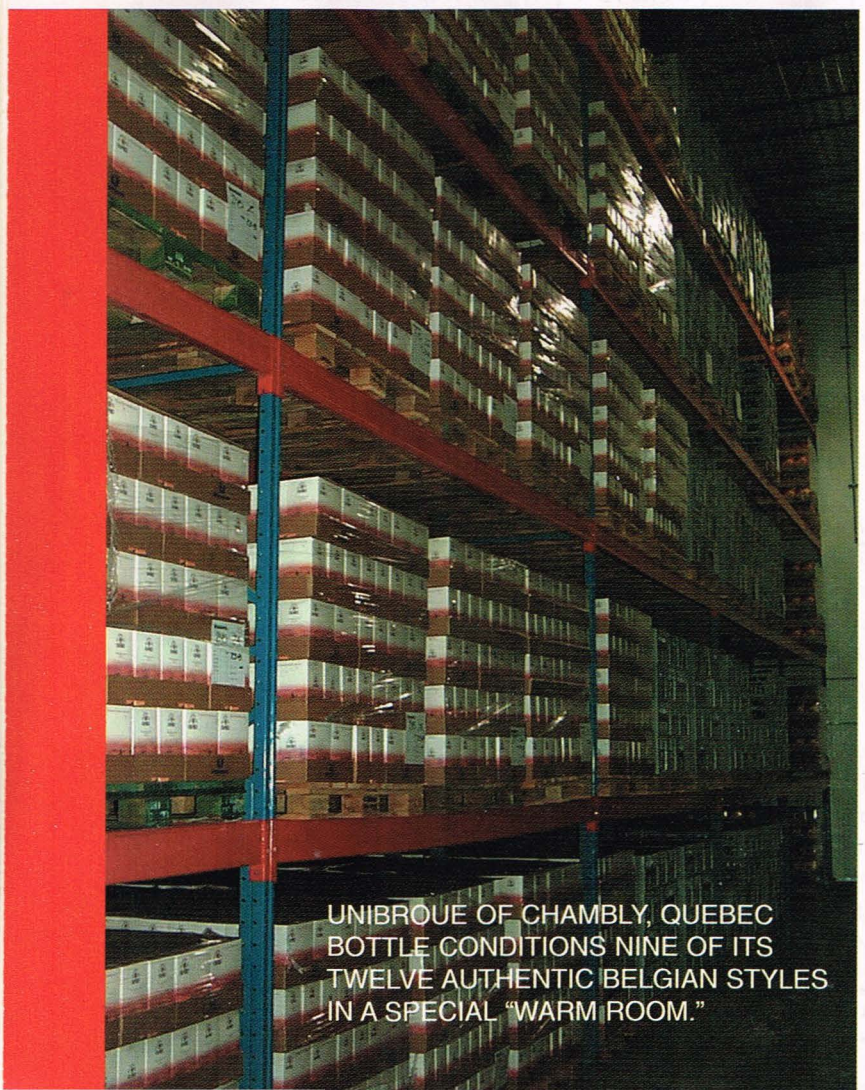
YEAST NAME	D/L	CO	FLOC	ATTEN	FERM TEMP	DESCRIPTION
Abbey Ale WLP530	L	White Labs	Med. to High	73% to 78%	Below 65° F	Fruity and plum characteristics.
Belgian Abbey II 1762	L	Wyeast	Medium	73% to 77%	65° to 75° F	Slightly fruity with a dry finish.
Belgian Ale A36	L	YCK	Medium	High	65° to 68° F	Estery and fruity with a spicy nose.
Belgian Ale WLP550	L	White Labs	Medium	72% to 78%	68° to 78° F	Phenolic and spicy flavors dominate.
Belgian Ale 1214	L	Wyeast	Medium	72% to 76%	58° to 68° F	Abbey-style yeast for high gravity.
Belgian Ale #1 CL-300	L	BrewTek	Med.to High	75% to 77%	66° to 72° F	Robust, estery with clove and fruit.
Belgian Ale #2 CL-320	L	BrewTek	Normal	74% to 76%	66° to 72° F	Dry, fruity and estery, malt profile.
Belgian Ale #3 CL-340	L	BrewTek	Normal	74% to 76%	66° to 72° F	Trappist with esters of spice, fruit.
Belgian Golden Ale WLP570	L	White Labs	Low	75% to 80%	68° to 75° F	Fruity and phenolic flavors.
Belgian Saison I WLP565	L	White Labs	Medium	65% to 75%	68° to 75° F	Earthy, spicy, peppery notes.
Belgian Ale Strain YST003	L	YeasTech	Medium	High	63° to 68° F	Dry, estery flavor with spicy notes.
Belgian Strong Ale 1388	L	Wyeast	Low	73% to 77%	65° to 75° F	Fruity nose, dry, tart finish.
Trappe Ale A16	L	YCK	Medium	High	68° to 72° F	Typical Trappist esters and aroma.
Trappist Ale BRY 204	L	Siebel Inst.	Low	High	68° to 72° F	Dry, estery flavor; clove spiciness.
Trappist Ale WLP500	L	White Labs	Med. to Low	73% to 78%	65° to 70° F	Distinctive fruit and plum notes.
Trappist High Gravity 3787	L	Wyeast	Medium	75% to 80%	64° to 78° F	Ferments dry; rich ester profile.
Belgian Ardennes 3522	L	Wyeast	Medium	72% to 76%	65° to 85° F	Mild fruitiness with spicy character.
Belgian Wit A35	L	YCK	Medium	Low to Med.	65° to 70 ° F	Spicy, slight phenolic character.
Belgian Wit Ale WLP400	L	White Labs	Low to Med.	74% to 78%	67° to 74° F	Slightly phenolic and tart.
Belgian Wit II Ale WLP410	L	White Labs	Low to Med.	70% to 75%	67° to 74° F	Spicier, less phenolic than WLP400.
Belgian Wit Beer YTS004	L	YeasTech	Medium	72% to 75%	63° to 68° F	Good for light, Belgian-style ales.
Belgian Wheat 3942	L	Wyeast	Medium	72% to 76%	64° to 74° F	Apple, plum nose with dry finish.
Belgian Wheat CL-900	L	BrewTek	Normal	72% to 74%	66° to 72° F	Soft, bread-like flavor, sweet finish.
Belgian Witbier 3944	L	Wyeast	Medium	72% to 76%	60° to 75° F	Tart, phenolic profile.
Forbidden Fruit Yeast 3463	L	Wyeast	Low	73% to 77%	63° to 76°	Phenolic profile, subdued fruitiness.
LAMBIC CULTURES:						
Belgian Lambic Blend 3278	L	Wyeast	Low to Med.	65% to 75%	63° to 75° F	Rich, earthy aroma, acidic finish.
Brettan. Lambicus 3526	L	Wyeast	Medium	Low	60° to 75° F	Pie cherry-like flavor and sourness.
Brettan. Lamb. CL-5200	L	BrewTek				
Brettan. Bruxell. 3112	L	Wyeast	Medium	Low	60° to 75° F	Produces classic lambic character.
Brett/Ped Combo CL-5600	L	BrewTek				
Pedioc. Damnosus CL-5600	L	BrewTek				
Pediococcus Cervisiae 4733	L	Wyeast				Lactic acid bacteria
Lactobac. delbruckii 4335	L	Wyeast			60° to 95° F	Lactic acid bacteria

KEY: D = Dry • L = Liquid • Co = Company • Floc = Flocculation • Atten = Attenuation
Ferm Temp = Ideal Fermentation Temperature • YCK = Yeast Culture Kit Company

ON THE YEAST

BY THOMAS MILLER

BOTTLE CONDITIONING IS KEY TO EMULATING THE AUTHENTIC TASTE OF BELGIAN ALE. HERE'S HOW TO DO IT RIGHT.



UNIBROUE OF CHAMBLY, QUEBEC BOTTLE CONDITIONS NINE OF ITS TWELVE AUTHENTIC BELGIAN STYLES IN A SPECIAL "WARM ROOM."

So you have finished your latest batch of Belgian ale! You brewed it and fermented it. It looks great in the secondary. Now it is time to bottle ... and to bottle condition. But you wonder: Are there any tricks to emulating the great Belgian breweries and achieving the authentic Belgian ale taste? In a word, the answer is yes. Think of it like any other beer style, with a twist.

But first, a few words on bottle conditioning: This technique is the heart and soul of most homebrews. Unless you have the equipment to filter and "force carbonate" your brews by injecting carbon dioxide gas, every homebrew will need to be primed with sugar and undergo bottle conditioning. Why? Because this is the process, that final homebrewing step, that naturally carbonates your beer. Doing it right is as important as treating your brewing water, perfecting your sparge or selecting the right yeast.

And it's an even more important technique when it comes to Belgian brews. The primary reason: Traditional Belgian yeast requires higher temperatures to condition efficiently, which has led most Belgian breweries to create special "warm rooms" for bottle conditioning. But it's also about flavor and shelf-life. Belgian yeast, which under many circumstances is a wild or house-grown yeast, contributes special flavor attributes and texture to your finished beer. It also helps stabilize the beer; many homebrewers believe that bottle-conditioned beer stays fresher, longer.

For advice on mastering the art of bottle conditioning, we turned to two breweries renowned for their award-winning Belgian-style beers: Unibroue of Chambly, Quebec and Ommegang of Cooperstown, New York. Both breweries produce authentic Belgian brews and

bottle-condition almost every style of beer they sell.

Before you start bottling, the first thing you need to procure are beer bottles. Regular 12-ounce or 22-ounce bottles are not appropriate for the job, since the higher pressure levels of Belgian ales will make these bottles explode. Champagne bottles in the 750-ml size are a traditional choice; you can also downsize to the 375-ml champagne bottle (also known as a "split"). Most homebrew shops carry champagne bottles, but for hefty prices. Look to spend $16 to $18 for a case of 750-ml bottles.

