Brew

FEBRUARY 2001, VOL.7, NO.2

THE HOW-TO HOMEBR NE

11 German Recipes!

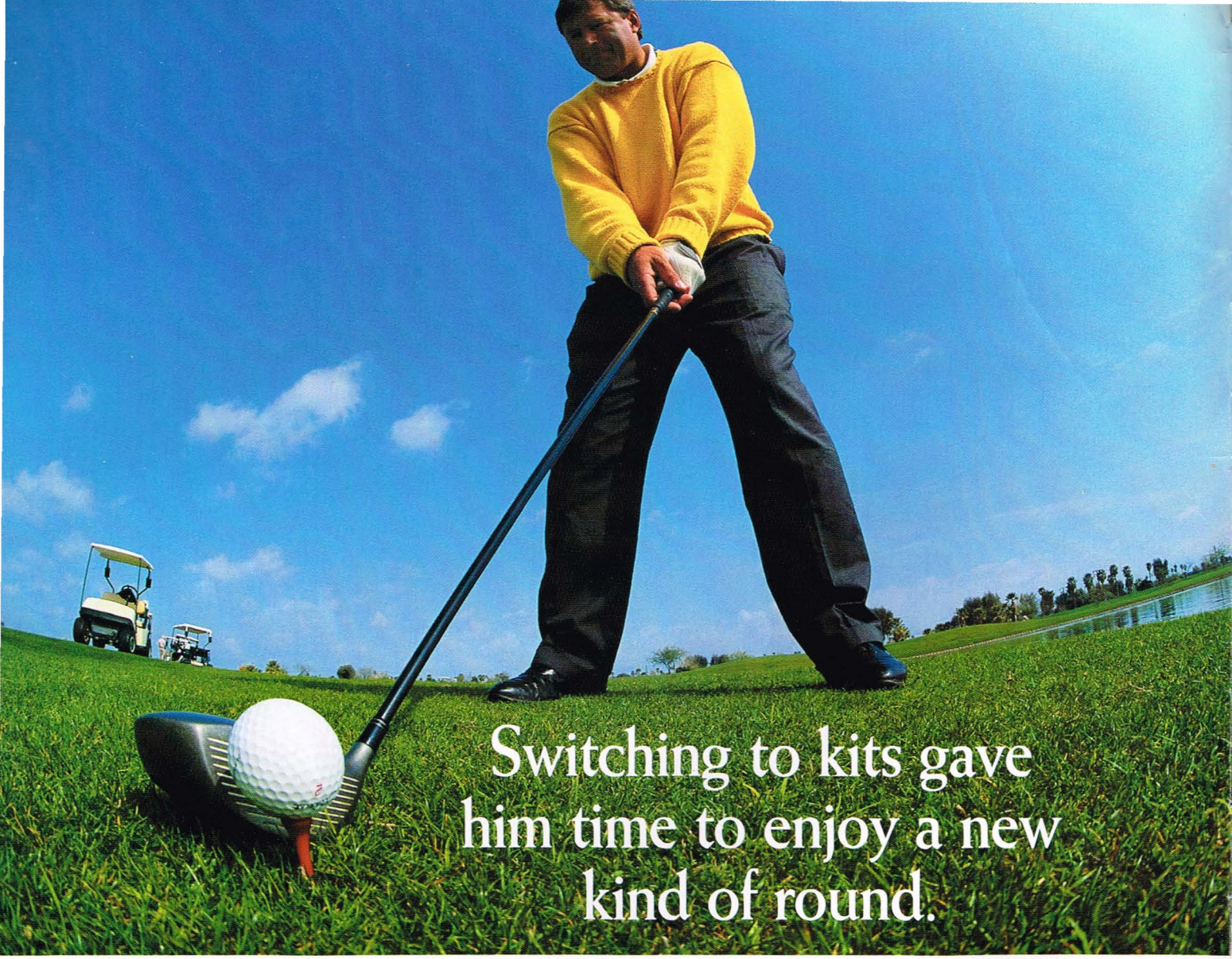
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"I wouldn't have believed that a kit beer could be so good"

Roy Bailey - Beer Correspondent
CAMRA's 'What's Brewing' magazine (April 2000)

In Roy Bailey's local Good Beer Guide Pub, the customers' reaction was ***"uniformly complimentary"*** and ***"most of them thought it was a full-mash ale"***

"I'm really impressed! This is better than many pints I've had in the pub"

BBC Radio 4 food & drink programme (July 2000)

This man loves brewing. But he also loves life.

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Cover photo: Charles A. Parker/Images Plus



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Editor's Note

My Haus in Munich

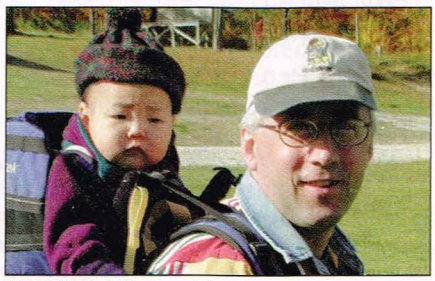
While writing a photo caption for this month's cover story on German beers, a weird fact occurred to me: Outside of the United States, the one place I have visited more than any other is the Hofbräuhaus in Munich. I've been to Germany three times, and on each trip I've made my way to this world-renowned brewery and beer hall. The first visit, during a high-school German Club excursion, was the first time I tasted authentic German beer. Having grown up in Nebraska, where Coors was considered exotic, the huge flavor and powerful punch of that bock just blew me away. Then our chaperone caught up with us and the tasting session came to an abrupt end.