If you still can't find good empty bottles, the next best thing (and my preferred method!) is to purchase full bottles of champagne or Belgian ales, drink them and save the bottles. The overall cost will be higher, but the fun makes it worth the cost. Since a 750-ml bottle holds slightly more than 25 ounces, you will need about 26 empty bottles for a five gallon batch (or 52 bottles if you plan to use splits).

Yeast for bottle conditioning is your next concern, says Randy Thiel, the head brewer at Ommegang. Thiel explains that the yeast used during primary fermentation of strong Belgian brews — above 15° Plato or 1.060 original gravity — gets beat up during fermentation and will be of little value during bottle conditioning. If you condition your beer at least two weeks before bottling, most of this old yeast will drop out of suspension. Then you can add new yeast.

"Of the twelve beer styles we make, we referment nine," says Paul Arnott, master brewer at Unibroue. "It's a very favorable way to age beer, especially the strong, dark styles. With a normal filtered beer, after six months, you no longer want to drink it. With a refermented beer, the flavor gets better and more complex."

Before bottling, slowly rack your beer into a sanitary carboy or large plastic bucket, leaving about one inch of beer above the sediment on the bottom of your conditioning tank. Do not disturb the sediment or



this effort will have been wasted!

Now dose the transferred beer with priming sugar. As always, corn sugar is the best choice, since it imparts nominal flavor. To hit the standard CO_2 level for a typical Belgian beer (about 8 grams per liter), Thiel recommends you add 200 grams of priming sugar. This amounts to about one cup of sugar, a bit more than the 3/4 cup suggested by most homebrew experts.

Next, add fresh yeast to your beer. Two notes: First, this step is entirely optional, since the remaining yeast in suspension should do a satisfactory job for bottle conditioning under most circumstances (especially for lower gravity Belgian ales between 1.048 to 1.056 original gravity; these should be fine without new yeast, says Thiel). Stronger, higher-gravity beers will benefit most from new yeast.

Second, if you add new yeast, it is always a good idea to "start" fresh yeast before pitching. This ensures sufficient yeast quantity and an active yeast. The day before bottling, I boil 1/4 cup of dried malt extract in three cups of treated water. Do not use too much malt extract, because some of this will make its way into your beer and will contribute to carbonation.

I boil the solution for several minutes, cover my boiling vessel, and cool it quickly by submersing the container in ice water. Then I transfer the chilled wort to a sterilized Mason jar, pitch my yeast and seal it with a bung and air lock. By the next day, that small batch is fermenting vigorously. Pour this entire mixture slowly into the beer you are preparing to bottle.

If you do add new yeast, Thiel says you can choose any kind for bottle conditioning your Belgian ale. Since the job of this yeast is to create CO_2, any imparted flavor from the yeast will be very slight. You should consider what works best for you based on the following: lager yeast needs lower temperatures, so you will want to condition colder and longer. Regular ale yeast works great at room temperature and is fast. Typically, these are the best choice for homebrewers.

But since we are looking for authenticity, you will probably choose to add more Belgian yeast. This yeast works best at warmer temperatures — generally around 78 degrees Fahrenheit, which is above room temperature. Most Belgian breweries have a special "warm room" for conditioning purposes — it holds the temperature constant throughout the conditioning period. If you can maintain warm temperatures, conditioning will be completed in two weeks.

"Pick a strain that's right for the type of beer you're brewing, and try to use a liquid culture," says Arnott. "Be sure to find a strain that can support the alcohol level of the beer. Also, the stronger and darker the beer, the more yeast you need."

Once you have added the sugar and the yeast, give your beer several easy stirs with a sterilized spoon (be careful not to aerate the beer!). This circulates the yeast. Now you can begin bottling. For bottle closures, standard bottle caps fit most champagne bottles and are an acceptable option for sealing your brew. Use oxygen barrier bottle caps if you plan to store your beer for longer periods.

Champagne corks are the more traditional Belgian beer closure, though real mushroom-shaped champagne corks can be tough to find. Homebrewers will have more luck with other options, including plastic champagne corks. These are readily stocked by most homebrew shops and are simple to use. You just force them in by hand and clamp down with a wire.

Regular Size Nine wine corks are a good substitute for champagne corks. One brand, called the ALTEC cork from the French company, Sabaté, is a new-generation cork with superior sealing qualities. It also does not contribute the

musty, stale flavors often associated with traditional corks. Homebrewers should be able to find these at the local homebrew store.

If you do find real champagne corks, you will need a champagne corker. This is a specially designed corker that fits over the mushroom top of the champagne cork and presses the cork down into the bottle. Champagne corkers are expensive and hard to find, though some homebrew shops might rent them to customers.

Once the cork is in the bottle — be it a real champagne cork or a regular wine cork — you will need wire cages to hold the corks in. You can either purchase these separately for about $5 for 50 closures or save them as you amass your collection of champagne bottles. Simply drape the wire cage over the cork and twist tightly around the neck of the bottle. Regular wine corks also can be held in place by putting a "crown cap" over the cork. Lindeman lambics are packaged in this way.

Once the bottles are corked, store them upright for several weeks (upright storage allows the yeast to settle at the bottom of the bottle; be sure not to lay the bottles down.) Arnott conditions his beer between 20° to 25° Celsius (68° to 77° Fahrenheit) and says it is carbonated in about three weeks. "It's carbonated at that point, but with a refermented beer, the work never stops," he says. "The yeast will continue to work and the beer will continue to evolve. The best time at which to drink it is a matter of personal taste. In good cases, refermented beers can last for several years without a problem."

When carbonation is completed, further conditioning at 60 degrees Fahrenheit will stabilize the beer. Your brew should be drinkable in one week. But as Arnott says, give it time! When brewing Belgian style, patience is a virtue. ■

Tom Miller is a regular contributor to Brew Your Own. He writes "Tips from the Pros" in each issue.

A GLASS FOR EVERY BEER



Chalice Flute Tumbler Tulip Pilsner Thistle

Few nations take beer as seriously as Belgium, a country seemingly obsessed with the nuance and finer points of barley fermentation. The average Belgian shows the kind of respect for beer that in other nations is the territory of wine connoisseurs.

Not surprisingly, this cultural idiosyncrasy goes beyond how the beer is brewed, fermented, aged, bottled and bought. It also includes the way the beer is served — in the proper glass.

There is no way to estimate the number of different beer glasses Belgium has produced over the centuries. Successful collectors have thousands in their possession and new ones turn up regularly at antique shops and flea markets. Many are colorful, with enameled brewery logos; some are unusual, like the stirrup-rack glass made famous by Kwak that will not stand on its own. All are elegant, beautiful and reflect a devotion to beer.

It makes sense for Belgium to have cool beer glasses. The country boasts the world's most diverse and specialized brewing industry and Belgium has been a glass leader for three centuries. Devoid of gold, copper, oil or natural gas, Belgium has lots of coal and high quality quartz sand, the raw material for glass.

Belgian beer glasses can be loosely placed in several categories. Among the most recognizable is the **chalice**, named for its resemblance to the holy wine vessels that grace altars in Catholic churches. This style is preferred for Belgium's many Trappist and abbey beers. The wide mouth fulfills two functions: its large surface area thins the head, which in turn vents lots of aroma.

Flutes are used for a variety of Belgian styles, especially fruit lambics like kriek (cherry) and framboise (raspberry). The flute helps preserve the delicate bubbles characteristic of lambic, not unlike the glasses preferred by champagne lovers. Blended gueuze and sweetened faro lambics are often served in a straight-sided **tumbler** — its simplicity perhaps reminiscent of the style's peasant heritage.

Many of Belgium's white beers — called witbier or biére blanche — are served in a stocky, faceted tumbler. This is the shape made famous by Hoegaarden, the classic Belgian wit.

Tulips and snifters are not only a joy to hold and sip but their hourglass shape concentrates aroma and foam at the top, making them perfect for Belgium's many heady, sweetly fragrant ales. The stem evokes elegance and preserves temperature.

Tall **pilsner** and vase-like weizen glasses also make regular appearances at Belgian cafes, where they are used like their German cousins. And though you won't find them in the style's homeland, when Belgians pour Scottish ale, they pour it into a **thistle** glass — its shape paying homage to the national symbol of Scotland.

As if to cultivate their preoccupation with glassware diversity, researchers at Catholic University of Leuven's Centre for Malting and Brewing Science continue to study the influence of serving vessels on aroma, head, temperature and flavor. The research confirmed some traditions and debunked others and also shed some light on the influence of marketing on glass design. —*Sal Emma.*

Brew by the Numbers

A handy guide to calculating gravity, bitterness and color

by Chris Colby



WHEN WRITING A BEER recipe, you start with an idea of the beer you would like to brew. To get from this idea to the finished beer, you can take one of two approaches. You can experiment, perfecting the beer through the trials and errors of several brewing sessions. Or you can carefully crunch some numbers and plan the brew ahead of time.

To plan a brew, you need to know a few details about your ingredients and your brewing process. Armed with this knowledge and a calculator, you can plan the original gravity, bitterness level and color of your beer.

I. Calculating Specific Gravity

Specific gravity is, essentially, the amount of sugar in your wort. Other compounds in wort affect gravity, but their impact is minor compared to that of sugar. Pure water has a specific gravity of 1.000. Adding sugar to water increases its specific gravity. Most beers have an original gravity between 1.035 and 1.100. (Original gravity is the specific gravity of a beer before the yeast is pitched.) Box 1 *(page 50)* shows the original gravity of different styles of beer.

Calculating Original Gravity

Original gravity depends on three factors: the amount of grains and extracts used when brewing, how much sugar they contain and how much of that sugar you can extract. To calculate the expected original gravity of a wort, use the following formula:

Equation 1.1:
SGP(GP/gal)=[W(lb.)*EP(GP/lb.)*EE]/V(gallons)

SGP stands for specific gravity points, in gravity points per gallon. Gravity points are the decimal portion of original gravity. A pale ale with an original gravity of 1.048 has 48 gravity points per gallon. A barleywine of gravity 1.105 would have 105 gravity points per gallon.

W is the weight, in pounds, of the grain used. EP is the extract potential of the grain. This is how many gravity points of sugar are contained in a pound of the grain. Weight times extract potential gives you the total amount of sugar in the grains, measured in gravity points. Table 1 *(page 51)* lists the extract potential of many common grains, malt extracts and adjuncts.

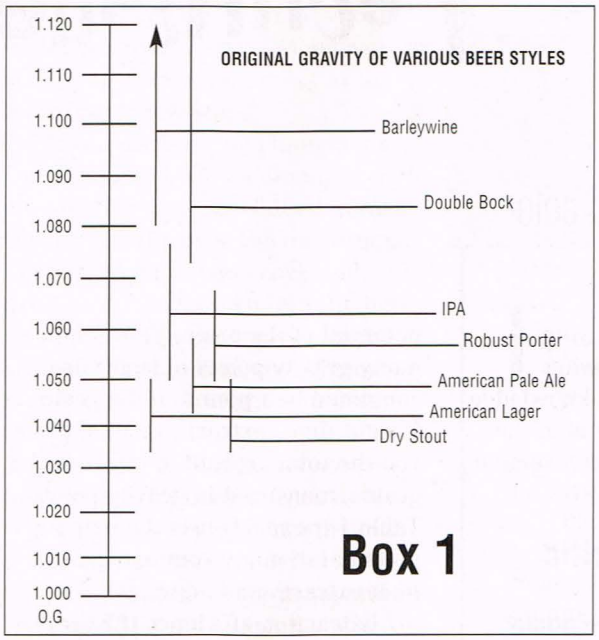
Extraction efficiency (EE) is the measure of how well you extract the sugars from the grain. Values for extraction efficiency range from zero to one. Multiplying total gravity points times extraction efficiency gives you how many gravity points the brewer extracted. This amount is divided by the volume of your beer. This yields specific gravity points, the decimal portion of original gravity.

Calculating Extraction Efficiency from Brewing Data

Extraction efficiency (EE) can be calculated by rearranging equation 1.1 to:

Equation 1.2:
EE=[SGP(GP/gallon)*V(gallons)]/[W(lb.)*EP(GP/lb.)]

Multiplying SGP times V gives you the total gravity points from the batch. W times EP is the maximum amount of gravity points that could have been extracted from the grain. The actual amount of gravity points divided by the maximum amount of gravity points possible is your extract efficiency. If you extracted all of the sugar (100%), your extraction efficiency would be 1.00. If you extracted none of it (0%), your extraction efficiency would 0.00. Homebrewers get efficiency values that range anywhere from 40% to 85% (EE = 0.40 to 0.85).



Box 1

Example of Extraction Efficiency Calculation

For example, let's say you brewed a five-gallon batch using 9 lbs. of pale malt and your original gravity turned out be 1.048. From the table, the extract potential for pale malt is 36. So, your extraction efficiency would be:

EE =[48*5]/[8*36]= 0.83

Example of Original Gravity Calculation

Now that we know how to measure or calculate all the terms in the equation, here's an example of how to calculate original gravity. Let's say you plan to brew a five-gallon batch of beer again. You plan to use 3.5 lbs. malt extract, plus 4.5 lbs. pale malt and 1/2 lb. crystal malt (40° Lovibond). Your extraction efficiency, from before, was 83%. From Table 1, you can see that dried malt extract yields 45 GP/lb. Extraction efficiency for malt extract is always 100%, so its extraction efficiency is 1.0. The extract potential for pale malt is 36 GU/lb.,while the EP for the crystal is 30. Substituting the numbers for the variables gives you:

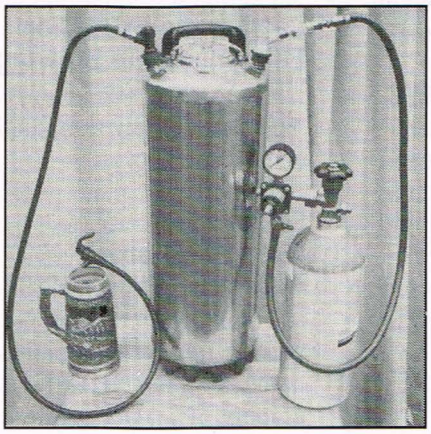
SGP = [3.5*45*1.00]/5+ [4.5*36 *0.83] /5 + [0.5*30*0.83]/5=60.9

60.9 specific gravity points is equivalent to an original gravity of almost 1.061.

Calculations from multi-grain grain bills can be extensive. Luckily, there's a shortcut if you don't mind sacrificing a little accuracy. You might have noticed that the range in extraction potentials isn't very large. And the grains with the lowest extract potentials are only used in small amounts. This allows a helpful shortcut.

For pale beers, simply treat all grains as base grains. Add up the

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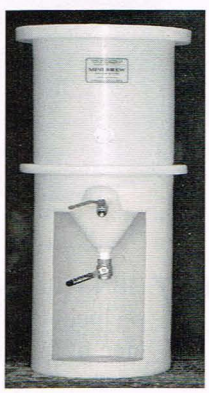
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Pale malt	36
Munich malt	35
Biscuit malt	35
Crystal	30-33
(darker malts have lower values)	
Chocolate	29
Black patent	25
Roasted Barley	25
Adjuncts	
Dried malt extract	45
Liquid malt extract	38
Corn syrup	37
Molasses	36
Honey	33

Table 1

total amount of grain that you added and treat it all as pale malt. For dark beers, treat the base grains plus crystal malts as pale malt. Then lump all the specialty grains together. Use the extract potential of the most abundant specialty grain as the value for the lumped grains.

You sacrifice some accuracy by lumping grains of different extract potentials together. But the difference is slight and always goes in one direction — you always overestimate your original gravity. Except for very dark beers, the difference is rarely ever greater than a few gravity points.

The equations for specific gravity have great practical value for homebrewers. Every variable can be determined to sufficient precision to make the outcome of the calculations worthwhile. Using these calculations, an accomplished brewer can expect to hit target gravities within a point of his calculations.

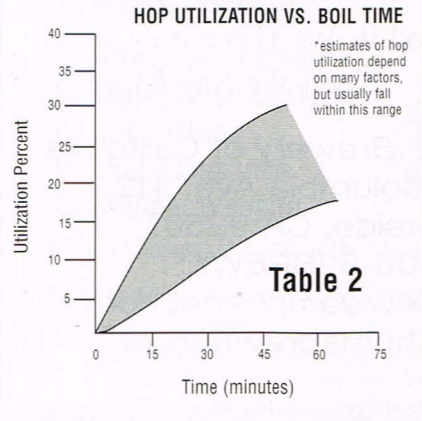


Table 2

II. Calculating Bitterness

In alcoholic beverages, maltiness is usually balanced by another flavor. In wine (and some styles of beer), maltiness is balanced by acidity. In most styles of beer, maltiness is balanced by the bitterness of the hops. The level of bitterness in beer can be expressed as International Bitterness Units (IBUs). Box 2 *(page 52)* shows the bitterness levels of various styles of beer. IBUs can be calculated using the following formula:

Equation 2.1:
IBU = [W(oz)*AA%*U*7489]/V(gal)

W is the weight, in ounces, of the hops. AA% is the percentage of alpha acids in the hops, expressed as a number between zero and one. Multiplying weight times alpha acid percent gives you the total amount of alpha acids added to your beer. Often, this number is called AAU.

U is the utilization factor, the percent of the alpha acids that end up contributing towards the bitterness of the beer. U is also expressed as a number between zero and one.

The value for U is affected by many things, including wort gravity and the form of hops used (pellet, plug or whole). But the primary variable is boil time.

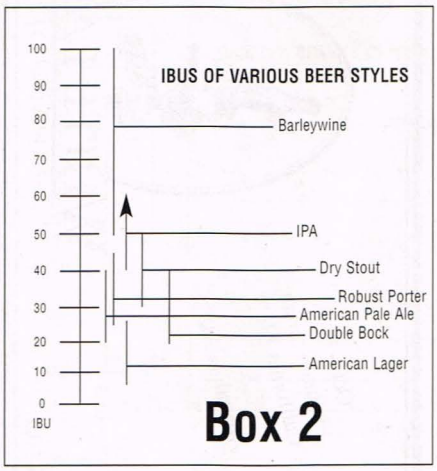
Table 2 *(page 51)* gives ranges of values of U for various boil times. When wort is boiled, alpha acids are converted to isomerized alpha acids, the substances that contribute to bitterness. Multiplying the utilization factor times AAU (total alpha acid units added) yields the amount of isomerized alpha acids in the beer. The number 7489 is a conversion factor; if you enter the weight of the hops in grams and the volume of the beer in liters, this term drops out of the equation. Dividing by volume gives you bitterness in IBUs.

Example of Calculating IBUs

Let's say you brew your pale ale



CIRCLE 47 ON READER SERVICE CARD



Box 2

again. You add 2.0 ounces of Northern Brewer hops with 8.5% alpha acid and boil them for 1 hour. With 15 minutes to go in the boil, you add 1.5 oz. of Fuggles hops with 4.0% alpha acid. After choosing values of U from Table 2, we get:

IBU = [2*0.085*0.25*7489]/5+
[1.5*0.04*0.075*7489]/5 = 70.4

Another factor that influences the equation is the aging of the hops. The alpha-acid percentage of the hops may have decreased since the measurement was made. The amount of decrease would depend on how the hops were stored after the initial alpha-acid measurement.

Unfortunately, the homebrewer usually has no way of determining the storage history of his hops. Even if the homebrew shop has stored the hops properly you don't know how they were treated by the wholesaler or the conditions of transport. To take aging into account, you need to multiply alpha-acid percent by a factor that measured what percentage of the alpha-acids were lost.

The IBU calculation is not as valuable to homebrewers as the calculation of gravity. There is no simple way to measure IBU for homebrewers. Since IBUs can't be directly measured, the utilization factor can't be accurately estimated for a brewer's own equipment. As a consequence, most homebrewers use a value of U from a table or graph. The value chosen may not match their brewing practices. In addition, the electronic scales most homebrewers use only measure to the nearest 0.25 oz. so the homebrewer can't add precise amounts of hops for small-scale variations in IBU.