In this issue, we tour the wide and wonderful world of German beers through a great collection of stories. The cover article, written by Tess and Mark Szamatulski, offers a dash of German brewing history and step-by-step recipes for brewing five delicious beers, from helles to dopplebock. It's accompanied by articles that explain three interesting German brewing methods: making "stein beer" by using superheated rocks to boil wort; "first-wort hopping" by adding bittering hops to the kettle before the boil; and conducting a double-decoction mash.

The decoction article, which includes tips and detailed instructions, is authored by Lynne O'Connor, who owns St. Patrick's of Texas, a large homebrew and wine-making supply shop in Austin. This excellent article is based on first-hand knowledge: Lynne recently traveled to the Czech Republic and spent 14 hours watching a brewmaster conduct a traditional double decoction, from doughing-in to pitching the yeast. We're very glad to have Lynne's work in our pages. Prost!

KATHLEEN

Contributors



Charlie and son Adam scout out some photo-shoot locations in Vermont.

Charlie Parker's first *BYO* assignment required him to photograph a sheep — a big and rowdy sheep — as it peered over beer bottles perched on a stone ledge. The photos were terrific (see the Summer 2000 issue), and from that day forward, Parker has been our man behind the lens.

Charlie graduated in 1983 from the Rhode Island School of Photography and moved to Vermont to help his parents run their new inn. He never left. He and wife Meg are now settled in Bridgewater, 10 miles from the Killington ski slopes, with their one-year-old son, Adam.

Charlie established his freelance photography business, Images Plus, in 1985. His clients now range from Fortune 500 firms to mom-and-pop shops. And, of course, he shoots the cover for almost every issue of *BYO*. His favorite so far? "Actually, it's this issue," he says. "Their rapport was terrific and I love the expression on their faces. They look so happy." With easygoing Charlie taking the photo, who wouldn't be?

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Mail

No Tree, No Sahti?



I am attempting to brew a batch of Finnish sahti and am trying to determine how much juniper to use. All the recipes I've seen discuss filtering the wort through branches and berries. As I have only dried berries available to me, can you offer any suggestions? Also, I was able to locate an herbal extract of juniper. Can I use this extract? If so, how much would I put in a five-gallon batch?

Are Valvas
Snohomish, Washington

The timing of your question is excellent, because the January issue of BYO included a recipe for sahti, the juniper beer that's indigenous to Finland (see "Adventures in Homebrew"). Authors Joe and Dennis Fisher reply: "Brewing an authentic sahti supposedly requires the use of juniper branches, sahti malt and Finnish baker's yeast, but Michael Jackson once sampled a contest-winning homebrewed sahti made without any juniper at all.

We'd recommend that you stick with the dried berries (a few tablespoons of crushed berries in a five-gallon batch) and avoid the extract. There are different kinds of juniper extract: Some are tinctures, which might be okay in beer, but essential oil of juniper is so strong that it can be poisonous, even in small doses. Juniper is an acquired taste; too much can produce a flavor and aroma reminiscent of smelly feet."

Coffee Malt

I would like to know where to obtain the "kilncoffee" malt mentioned in the Corsendonk recipe in "Dubbel Vision" *(November 2000)*. I really enjoy this Belgian dubbel and would like to brew a batch.

George L. Watt
via e-mail

Kilncoffee malt, made by Malterie Franco-Belges, is a bit obscure. One mail-order source is St. Patrick's of Texas, one of the country's largest homebrew supply shops. Just contact St. Pat's on the Web at www.stpats.com or call (800) 448-4224. Also: Author Scott Russell says he used to get it wholesale, when he worked at a commercial brewery, from GW Kent.

Glowing Reference

I just received the December 2000 issue, which included the "Reference Guide." Wow! What a great resource! All the information a homebrewer could want in one place. If anyone is trying to brew without subscribing to *BYO*, they are fumbling in the dark. Cheers.

Paul F. VanSlyke
Deposit, New York

Soda Query

I'm making a cream soda for a family event, but I'm having trouble getting the creamy taste. I have tried several recipes, using everything from raisins to cream of tartar. My basic ingredients are corn sugar and cane sugar, vanilla bean and malto-dextrin. I'm using forced carbonation. I tried the extract, but that seems to work best with yeast, not carbon dioxide. Any advice?

Jerri Lynn Cologna
Marshfield, Missouri

For an answer, we turned to Stephen Cresswell, author of "Homemade Root Beer, Soda and Pop" (Storey Books, 1998). Coincidentally, we published three of his excellent root-beer recipes in the January issue of BYO. Here's what the soda expert says:

"A truly creamy taste and body can be elusive with soft drinks. I believe a foamy, creamy body is



MaiL

more attainable with a yeast-made beverage than with carbon dioxide. Still, my recommendation is to do what the oldest makers of cream soda did in the century-before-last: They first made a beverage with a strong vanilla taste, then added a few tablespoons of table cream to the drink at serving time."

Extract Brewers Unite

I found the "Don't Boil It" article by Mark Henry to be very informative and well-written *(October 2000)*. He dispelled many of the fears and misinformation out there regarding the brewing of beer from kits. The article systematically broke down all of the major points of contention around this topic.

Please keep in mind that the majority of us are kit and or extract brewers who just don't have the time and energy to brew all-grain. But we still want excellent beer.

Svend Nielson
Bolton, Ontario

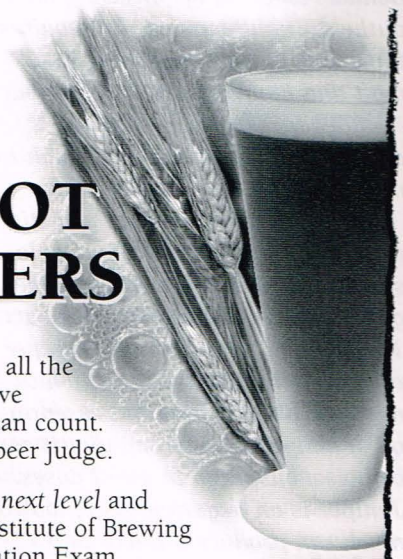
Alaskan Fermentation

The Alaskan Ale recipe offered by the Replicator *(September 2000)* sounds really good. I would like to try it, but I have a question about the fermentation process. The recipe says that primary fermentation occurs at 68° F for 10 days, then you tranfer to secondary and ferment at 40° F for a couple of weeks. Wouldn't Wyeast 1007 (German Ale) be put into suspension at this temperature and not finish fermenting?