Despite all this, using the IBU calculation can get the brewer to the right ballpark. Fine-tuning the bitterness calculation further can be done by trial and error.

III. Calculating Color

From straw-colored pilsners to jet-black stouts, beers vary greatly in color. Box 3 *(page 53)* shows the color ratings of various styles of beer in Standard Reference Method (SRM). SRM is a common color scale that is similar to degrees Lovibond. Lovibond tends to be used to

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describe malt color while SRM describes the finished beer. A beer with a low SRM is pale (Budweiser is 2) and a high SRM number indicates a dark beer (stouts are over 50 SRM). The SRM scale uses the following comparisons: water at 0.0, straw at 1 to 5.5, amber at 5.5 to 40 and black at 40+.

You want your brew to have a color that properly represents the style you're brewing. Unfortunately, the tools available to the homebrewer aren't really up to the task. Another measure of beer color is HCU, homebrew color units. It is calculated as:

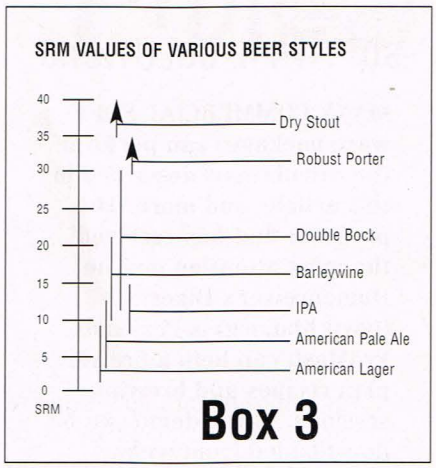
Equation 3.1:
HCU = [W(lbs) * CR(° L)]/V(gallon)

W(lb.) is the weight of a grain. CR(°L) is the color rating in degrees Lovibond. Multiplying the two yields total color added by the grains. The number for total color is then divided by volume.

The HCU equation is similar to the SGP and IBU calculations, except it is missing a utilization or efficiency term. Essentially, it is only a measure of how much color is put into the beer from the grains. How that color is changed by the brewing process is ignored.

Ignoring the effect of the brewing process on beer color is unfortunate, since many brewing processes affect wort and beer color. Some factors increase color. These include: high hop rates, longer boil times, finer grain crushes and oxidation from wort abuse or aging. Fermentation, in contrast, reduces the color of the wort.

The equation could be improved if a factor was added to account for changes in color due to the brewing process. In fact, two factors would be needed. Some color changes are modifications of the grain color added to the beer. Loss of color during fermentation, for example,



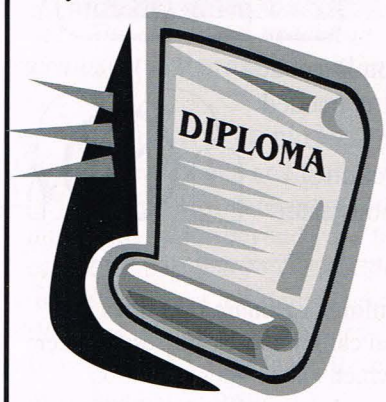
Box 3

depends on the amount of color initially in the wort.

Other color changes do not depend on the initial beer color. Some of the wort darkening during the boil is due to the sugars caramelizing. In solution, the sugars are colorless. The color that sugar caramelization contributes does not come from the roasting of the grain.

So, an equation that took both of

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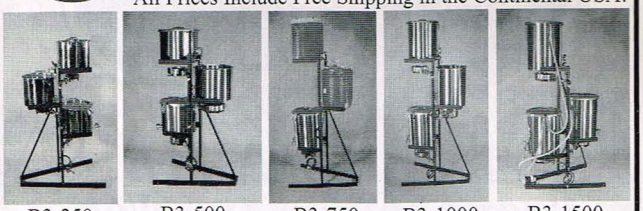
CIRCLE 3 ON READER SERVICE CARD

Beer Beer & more Beer

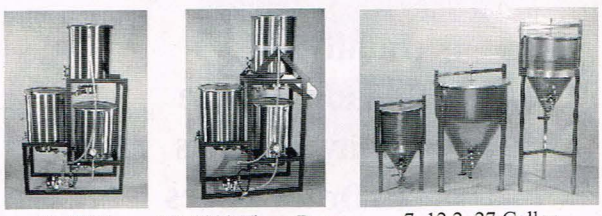
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SOFTWARE SOLUTIONS

MANY COMMERCIAL SOFTware packages can perform the calculations described in this article, and more. The program that has received the most attention on The Homebrewer's Digest (www.hbd.org) is ProMash. ProMash can help a brewer plan recipes and brewing sessions. A free demo can be downloaded from www.promash.com.

A web-based brew calculator "The Recipator" can be found at www.hbd.org/recipator. Just follow the instructions at the site and the Recipator does the rest.

A downloadable brewing spreadsheet is also available from BYO's own web site, www.byo.com.

these factors into consideration would need two new variables. The resulting equation would be:

Equation 3.2
NHCU=[W(lbs) * CR(degrees L)*TF + AF]/V(gallon)

NHBU is New Homebrew Color Units. The two new factors are TF and AF. TF is the transforming factor, the extent that the grain color is modified. AF is the additive factor, the amount of color that appears during the brewing process or aging that is not dependent on roasted grain-derived color.

There are other problems with homebrew color units (old or new). HCU does not correspond to any of the common measures for beer color. For example, HCU cannot be directly compared to SRM values such as those given in Box 3. Additionally, there is no common method of measuring HCU available to homebrewers.

If methods are developed to measure HCU, the TF and AF factors could be estimated by solving the equation for these factors. The values could then be determined by substituting the other variables with data from brewing sessions.

Are you confused yet? If you work with these equations often enough, they will become familiar to you. Many brewers set up spreadsheets in Excel or other programs to aid them in doing these calculations. If you try brewing new styles of beer often, you may soon become convinced that your calculator is as valuable a brewing tool as your hydrometer or pH meter. ■

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

For Boxes 1-3

* Data from BJCP Guide to Beer Styles
Arrows indicate higher values are acceptable to style

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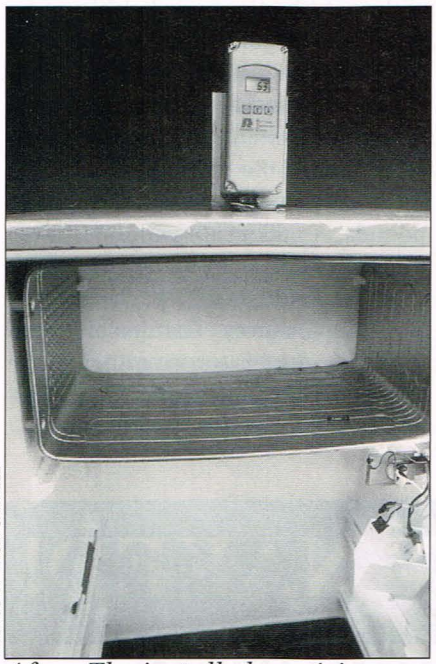
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CIRCLE 46 ON READER SERVICE CARD

Ice Cold Beer

How to build a temperature-controlled refrigerator

by Thom Cannell



PHOTOS BY THOM CANNELL

After: The installed precision thermostat is ready for action.

MAYBE YOU'VE BREWED in the summer and watched helplessly as fermentation temperatures soar beyond your 64° F target, or perhaps you've decided to make your first authentic lager. Either way, you need a temperature-controlled refrigerator. Here's how to build your own.

Start with a refrigerator large enough to hold at least one fermentation vessel. Likely it's an old fridge, used, abused and close to being discarded. Regardless of condition or age, if it works, it's good enough. You'll need this refrigerator and a precision temperature controller, available from homebrew suppliers or Grainger Corporation (www.grainger.com).

Your first consideration is the refrigerator. For information, I turned to a pal who owns an appliance store. Bill LeVeque, owner of G&W Maytag in Okemos, Michigan, has helped dozens of homebrewers convert refrigerators.

"You need to have a cyclomatic refrigerator, not one that is self-defrosting," says LeVeque. "The simple cyclomatic (compressor, condenser, evaporator) requires manual defrosting. A self-defrosting model will warm up every 6 to 8 hours and may rise to 55° F." This is not too good if you're lagering.

The difference between refrigerator styles is easy to spot; cyclomatic refrigerators will have coils in the back. A self-defrost has coils under the refrigerator (and wires and tubes in the sides). Cyclomatic refrigerators also have flat floors suitable for fermenters. Used models, with a warranty, cost about $75; a new one is $300 or so.

If the interior walls are damaged, cracks and holes can be repaired with epoxy or RTV silicone and anything flat — like thin plywood or clear Lexan. If the door is damaged, you could fill the opening with several layers of foil-faced insulation and cover it with plywood. Just make sure the insulation is sealed into the door and that the door is mechanically stable. Bill suggests using thin luan plywood and injectable foam, like the stuff you use to insulate your home.

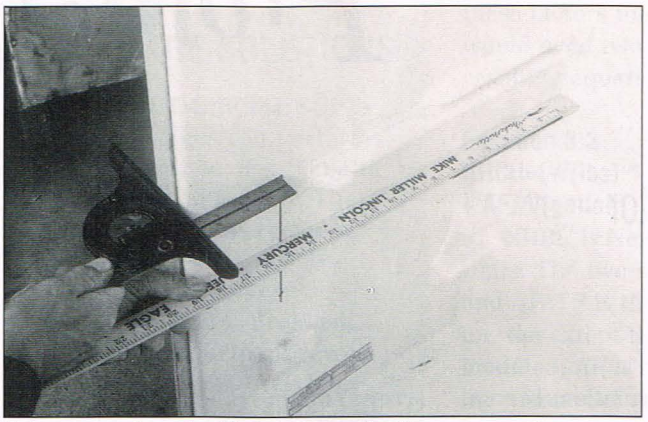
Another reason to modify the door is depth. My photo model's shelving intrudes almost four inches into the refrigerator chest. Removing the shelving (look under the door gasket for mounting screws) might make room for an extra fermenter. For now, the molded shelving panel will remain.