Mike Kesler
Waukesha, Wisconsin

Scott Russell replies: "Generally, yeast activity is minimal after three or four days, so the cool conditioning phase is not really about yeast but about smoothing and clarifying. Lager yeast and certain strains of ale yeast (Wyeast 1007 and 1338 are two that come to mind) are cold-tolerant and do continue to 'work' at cellar temperatures and cooler. This step is absolutely standard procedure for German ales, whether brewed in Juneau or Düsseldorf!" ■

THE NEXT STEP FOR HOTSHOT HOMEBREWERS



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Brick Oven Beer

Aligning your homebrewing hobby with the seasons

DeAnna Mach • Pawlet, Vermont



PHOTO COURTESY OF DEANNA MACH

Homebrewers and pizza makers, DeAnna Mach and Christina Mansfield in front of their awesome wood-fired brick oven, handy for roasting grains.

My partner and I started homebrewing three years ago with a friend who was a homebrewer. Some other friends were getting married and they wanted some good-tasting beer to toast with, so we took on that assignment. Our first beers were a combination of malt extract syrup and grains — what we called our mini-mash.

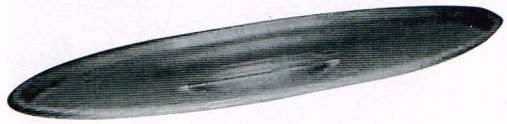
Being connoisseurs of fine food (we own a wood-fired pizza bakery in Pawlet), we both knew that, at some point, our beer needed to be taken to the next level.

WE WANTED OUR HOMEBREW TO HAVE SOME ZING, IF YOU WILL.

Chris and I started experimenting with different techniques and flavors. We wanted our homebrew to have some zing, if you will. Something that defined it as ours. Something so incredibly good-tasting and different that the taster would hardly recognize that it was brewed over a small gas range in a very small kitchen.

Our beers started off a little too exotic. We would add hot peppers to our dark beers for drinking in the cold winter season. Nothing cleans out your sinuses like our "Goat Scrotum Stout!" That was what we called it, thinking with a name like that you wouldn't have very many taste testers. There was also that time we made our first "holiday cheer beer." Knowing we wanted something fruity, we added 15 pounds of berries, 10 pounds of black caps and 5 pounds of fall raspberries. Our beer turned from purple to pink in the period of six months. We now know a little bit goes a long way.

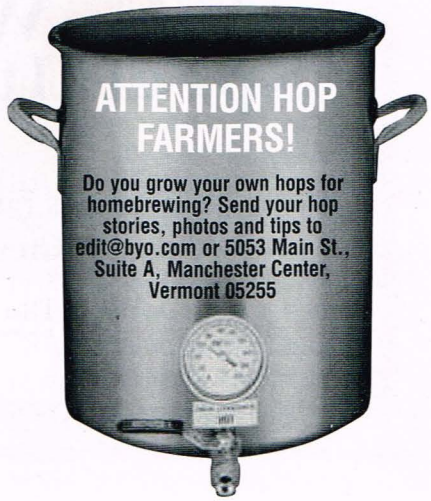
Having a wood-fired brick oven (which we use for our pizza) is a huge asset to, and influence on, our style. We have made a smoked oatmeal stout. Using cherry, apple and black birch wood to smoke our oats gave a wonderful aroma as well as taste. We roast our grains before grinding. We also use Vermont maple syrup and other natural sweeteners to prime our beers in the final with good results.



We like to brew in harmony with the seasons. In the early fall, we harvest wild pears and roast them in our brick oven with some almonds. Our roasted pumpkin beer is always a treat on Thanksgiving and you've already heard about our Christmas ale. In the spring, we celebrate the rising river, which we happen to live precariously close to, with "Dirty Brook Brown Ale." This is one of our favorites. When the river swells during the thaw, it comes within eight feet of our kitchen floor. The energy that surrounds the house creates a perfect atmosphere for brewing.

In the summer we harvest medicinal herbs. Burdock, nettles, Saint John's wort, red clovers — you name it, we use it in our brews. We make ales for whatever ales ya.

We always look forward to brewing. It not only gives us an excuse to relax and have a homebrew, but also to make our kitchen spotlessly clean. If you're ever in southern Vermont, be sure to visit the gals who have a big brick oven with great-tasting pizza and beer.



Sausage Day

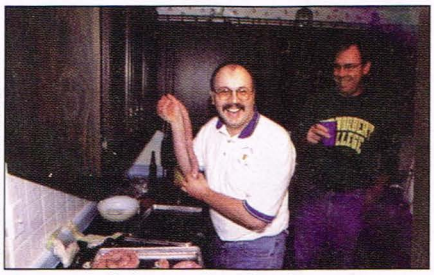


PHOTO COURTESY OF BILL REIS

A proud club member displays an impressive homemade German sausage.

Homebrewers are always looking for great food to match the beer we brew. Well, the Oconto County Brew Club has the problem solved. Sausage ... yes, sausage! Our club feels so strongly that sausage and beer were made for each other that we made 430 pounds this year.

In November, we held our second annual Sausage Day. Luckily, three members possess sausage stuffers and all of our members enjoy homemade sausage. Members bring snacks to match various types of sausage and, of course, plenty of homebrew to sample.

This year we made ten different types: two different German sausages, Swedish, Italian, meatloaf, kraut and onion, chorizo, garlic and onion, boudin and a secret family recipe of Polish sausage. All the sausage turned out great, with no preservatives and quality (90 to 95 percent lean) pork.

We mix everything the night before the event so we're ready to stuff in the morning. The kitchen is thoroughly sanitized. Just like making beer, you have to be extra careful to prevent bacterial infection.

The event takes about five hours with clean-up. All three machines work at the same time. We have a quality control station where bags are checked and marked. One member is in charge of cooking samplers of sausage for the group and, most importantly, keeping our glasses full of homebrew.

While we are making and sampling the sausage, we try to see which beer complements which sausage. Oktoberfests, alts and red lagers go great with German bratwurst and kraut and onion. We even cook the brats in Oktoberfest. For the chorizo (Mexican) and boudin (Cajun), a beer like Modelo goes great. To accompany the Polish sausage, we make a Polish pilsner (Zywiec) clone or a Polish porter (Okocim) clone. And with the Irish and Swedish sausage, Irish red ale goes perfectly.

My grandfather taught me how to make homemade sausage. He was a homebrewer during Prohibition. I am very happy to be able to keep both of these traditions alive in our family. If anyone is in northeast Wisconsin on the second Saturday in November, look us up. ■

Bill Reis
Oconto Falls, Wisconsin

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Excellent Extract

Use specialty grains to improve your malt-extract brews

by Thomas J. Miller

Extract brewers have it easy when it comes to making wort. Rather than crushing pound after pound of grain and mashing at carefully controlled temperatures, malt extract is simply stirred into hot water and often boiled. It's a great way to get started in the hobby and a time-saving way to make excellent beer. By using high-quality extract and a bit of know-how, a skilled homebrewer can produce tasty, award-winning batches.

Many pros use extract too — especially in small brewpubs, where extract saves time and money and helps the brewer produce consistently good batches. Don Gortemiller, head brewer at Pacific Coast Brewing Company, has won more than a dozen GABF medals for his extract beers, which range in style from hoppy IPAs to Scottish ales and Belgian tripels.

Winning awards, however, requires more than a few pounds of extract and hot water. Extract brewers must become skilled in the use of hops, wort chilling and good yeast management. They can also learn to use specialty grains to add flavor, color and body to their brews.

With names like crystal 40, carapils, black patent, caramel and chocolate malt, the world of specialty grains might confuse the brewing neophyte. For opinions and tips on using specialty grains, we turned to three extract-brewing pros.

Brewer: Don Gortemiller of Pacific Coast Brewing Company in Oakland, California. His first brewing experience was with a homebrew kit in 1975. He helped open Pacific Coast in 1988. Before that, he was a chemist at Chevron.

By using good extract, you can get pretty close to brewing a great beer, one that rivals any of the best beers out there. Here's the bottom line: the fresher the extract, the better. No extract has an infinite shelf life, so there can be some spoilage if the stuff gets too old.

In addition, many extracts have a signature flavor. It's something you can't get rid of. Perhaps it's hopped or tastes kind of fake or phenolic. Your goal is to find extract with a flavor that's as neutral as possible, so that by adding specialty grains and hops, you determine the flavor of your beer yourself.

Our extract is produced locally. The specific gravity is around 1.415. Commercial extract is usually between 1.435 and 1.449. That little bit of extra water that's been removed can hurt the beer. You can improve your beer by finding out when the extract was produced and using it as soon as you can.

Our beers are based on a pale malt-extract base. The rest of the flavors we get by "mashing" grains off on the side. When we mash, we're just extracting the flavors and colors, not converting starches over to sugar. So it isn't a "mash" as much as it's steeping the grains.

The grains we steep are black patent, roasted barley, caramel malts and other roasted specialty malts. It's important to understand that these kind of roasted grains don't need to be mashed in order to extract the desired qualities.

It's desirable to have a false-bottom brew kettle, to get better extraction of color and flavor from the grain. Just steep the grains in warm water, drain that liquid away and let the grains rest against the false bottom. Then spray warm water over the grains to rinse away the rest of the flavor and color.

If you use a grain bag, you may not get good extraction, because you can't rinse the grains very well. One way of improving extraction with a grain bag is to squeeze the bag with your hand. While this will get out more liquid, you run the risk of scalding your hands in the hot water. Just think of how you can burn your hand by squeezing a tea bag! Plus, squeezing and dipping the grain bag like a tea bag will extract tannins from the grains, and that will make your final product astringent and unpleasant to drink.

Also, if you're dealing in bigger quantities, you might end up with a very bulky bag of grains. The bag will be saturated with water, which makes it heavy and tough to move around, messy because it will always drip water, and impossible to squeeze effectively. Given all that, it's easy to see that using a false-bottom kettle is the best way to steep specialty grains.

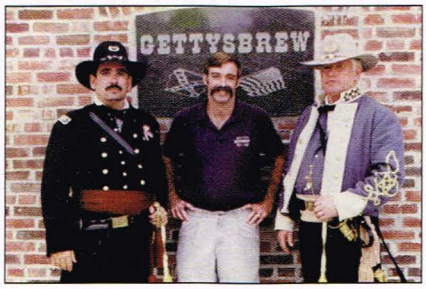


PHOTO COURTESY OF PAUL LEMLEY

Brewer: Paul Lemley of Gettysbrew in Gettysburg, Pennsylvania. Paul has a doctorate in biological chemistry. He began working on the business of opening a brewpub five years ago. It has been up and running for more than three years.

We get in this discussion all the time because brewers have an absolute bias toward brewing with grains. It's like having an argument about sports-car transmissions. Now, I like manual transmissions, but I know that automatic transmissions can do the job just as well, if not better.