Old refrigerators usually have a pressed aluminum box in the top. This is the freezer. If the door to the freezer compartment is missing you might want to construct one. If you will be lagering and keeping the temperature cool, you could store hops in the freezer. This would require a door. But if you're trying to keep an ale at 67° F or a weizen at 70° F, then there would be no point because the freezer temperature will reach 55° F or more.

Another feature likely to be missing is a defrost tray. Most trays have a flapper at the rear to help control ice build-up during humid months. I removed the tray, since its five-inch height prevented using 6.5-gallon glass fermenters.



Before: This used refrigerator will soon be a lagering chest.



Measure the shelf depth and allow enough room for the door shelves, unless you removed them.

Finally, make sure the door gasket is sealing correctly. Wash and scrub the gasket and sealing surface. If it's stiff, Bill recommends rubbing some petroleum jelly into it to restore flexibility. Otherwise, bulk door gasket only costs a couple of bucks a foot.

Now for the shelves. My fridge came without shelves. That didn't matter since no refrigerator shelf is the correct height for holding fermenters. The measured height of my fermenters, plus five inches for the bubbler, vary between twenty-three and twenty-six inches. To make the refrigerator suitable for holding two or more forty-five pound fermenters, I needed a sturdy shelf at least twenty-six inches below the freezer. There was no such option. Fortunately, the refrigerator has a deep "bench" at the back where the compressor resides.

That would provide a solid shelf support at the rear, but the defrost tray was only twenty-four inches above it. I removed the tray and used the rear bench as a support.

To find the depth of the shelf I measured in 3.5 inches, the depth of the door shelves, and made a mark *(see photo)*. It is 11.5 inches from there to the rear bench which will be the rear support.

To make shelf rails, I used one-inch by one-inch aluminum angle brackets cut to length. They are mounted level, at the same height as the rear support, and attached with four aluminum pop rivets per rail. The shelf should be sealed and painted and secured to at least one rail. And because I'm a perfectionist, I placed a support down to the steel floor of the refrigerator. Three fermenters weigh almost 150 pounds. A milk crate with boards atop would give the same support.

Now the high-tech part, controlling temperatures. The thermostat inside a refrigerator is neither precise nor will it allow settings as high as 68° F. The answer is a precision

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thermostat. Some allow you to plug the refrigerator into them and control power *(see page 58)*. Others replace the thermostat in the refrigerator. I chose a Ranco ETC 11000 from Grainger for $52.85 plus tax (Grainger #3ZP77).

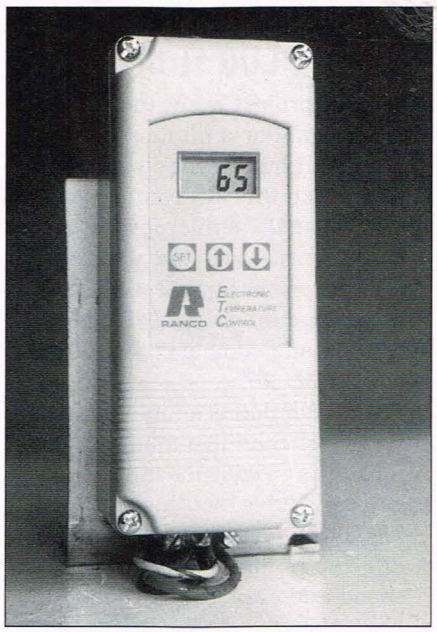
Before installing the new controller, turn the existing control to maximum or "on" if you don't want to remove it, and unplug the fridge. If it's already defunct, as ours was, remove the thermostat and tape over any connections not in use.

Our new controller is microprocessor-based and has setpoints from minus-30° F to 220° F. It also offers a differential adjustment of 1° to 30° F and an eight-foot temperature sensor cable.

Why is differential adjustment important? You want your beer to maintain as even a fermentation temperature as possible. And if you've watched your fermentations, you know that some yeast are so exothermic (heat giving), they raise the wort temperature by 7° F or more. So keeping the air inside the refrigerator constant is crucial. The Ranco ETC can accomplish this easily. It's able to switch 16 amperes, which is more than sufficient for our modest 3.75 amp requirement.

For installation, Ranco expects standard practices. That is to say, conduit, strain relief and proper connectors and connections. Remember: Black is hot. It goes to the brass color/narrow spade of the power connector. White is neutral. It goes to the silver color connector/wide spade on the plug. Red is traveler. It connects power.

Be sure the refrigerator is grounded: Since brewing is messy and wet and your new refrigerator is likely to be installed on a concrete floor, I would highly recommend spending $10 to $20 on replacing your power outlet with a "Ground Fault Interrupter" (GFI) outlet. A GFI detects current leakage and will immediately shut off the circuit before you get a hair-curling shock.



Closeup of a Ranco "Electronic Temperature Controller" (ETC).

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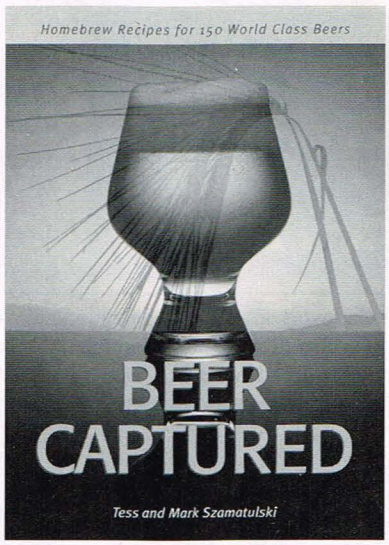
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CIRCLE 33 ON READER SERVICE CARD

PLUG IT IN

Our project is not the only good idea: For a bit more money, you could buy a plug-in controller like the "Brewer's Edge Controller II," a microprocessor-based device. Like our controller, you can select temperature setpoints and differentials for both heating and cooling control. The cost is $99.90.

Installation is simple and takes less than five minutes. Just plug the refrigerator into the Brewer's Edge, set the controls, install the temperature probe and you're done. Pros include speed and ease. A drawback is cost. Also, the device will only control the main compartment; the freezer will not be usable.

The Controller II and other plug-in devices are available from homebrew shops and mail-order companies.

Only a few thermostat connections are required, yet this was still a challenge because there are several ways to accomplish the same task. I disconnected the wires (red and black) from the rear of the old thermostat and considered several different options.

I could have run wires from the controller to those existing connectors, in effect replacing the defunct thermostat with the new. That meant long wires from the controller into the cabinet. Or I could have cut the power cord and wired it into the controller. That would mean the interior light wouldn't switch on unless the compressor was operating.

I spliced in the controller at the rear to leave power to the interior light. I spliced into the white, red and black wires and soldered the connections. Then I carefully wrapped the bare wires with two layers of electrical tape, each layer going in opposite directions. I connected our wiring to the ETC, following the included directions.

I ran the sensor cable down the wiring bundle and drilled a 1/4-inch hole through an access port built into the refrigerator (the foam-injection port.) I pushed the sensor through the hole and simply taped it to the side of the box, using a shelf channel as a guide.

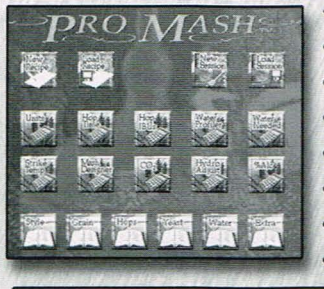
Setting the ETC is very similar to setting your digital watch. Setting the differential is up to you. The ETC-equipped refrigerator switches on when the temperature gets to your desired temperature plus the differential amount. Try setting a four to five degree differential and setting the temperature one degree above the desired fermentation temperature. That should provide a useful average. ■

Thom Cannell is a regular contributor to Brew Your Own.

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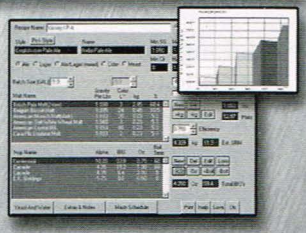
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CIRCLE 7 ON READER SERVICE CARD

Herbal Libations

The ways and means to making a spiced metheglin

by Pattie Vargas and Rich Gulling



HERBS DRYING IN BUNCHES in country kitchens. Air redolent of spice. Jars of honey lined up in farmer's markets — like crisp fall apples and pumpkin pies, these things punctuate fall's colorful days and frosty nights. Come November, old-time winemakers used to venture into the cellar to blow dust off the bottles of last year's metheglins. Similar to sack meads, metheglins get their complex flavors from a combination of honey and herbs or spices. Metheglins cater to sophisticated tastes in the dining room as well as in the kitchen.

Metheglins get their name from the Welsh word "meddyglyn," which means "physician." In medieval times, spiced meads were believed to have medicinal powers. No doubt, those who sipped them did feel better. When the Tudors brought some Welsh customs to England in the sixteenth century, metheglin referred to plain and spiced meads.

Honey-based wines were also common in ancient Scandinavia, Gaul, Teutonic Europe and Greece. Meads were the beverage of choice in northern countries where grapevines do not flourish. By the fourteenth century, spiced ale and pyment (grape melomel) became more popular. Eventually, mead, once the most common drink of England, lost ground to ales, beer and grape wines.

Metheglins deserve to make a comeback. Once you've brewed your own batch, you may decide your kitchen isn't complete without them.

A Few Tips

Fresh honey is best for making metheglins. If possible, buy raw unprocessed honey from a local beekeeper and use it quickly; the quality of honey deteriorates over time. Otherwise, you can find unprocessed honey at natural food stores or your local home winemaking or homebrew supply shops.