The same is true of malt extracts. I have a hard time believing that anyone can do a much better job than Briess or Muntons. They create a consistent product. This saves energy and makes it unnecessary to go through the trouble of handling grains.

When it comes to specialty malts, it's interesting to note that you can get extracts for them. Briess, for example, has regular extract styles like light, amber and dark. You would use these as the base for your beer. However, you can also get specialty grains in extract form. The most popular brand is Morgan's Master Blends, which is a line of specialty grain extracts from Australia. The grain types include caramalt, chocolate malt, wheat malt, roasted black malt and carapils.

When it comes to formulating recipes, if you work out the recipe for an all-grain beer and determine the ratios you will use for grains, you can translate those ratios into an all-extract beer. For example, if your beer is 95% base malt, 4% crystal malt and 1% chocolate malt in an all-grain, you do the same breakdown when translating to extract. Just be sure the targeted original gravity is the same.

Oats and rye don't come as extracts but homebrewers can get them in one-pound bags. You'll need to put them in a hop bag when adding them to the brew kettle. You boil these grains throughout the one-hour boiling to extract the sugars and other characteristics you want. Another option is to steep them alone, like a tea bag, at 155° to 160° F. This will yield about 25% of desirable sugars, an efficiency that's far less than you would get with a full mash. You will get some characteristics that you were seeking, though they will be mild. Oats are particularly good for cutting bitterness. It's one reason why they are used in oatmeal stout. Rye, by contrast, has a very distinctive taste that I don't particularly like.

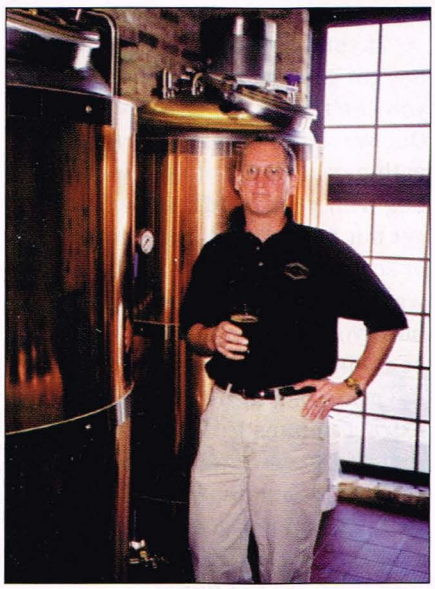


PHOTO COURTESY OF KEN NOVAK

Brewer: Ken Novak of Legends Brewhouse and Eatery of Green Bay in Green Bay, Wisconsin. He was a homebrewer for more than five years before he started brewing for Legends.

Making extract beer is really quite simple. We use a four-barrel extract system and use only extract for our ales and lagers. The only ingredients are liquid extract, hops and dry yeast.

Obviously, that means there are no specialty grains in our beers. In truth, there's probably no way we could even use grain in our system. Our 140-gallon kettle has a filter that would get all blocked up. And a grain bag would be too huge to handle safely and effectively. At home, it's much easier to use specialty grains; you can simply steep them in a cheesecloth bag to add flavor and color to your beer.

To make our beers, we use different kinds of base malts, including golden light, light, amber, dark and weizen malts. This combination allows us to brew a dunkel, a weizen, a light, an amber, a nut brown, a pale ale and a bock. The only way our beers differ from one another is through their base malts and hop profiles. And we're still able to produce great beers!

We also use glucose. Glucose (also known as corn sugar) is 100% fermentable sugar often used to create secondary fermentation in unfiltered beers and create carbonation in the finished product. It can also be added to increase specific gravity and raise the alcohol content. Glucose is relatively flavorless, so it doesn't impart much flavor to the brew, though excessive use will produce a thin-bodied beer.

At home, the key to using specialty grains is to just barely crack the grain. Put it in a bag and lightly run a rolling pin over it. This cracks the husks but holds in the flavor. Then you just put the grains in a hop bag and drop the bag in warm water, maybe 150° F. By steeping the grains for about thirty minutes, you get the color and flavor that you want. Crystal malt is the most versatile specialty grain. It adds great color and body to the final beer. ■

Topping Off

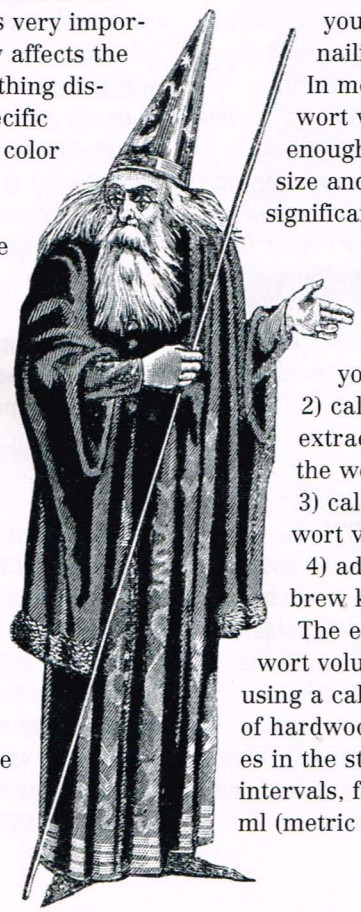
Wort volume, steeping grains and absinthian adjuncts

Mr. Wizard

I have seen a lot of recipes in your magazine described as "5 gallons." How then, if a collection of 5.75 gallons of wort and a 90-minute boil are called for, can you end up with 5 gallons? As a rule, I boil 7 gallons of wort for 90 minutes and rarely end up with 5 gallons in the primary. In fact, my last effort netted me 4 gallons of wort and probably a gallon of trub. Is topping off the answer?

Rick Rocheleau
via e-mail

This is a good question. All brewing recipes give a volume of wort to collect before boiling as a guideline. But the volume that really matters is the wort volume after boiling. Wort volume is very important because it directly affects the concentration of everything dissolved in the wort. Specific gravity, bitterness and color are all affected by changes in volume.



All brew kettles are different with respect to their evaporation rate during boiling. Evaporation rate varies with the shape of the kettle, the material of construction (stainless, aluminum, copper) the thickness of the material and the heat source.

Most commercial brewers try to evaporate about eight percent of the wort volume during the boil. In a large brewery this figure is critical, because excessive evaporation wastes energy, is expensive, and does not add anything to beer quality. It sounds like you have a pretty aggressive boil! I would take a vigorous boil over a wimpy boil any day.

Now for the practical advice. I try to nail my wort gravity coming out of the kettle. The easiest way that I've found to hit a target gravity is to measure the specific gravity after the boil and add hot water to the wort to adjust the gravity. The wort gravity must be a little higher than the target gravity for this method to work. If the wort volume after adjustment is much different than the target volume for the recipe, the bitterness may be higher or lower than projected, but you can't worry about nailing every parameter. In most cases the adjusted wort volume is close enough to the target batch size and bitterness is not significantly changed.

To apply this technique you must:

1) accurately measure the volume of your wort.

2) calculate how much extract is dissolved in the wort.

3) calculate the adjusted wort volume.

4) add hot water to the brew kettle.

The easiest way to measure wort volume in a kettle is by using a calibrated dipstick made of hardwood. I like to cut notches in the stick at convenient intervals, for example every 250 ml (metric is much easier to use in the brewing calculations).

Here's an example: Suppose you have a recipe that should yield 5 gallons (18.9 liters) of 1.048 (12° Plato) wort and you determine that you actually have 4.3 gallons (16.3 liters) of 1.055 (13.5° Plato) after the boil.

Step One:

How much extract is present?
Kg extract present =
(liters of wort) x (specific gravity) x (°Plato) = (16.3) x (1.055) x (0.135) = 2.32 kg

Step Two:

What is the adjusted wort volume?
Adjusted volume =
(kg extract present) ÷ {(target SG) x (target °Plato)} = (2.32) ÷ {(1.048) x (0.12)} = 18.45 liters

After crunching a few numbers you can simply top your kettle up to 18.45 liters by adding 2.15 liters of boiled water. There are a few notable details in the calculation shown above. Plato must be expressed in decimal form because degrees Plato is a weight/weight percentage (12° Plato means the wort contains 12 grams of solids per 100 grams of wort).

A rough conversion between degrees Plato and specific gravity can be made by dividing the specific gravity number behind the decimal (often called points of gravity) by four. A specific gravity of 1.048 has 48 gravity points and 48÷4 = 12° Plato. This approximation is pretty good up to about 1.070. After this the approximation begins to deviate from the actual conversion. A conversion table between specific gravi-

ty and degrees Plato can easily be made in a spreadsheet using the following formula. An example converting 12° Plato to specific gravity is shown (the order of operations is little confusing at first glance).

Specific gravity =
1 + [Plato ÷ {258.6 - (Plato x 0.88)}] = 1 + [12 ÷ {258.6 - (12 x 0.88)}] = 1 + [12 ÷ {258.6 - 10.6}] = 1 + [12 ÷ {248}] = 1 + [0.048] = 1.048

Mr. Wizard

I am an extract brewer and recently brewed an oatmeal stout. When it finished aging, I tried a glass. The taste was good but I have some concerns. What can I do to increase head retention? When steeping crushed grains, what is a good method to keep the husks from escaping from the steeping bag? I worry these are going to cause off-flavors but it never fails that some of them slip through the steeping bag.

Lastly, when using oatmeal, I was confused if I should put it in a steeping bag or add it to the pot. I added it directly to the pot and I had a heck of a time siphoning my wort.

Aaron Songer
Huntingburg, Indiana

This question touches on several good brewing topics. For starters, oatmeal must be mashed to convert the starch into fermentable sugars. If the oatmeal is simply steeped, you will extract starch and viscous gums (beta-glucans) from the oatmeal. The only grains I would use for steeping are crystal malts and dark roasted grains like roasted barley, black patent malt and chocolate malt. All other grains should be mashed in order to convert the starches contained in the grain to fermentable sugars.

Oatmeal is added to beers, especially stouts, because it is believed to enhance the foam stability and body of the brew. Some brewers believe that the beta-glucans increase beer viscosity enough to increase foam stability. Although many brewers share this view, this benefit is arguable. Furthermore, oats are rich in lipids (oil) and lipids are not good for foam. Oatmeal is also well known for making wort separation difficult because of the viscous beta-glucans. Brewers using oatmeal often use it sparingly so that wort separation is not an absolute nightmare.

I believe the proteins found in unmalted grains, like oatmeal and raw barley, are responsible for improved beer foam. When grain is malted these proteins are reduced in size and have different foaming properties compared to the proteins in unmalted grain.

As far as steeping methods go, all grains used for steeping should be placed in a bag unless you plan on straining the steeping grain and water mixture prior to adding your extract, be it DME or liquid extract. I would not worry too much about a few pieces of husk escaping from the steeping bag, but if you are getting a large amount of leakage you may want to find a bag that has a finer mesh.

If I'm reading your question correctly, it sounds like you boiled the oatmeal with the wort. Whether steeping crystal malt, roasted barley or oatmeal, I would not boil the grain, especially without a steeping bag. Many brewers find that boiling grains gives beer an astringent flavor and, as you describe, boiled grain that is not in a steeping bag makes siphoning extremely difficult. Steeping should be performed between 150° and 170° F.