Because honey is low in nitrogen — and nitrogen is required for a vigorous fermentation — yeast nutrient must be added to metheglins. Traditionalists first boil the honey with water to coagulate the proteins and beeswax residue. Then they skim off the foam. Boiling kills wild yeasts in the honey and ensures that the wine yeast you choose will flavor the metheglin.

This process usually produces a fine, clear mead. Some critics say that boiling also removes some of the honey's aroma and flavor. They suggest bringing the honey-water mixture to a temperature of 160° F, holding this temperature for five minutes, and then rapidly cooling the mixture to room temperature. Still others avoid heat completely, and use sulfites to sanitize the must and clarify the mead by repeated racking prior to bottling.

Your water is also important. Old recipes call for rainwater, which once was pure but today often contains pollutants. Some spring water has a high sodium content, as does softened water. Your safest bet is to use tap water, but if your water supply is extremely hard or extremely soft, use distilled water.

COMMON METHEGLIN FLAVORINGS



A wide variety of herbs and spices can be used to flavor your metheglin. Herbs are generally leafy and spices are harder (seeds, roots and woods). Spices such as cinnamon, nutmeg, ginger, vanilla, caraway seed, cloves and almonds have well-known flavors. Metheglins made with these ingredients are much like the mulled wines served during the holidays. Caraway makes a good cooking wine and fennel is great for licorice lovers. For herbal wines, rose petals and the other flowers listed are very subtle and great for drinking and cooking. Parsley wine is crisp and needs aging, as does sage wine. Here's our list of ingredients.

Tarragon (French)	Sweet Marjoram	Peppermint
Stick Cinnamon	Rosemary	Mace
Nutmeg	Whole Cloves	Orange Peel
Balm	Lemon Peel	Hyssop
Rose Petals	Chamomile	Lemon Mint
Ginger	Sweet Basil	Sage
Sweet Woodruff	Cardamom	Fennel Root
Spearmint	Orange Mint	Honeysuckle Flowers
Thyme	Lemon Balm	Angelica
Caraway Seeds	Parsley	Violet
Clover Blossom	Almonds	Dandelions
Vanilla	Juniper Berries	Orange Blossoms

Metheglins also need an added acid component — either a commercial acid blend (which you can buy at a home winemaking shop) or citrus juice for tartness. The acid level of a finished metheglin should be between 0.5 and 0.7 percent, a figure you can measure with a simple kit. The acid can be added at the beginning or at the end of fermentation. If you are a novice, follow the recipes closely at first. As you gain experience, you can adjust the flavors and the acidity at the end of the process.

You'll need three major ingredients in addition to honey, water and herbs or spices: yeast, yeast nutrient and the acid blend. Some good yeast strains for honey wines include Montrachet (Red Star Davis # 522), California Champagne (Red Star Davis # 505), Pasteur Champagne (Wyeast 3021) and Prise de Mousse (Lalvin's EC-1118). The yeast nutrient contains ammo-

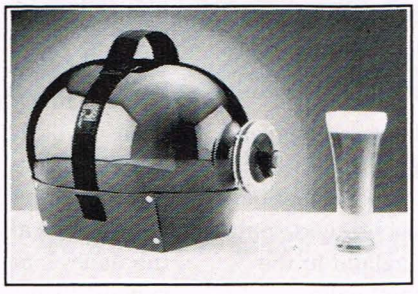
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nium compounds, trace elements and vitamins. Since commercial yeast nutrients vary, use the amount recommended by the supplier. The acid component provides good wine flavor, helps create a good environment for yeast growth and has a slight preservative action.

Some of the best herbs for metheglins appear on the herb chart, but you may also use others. Be sure to check the properties of the herb before you use it and use culinary herbs rather than medicinal herbs. If you have any questions you should refer to an herbal dictionary. If you wouldn't eat it, don't make methleglin with it.

The amount of the herbs used in metheglins depends on the nature of the mead and how you plan to use it. If you are in doubt, start by making a fairly strong "tea" from the herb and then make this tea into a metheglin. For cooking metheglins, make the tea slightly stronger. Depending on growing conditions, fresh herbs vary widely in the strength of their flavors. Dried herbs have more concentrated flavors than fresh ones.

Royal Metheglin

We're not sure if the metheglin served to royalty was any better than a peasant's variety, but we're sure the spices make this mead fit for a king. Makes one gallon.

Ingredients

3 lbs. (1.4 kg) honey
3 tsp. (15 g) fresh rosemary leaves
3 tsp. (15 g) fresh thyme leaves
3 tsp. (15 g) orange zest
3 tsp. (15 g) lemon zest
3 fresh sage leaves
3 bay leaves
1 tsp. (5 g) dried hyssop
4 allspice berries
6 cloves
3 tsp. (15 g) fresh ginger, chopped
2 bags Earl Grey tea
1 tsp. (5 g) pectic enzyme
1 tsp. (5 g) acid blend
1-1/2 cups (360 mL) orange juice
1 package Montrachet yeast (5 to 7 g)
1 tsp. (5 g) yeast nutrient
1/4 tsp. (about 1 g) grape tannin
1 campden tablet

Step by Step

Boil the honey in water (1 part honey to 2 parts water) in a large non-reactive pot for 10 to 20 minutes, skimming off the foam. When the foam stops rising, add herbs and spices. Cool and transfer to a two-gallon plastic container. Brew the tea by steeping in a cup of boiling water for 5 minutes. Add the tea to the honey mixture along with the acid, the pectic enzyme and water to make a gallon. Add the campden tablet and let the mixture sit, well-covered, for 24 hours.

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Make a yeast starter by combining the yeast and yeast nutrient with tepid orange juice. Cover, shake vigorously, let stand until bubbly (1 to 3 hours), then add to the must. Add tannin and allow the mixture to ferment. Rack after the most vigorous fermentation and siphon the wine into a one-gallon, airlocked fermenter. Rack into another airlocked fermenter in 3 months and again in 6 months. Rack again before bottling, about one year after fermentation started. Bottle and cork. Store in a cool cellar for 6 months before using.

Fall Spice Metheglin

Makes one gallon of mead.

Ingredients

1 vanilla bean
1 cinnamon stick
1/2 tsp. (2.5 g) ground ginger
1/2 tsp. (2.5 g) ground nutmeg
1/2 tsp. (2.5 g) ground allspice
1 large orange, juiced
2 lbs. (900 g) clover honey
1 tsp. (5 g) pectic enzyme
1 tsp. (5 g) acid blend
1 package Montrachet yeast (5 to 7 g)
1-1/2 cups (360 mL) orange juice
1 tsp. (5 g) yeast nutrient
1/4 tsp. (1 g) grape tannin
1 campden tablet

Step by Step

Put the spices and juice of the orange into a two-gallon plastic container. Boil the honey in water (1 part honey to 2 parts water) in a large non-reactive pot for 10 to 20 minutes, skimming off the foam. Pour the honey-water mixture over the spices and juice. Cool. Add the acid, the pectic enzyme and water to make a gallon. Add the campden tablet and let the mixture sit, well-covered, for 24 hours.

Make a yeast starter culture by combining the yeast and yeast nutrient with the tepid orange juice. Cover, shake vigorously and let stand until bubbly (1 to 3 hours), then add to the must. Allow the mixture to ferment. Rack after the most vigorous fermentation and siphon the wine into a one-gallon, airlocked fermenter. Rack into another airlocked fermenter in 3 months and again in 6 months. Rack again right before bottling, one year after fermentation started. Bottle and cork the finished metheglin. Store for 6 months.

Rocky Mountain Red Metheglin

We found that hummingbirds loved Celestial Seasonings' Red Zinger tea. Once we tasted this metheglin, we know why! Makes one gallon of mead.

Ingredients

3 lbs. (1.4 kg) orange blossom honey
1 cinnamon stick

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1/8 tsp. (about 1/2 g) ground cloves
2 tsp. (10 g) fresh grated orange zest
2 large oranges, juiced
8 Celestial Seasonings Red Zinger tea bags
1 tsp. (5 g) pectic enzyme
1 tsp. (5 g) acid blend
1-1/2 cups (360 mL) orange juice
1 tsp. (5 grams) yeast nutrient
1 pkg. Montrachet yeast (5 to 7 g)
1/4 tsp. (1 g) grape tannin

SOME MEASUREMENTS FOR METHEGLINS

Dried herbs..... 2 to 3 ounces (about 57 to 85 grams) per gallon
Fresh herbs..... 2 to 3 cups (480 to 720 mL) per gallon, loosely packed
Nuts..... 1 to 2 ounces (28 to 56 grams) per gallon
Cinnamon sticks....15 grams per gallon
Juniper berries..... 4 to 5 per gallon (juniper berries are one of the flavoring components of gin; a few go a very long way)
Peels (citrus)..... 2 to 3 fruits per gallon (just the absolute outer rind)

Step by Step

Boil the honey in water (1 part honey to 2 parts water) in a large pot for 10 to 20 minutes, skimming off the foam. Add the cinnamon, cloves, orange zest and juice. Let cool and transfer the honey-water mixture to a two-gallon plastic container. Brew the tea by steeping in 2 cups of boiling water. Add the tea to the honey and spices. Add acid, pectic enzyme and water to make one gallon. Add campden tablet and let sit, well-covered, for 24 hours.

Make a yeast starter culture by combining the yeast and yeast nutrient with the tepid orange juice. Cover, shake vigorously and let stand until bubbly (1 to 3 hours), then add to the must.

Add the tannin. Allow to ferment. Rack after the most vigorous fermentation into a one gallon, airlocked fermenter. Rack into another airlocked fermenter in 3 months and again in 6 months. Rack again just before bottling, about a year after fermentation started. Bottle and cork and store for 6 months in a cool cellar. ■

Pattie Vargas and Rich Gulling are the authors of several books, including "Making Wild Wines and Meads: 125 Unusual Recipes Using Herbs, Fruit, Flowers and More" (Storey Books, 1999). The three metheglin recipes in this article first appeared in that book.