Mr. Wizard

In several issues of BYO, the use of "malta" was discussed as an easy way to make a yeast culture (February and April 1999). I have had a total lack of success with this product. It was unavailable in my area, so when I drove to California to visit a friend I bought a case. I tried it several times, once with a tubed Wyeast culture and once with the dregs from several bottles of Sierra Nevada Pale Ale. Nada! I tried to aerate the second time, but I think maybe there's just too much CO_2 in the malta. I haven't tried letting opened malta sit in the fermenter for a few days before adding the yeast. I'm too busy making beer! Any ideas?

Victor McAllister
Sequim, Washington

I think your problem is the malta you purchased and not the viability of your yeast. Malta is unhopped, carbonated wort. At first glance, malta sounds like a great yeast starter. The problem is that malta is not a shelf-stable product; after all, wort is a great medium for bacteria and yeast to grow in. Some malta is pasteurized in the bottle like beer and some malta is stabilized with benzoate or sorbate like sodas and bottled teas. These stabilizers prevent the growth of yeast and some bacteria — not exactly good for making yeast starters.

Fortunately, these ingredients must be listed on the bottle label. If you want to use malta for a starter, make sure you purchase malta that is free of any preservatives. The carbon dioxide in the malta should not pose any problems because it will escape through the airlock on your propagation container.

Personally, I find it pretty easy to make up starters using DME. I have a pressure cooker and make up several quarts of 1.048 wort in canning jars and sterilize at 15 pounds of pressure for 20 minutes. After canning, the lids are tightened and the canned wort can be stored at room temperature indefinitely.

Mr. Wizard

As a homebrewer, I am always looking for new and unique ways to tweak my recipes and the drinker's interest. I also appreciate the historical tradition of brewing beer and distilling liquors. One such romantic liquor that has captured my imagination is absinthe. I would like to combine the two and produce an absinthe beer.

I have researched the wormwood

plant from which absinthe is made and read that it has historically been used in brewing ale. It also has a reputation for being dangerous. I know similar herbs like licorice and anise are often used in brewing. Is there a style that would support the use of wormwood as an adjunct? How and when would one go about adding this to the wort? Would you use dry herbs or oil extract? Are there any dangers in using this controversial plant?

Ed Koranda
Fort Worth, Texas

Absinthe is an anise-flavored liqueur also flavored with oil of wormwood (Artemisia absemthium), hyssop, veronica, fennel, lemon balm, angelica and other herbs. Absinthe is known for its bitter flavor, bright green color (from the chlorophyll in the wormwood herb), high alcohol content and toxic properties from the wormwood. One of the best known absinthes was produced by distiller Henri-Louis Pernod and was consumed by such notable people as Vincent Van Gogh and Oscar Wilde. Absinthe abusers were said to have "absinthism" and often ended their absinthe abuse with suicide. It was banned in the United States in 1912 because of the toxic nature of wormwood and the suicide association. Today's Pernod does not contain wormwood.

Wormwood contains a volatile compound named thujone. Thujone is a neurotoxin that affects the brain and also causes renal failure, tremors and convulsions. Chronic exposure to thujone can sometimes result in paralysis.

Wormwood-containing absinthe is still legal in certain European nations. After researching this liqueur I have no desire to ever sample it — I have seen descriptions of absinthe flavor as turpentine, Windex, nail polish remover and just plain vile! I'm all for brewing beer with traditional herbs and spices, but I do not recommend adding a known toxin to beer. This subject has popped up lately on several brewer chat sites and I strongly

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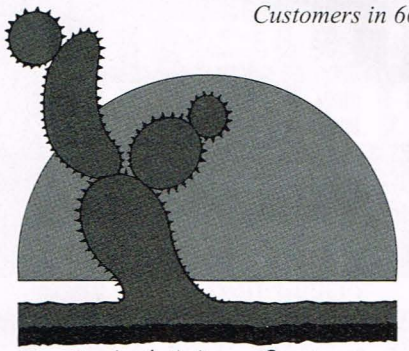
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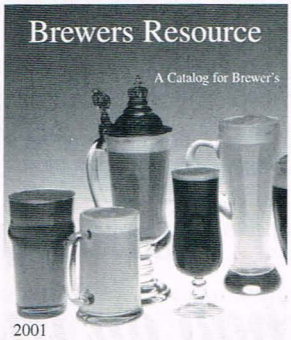
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encourage any curious homebrewer to thoroughly research the dangers of this compound and not to use it for brewing.

Mr. Wizard

One of my homebrew buddies has told me he is giving up homebrewing because of his concern about nitrosamines. Apparently there is a history of colon cancer in his family and the connection between nitrosamines present in beer and this disease has him seriously considering taking up a new hobby.

Are carcinogenic nitrosamines produced during the homebrew process? Do you know if there are there more nitrosamines present in microbrews or macrobrews?

Ron Sharman
Albany, Oregon

In 1978, German researchers reported finding low levels of the carcinogenic nitrosamine dimethylnitrosamine (DMNA) in beer. Subsequent studies provided evidence that the DMNA found in beer was derived from the barley malt used for making beer and other malt beverages.

Nitrosamines form when oxides of nitrogen, the so-called NOX gases formed during combustion, react with amino acids. Malt kilned by direct heating will contain nitrosamines because in direct-fired kilns the gas from the flame is exposed to the malt. Modern kilns use indirect heating where fresh air is heated in a heat exchanger and this hot air heats the kiln as opposed to the gas from the fire. It has been shown that polluted air can give rise to nitrosamines in indirect-fired kilns because NOX gases are found in polluted air. In response to this problem, malt houses located in polluted areas pretreat the air that is used for kilning.