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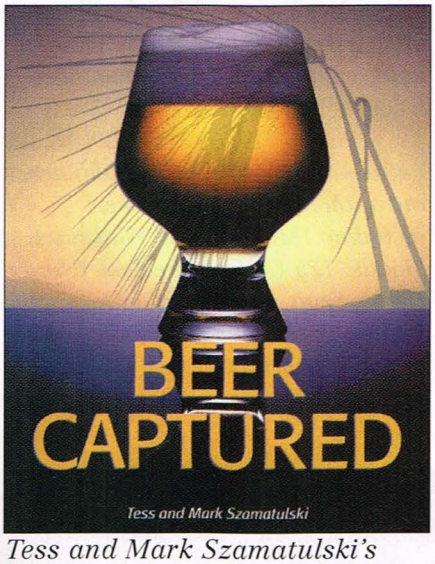


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Tess and Mark Szamatulski's new recipe book is on sale now.

NEW BEER BOOKS

"Beer Captured: Homebrew Recipes for 150 World-Class Beers" by Tess and Mark Szamatulski (Maltose Press). Hankering for a pint of Black Sheep Special Ale from Yorkshire, England? How about a Noche Buena holiday beer from Monterey, Mexico or a Baltika Porter from St. Petersburg, Russia? Tess and Mark Szamatulski serve up "clone" recipes for these far-flung beers and dozens of others in their handy new book.

The first three chapters offer tips for cloning beers, advice on brewing basics and recipe guidelines. From there, it's page after page of great recipes. For each beer, Tess and Mark offer a bit of background on the brewery, a brief description of the beer and a step-by-step extract-based recipe with partial-mash and all-grain options. Each page includes helpful hints and serving recommendations; the Black Sheep Special, for example, should be served "in a pint glass at 55° Fahrenheit with individual Beef Wellington .. and roasted potatoes."

The back of the book includes a chapter on pairing beer with food, plus helpful charts on style guidelines, hops, yeast and grains, malt, adjuncts and sugars. Each recipe was brewed, tested and tweaked by the Szamatulskis in their own "homebrew kitchen."

Tess and Mark are the authors of "Clonebrews: Recipes for 150 Commercial Beers" (Storey Books). They own Maltose Express in Connecticut, serve on the *Brew Your Own* editorial review board and write our "Style Calendar" column.

Suggested retail price: $15.95. To order, call (877) 827-5815 or go to www.beercaptured.com.

"North American Clone Brews: Homebrew Recipes for Your Favorite American and Canadian Beers" by Scott R. Russell (Storey Books). Longtime *BYO* columnist Scott Russell is the author of another new recipe book that's out this fall. The first section covers the basics of "clone brewing," from understanding the ingredients to basic brewing techniques. Section Two offers recipes for almost 150 American beers; Section Three serves up a dozen Canadian clones.

The recipes are partial mash, a combination of extract and grain. Each page also offers an all-extract and an all-grain option, plus a serving suggestion ("serve at 50° F in a cylindrical alt glass"), the basic stats (OG, FG, ABV and IBU) and a bit of background on the beer and brewery. The clone recipes range from Alaskan Amber to Crazy Ed's Original Cave Creek Chili Beer, Rogue Mocha Porter, Long Trail Ale and La Fin du Monde. The book also includes a complete style guidelines chart.

Scott has been contributing to *Brew Your Own* since the magazine was founded in 1995, handling our "Recipe Exchange" and "Replicator" columns and writing many features. He's the author of several homebrew books, including "Seven Barrel Brewery Brewers' Handbook" (G.W. Kent, 1996) with co-authors Greg Noonan and Mikel Redman. Price: $14.95. Call (800) 441-5700 or go to www.storeybooks.com.

The Beer History Book Store recently announced that the landmark 1962 tome, ***"Brewed in America: The History of Beer in the United States,"*** has been reprinted and copies are available. Price: $36.95. To check it out, go to www.beerhistory.com/store/s1175.shtml. The store is also offering a $49.95 "Crash Course" special that includes one copy of "Brewed in America" and one copy of ***"Beer Blast: The Inside Story of the Brewing Industry's Bizarre Battles for your Money" by Philip Van Munching.***

"The Brewpub Explorer of the Pacific Northwest, Second Edition" by Ina Zucker, Hudson Dodd and Matthew Latterell (Johnson Associates International). An updated, expanded guide to hundreds of craft breweries in Oregon,

Washington and British Columbia. Price: $16.95. Call (425) 454-3490 or email jasibooks@aol.com.

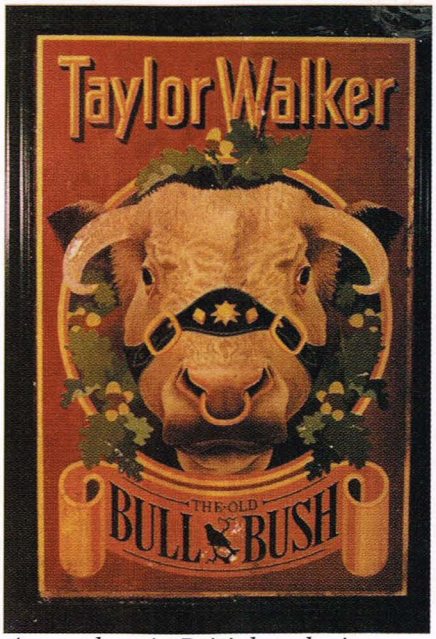
"Pocket Guide to Beer: The Connoisseur's Companion to More than 2,000 Beers of the World" by Michael Jackson (Running Press, 2000). This revised seventh edition is essential equipment for beer lovers; it's a directory to 2,000-plus beers from around the world, including 750 new or revised entries. Jackson describes and rates each beer. Price: $12.95. Call (800) 345-5359 or go to www.runningpress.com.

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The artwork on each sign is terrific. Just before our September press deadline, available signs depicted a knight slaying a dragon, the moon rising over Stonehenge, a fox-and-hounds hunting scene, a wide variety of landscapes and many other options. The signs cost between $700 and $1,000. Add $65 for shipping. You also can order a hand-painted sign of your own design. Allow four to six weeks for completion. Price: $1,500.



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Wyeast Laboratories recently introduced a new "Gold Tube" of pure liquid yeast that's ready to pitch, a nice addition to the company's well-established line of smack packs. Each tube of yeast contains 150 milliliters — some 40 to 60 billion cells — of freshly harvested yeast, enough for a five-gallon batch. The tubes are available in all of the Wyeast strains, plus select new strains with seasonal release. Suggested retail price: $6.

Also new from Wyeast: a sanitary sampling swab called "pro>tect." The swabs offer a ten-minute test for surface purity; they're ideal for testing hoses, fermenters and heat exchangers for residual proteins that can harbor bacteria or wild yeast. (The swabs are made for testing clean, sanitized and rinsed surfaces, not wort or beer). To use, you simply swab the test area and place the swab back into the tube, which is filled with a liquid indicating solution, and shake. The color will change within ten minutes; green is clean, gray is caution, purple means fail. Each swab costs approximately $4.

Both products are available at many homebrew shops. For more information, call Wyeast customer service at (541) 354-1335 or e-mail brewerschoice@wyeastlab.com.

WHITE LABS UPDATE

In other yeast news, White Labs has a new Web site that's worth checking out (www.yeastbank.com). The online newsletter features yeast tips, new product release information, articles and more.

Every other month, White Labs is releasing two or more "Platinum Series" strains from its private library. This is the first time these ready-to-pitch liquid strains have been available to homebrewers. Here's what's new in the months of October and November.

Australian Ale Yeast (WLP009): Produces a clean, malty beer with a pleasant ester character; can be described as "bready." Can ferment successfully, and clean, at higher temperatures. Attenuation: 70 to 75 percent. Flocculation: High. Fermentation temp: 65° to 75° F.

California Ale V Yeast (White Labs WLP051): From northern California, this strain is fruitier than California Ale (WLP001) and slightly more flocculant. Attenuation is lower, resulting in a fuller-bodied beer. Attenuation: 70 to 75 percent. Flocculation: Medium to high. Fermentation temp: 66° to 70° F.

Coming up in December and January: Southwold Ale Yeast (WLP025), Southern German Lager Yeast (WLP838) and Old Bavarian Lager Yeast (WLP920). For more information, call White Labs at (888) 5-YEAST-5. ■

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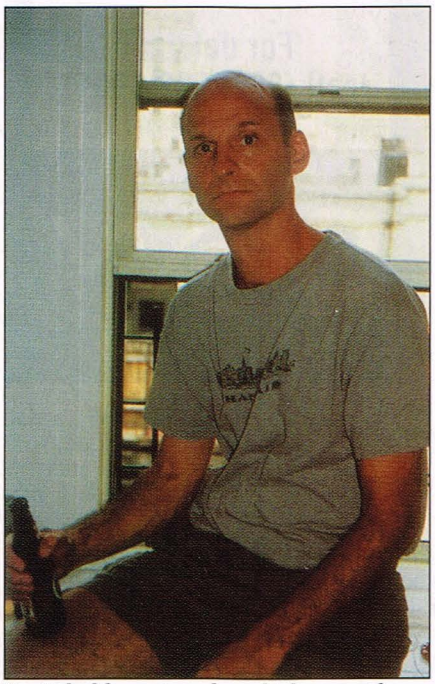


PHOTO BY BRETT PIERCE

Brett holds a store-bought beer and looks forward to having room to brew.

I BEGAN HOMEBREWING BACK in 1987 in an illegal loft space in New York City, just two blocks south of Madison Square Garden — a shadowy, dour stretch of city that could only boast cheap rent. I was 28 and exploring the fringes of television by working as a production assistant on programs about phone systems and "working women." This was not exactly early MTV; it was just bad television and I needed something edgy to round out my Manhattan persona.

I turned to homebrewing, moving past the vanguard of the burgeoning microbrewery movement and into an exclusive circle of determined young drinkers. Two homebrew shops had just opened in Manhattan and my knowledge of their whereabouts set me apart from others. Things were good.

My first homebrewing experiences were unqualified successes. Not because the beer turned out well — I learned to keep a store-bought supply on hand at all times — but because the brewing process was the best all-day party fodder in town. For five hours, my buddies and I would revel in the heavy grains and luscious smells. We got lost in the matrix of minutes and temperatures that were required to make the beer. It was the exact science that made it so appealing.

Then everyone would leave me stuck with a rancid kitchen. But I remained enthralled. When the yeast began to bubble it gave me goosebumps. I even loved the motions and rhythms of bottle capping. It doubled as a gym workout. (This should give you an idea of my overall body frame.)

I have a certain aptitude for denial but even my most internalized systems of abnegation couldn't hide the fact that my beer was unpleasant. In fact, my beer sucked. It really did. Maybe it was my impatience with the sterilization process, I don't know. I never took the matter seriously because it did not seriously matter. I had homebrew to share with my friends, an excuse for a bimonthly party and a rise in my Manhattan coolness stock.

Soon after I discovered homebrewing, I fell in love and decided to move in with my wife-to-be, Kerry. "Uh-oh," you say ... and rightly so. First, a word or two about Kerry. This is a woman who, upon tasting her first Guinness in Ireland, announced, "I have never tasted anything better in my whole life," to which I promptly replied, "I love you more than ever."

But beer drinking and beer making are two different things. And the beer-making equipment tends to take up a lot of space in a Manhattan apartment. While some of us don't mind sleeping in a place that smells like a pub, others do.

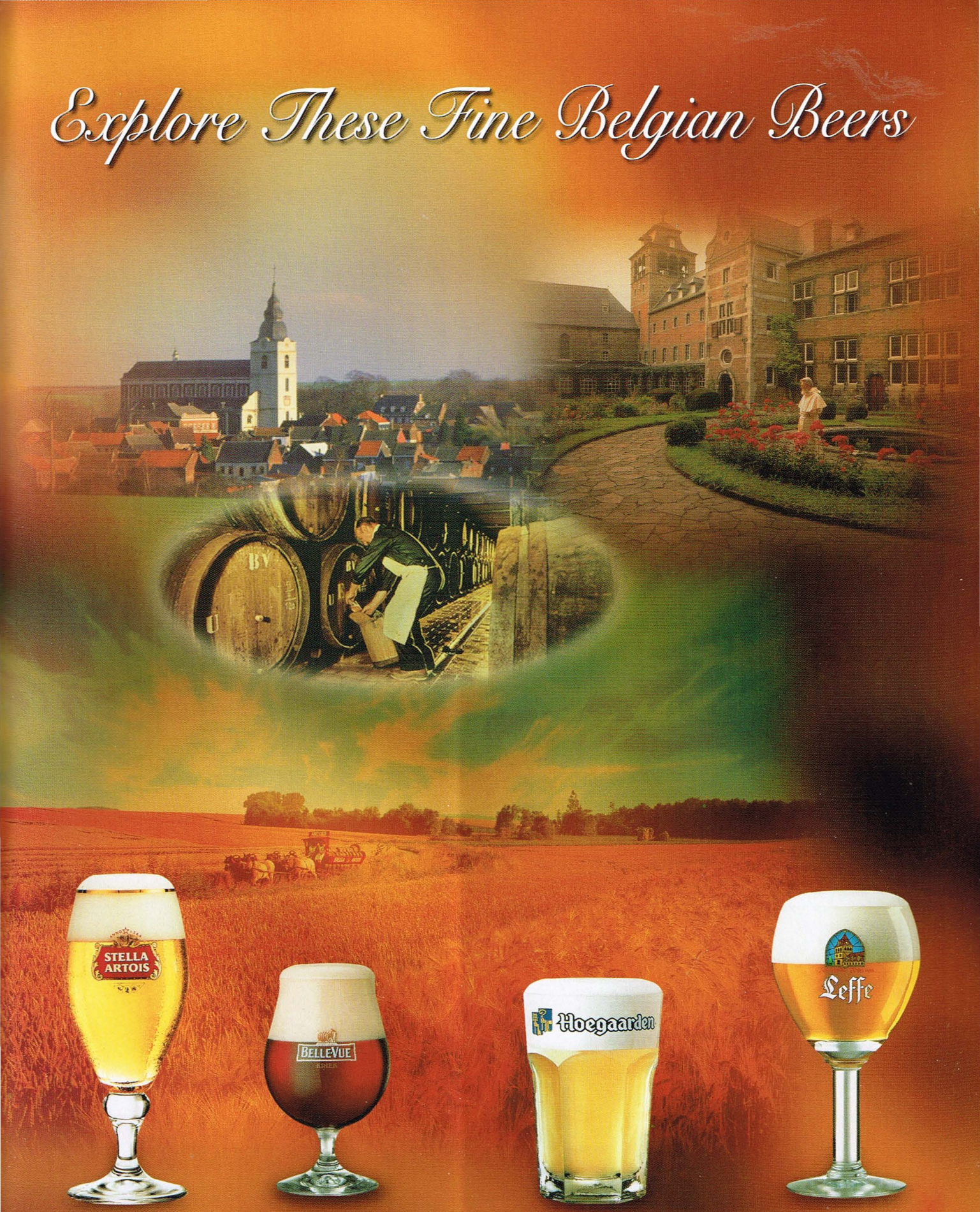
Just before our wedding, Kerry and I went around my apartment, putting blue dots on the things that would move to her place and green dots on everything else. I had to pick my battles and, in the end, my poster-sized photo of the Mets beating the Red Sox in 1986 was where I focused my defenses. The homebrew equipment went to storage.

Years have passed and the homebrewing glow that helped shape my New York identity has faded. Being a "Pete's Wicked" kind of guy is like being a mini-van owner: it lacks a certain cachet. Before you slam the magazine down in disgust, give me few more sentences to redeem myself.

There is hope. We're moving out of Manhattan to the wilds of northern New England. We're moving to a house with a big kitchen and a cool, dark basement. And those green-dot boxes from storage are moving with us. Yup, it's homebrew time again. But this time, maybe, it won't be about my social status. This time it'll be about the beer. ■

Having recently fled Manhattan, Brett Pierce and his family now live in Maine.

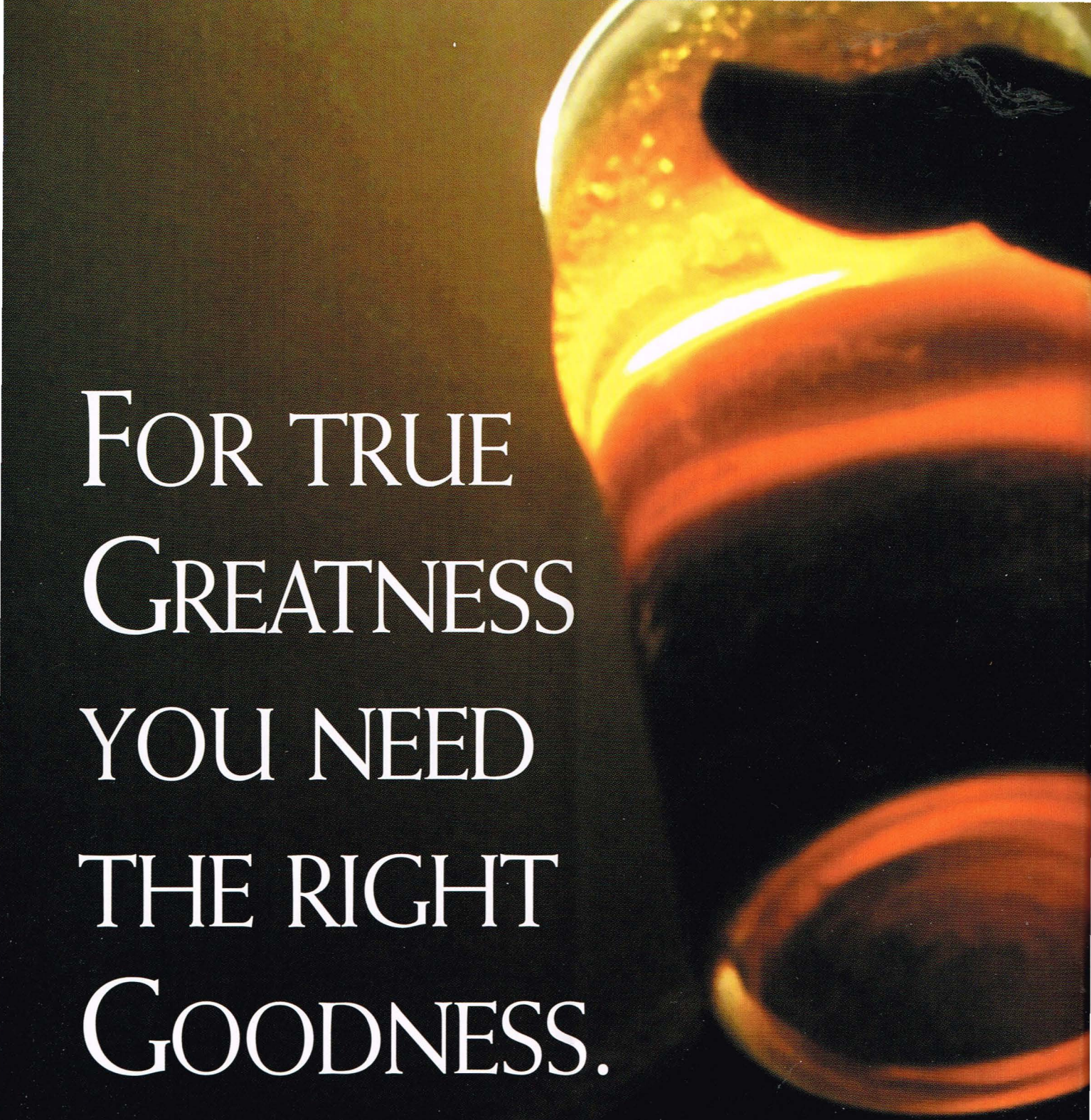
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