In 1980, a survey of all known malt producers in the U.S. was conducted and it was determined that modern kilning methods allowed for the production of barley malt con-

taining less than or equal to 10 parts per billion (ppb) of DMNA. According to FDA rulings on the subject, DMNA in barley malt at levels greater than 10 ppb is considered avoidable contamination under section 406 of the Federal Food, Drug and Cosmetic Act. This means that domestic brewers have access to malt with very low levels, if present at all, of nitrosamines. Other countries have similar laws protecting their citizens from nitrosamines in beer and in other foods. In short, I would tell your friend not to worry about nitrosamines in beer because it's not a problem.

On the other hand, if your friend is a backyard barbecuer, he may want to look into nitrosamines and grilled meat. Meat is rich in amino acids and grilling is a form of direct heating with combustion gases. Those tasty morsels of crunchy, grilled steak tips do contain nitrosamines and many people concerned about nitrosamines and health avoid grilled meats.

Mr. Wizard

A friend of mine, who is somewhat of a naturalist, asked me to make him a beer with acorns as one of the ingredients. Last week, we peeled and roasted our acorns to three different degrees of roast. Then, using the middle-of-the-road roast, we crushed and steeped the acorns in hot water as if we were using a crystal malt. We then sparged the wort into a brew pot and an made an American pale ale using an extract base. The finished beer tasted different, but good.

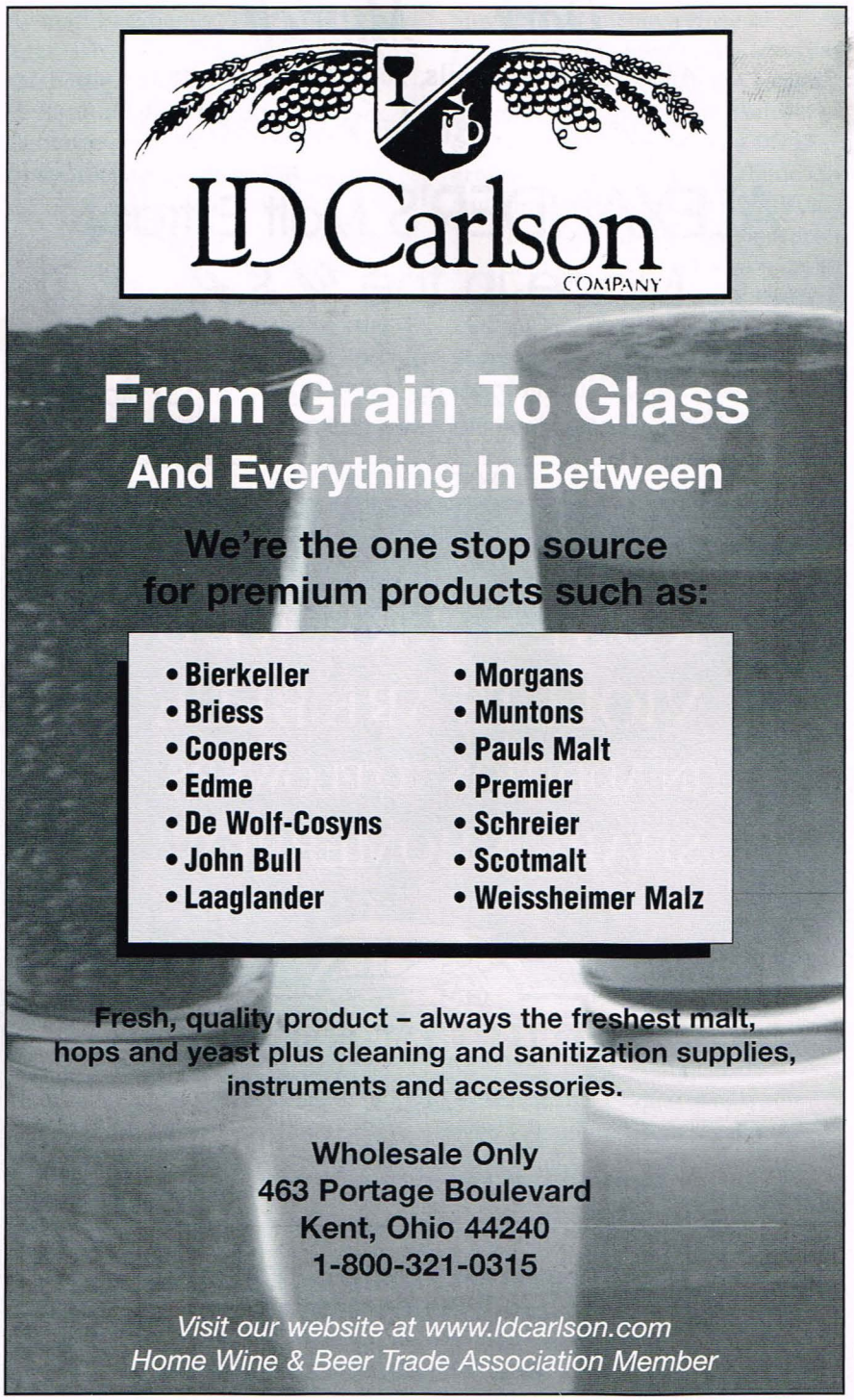
Is this concoction going to make us go blind, have hallucinations or die? It doesn't appear to bother squirrels, but is there anything in acorns that could harm us humans?

Dan Derrick
Irmo, South Carolina

There is nothing harmful about consuming acorns. In fact, acorns are used in many food dishes around the world. The main drawback to eating acorns is that they have a high tannin content and a very astringent quality.

Recipes calling for acorns always specify treating the acorns to leach the tannins out. An easy method to do this at home is to boil the acorns after shelling. One method calls for boiling the acorns for at least two hours, making sure to change the water every time it becomes tan in color. This process should be repeated until the acorns no longer taste astringent. After boiling, the acorns will be dark brown and can be toasted in the oven until they are dry.

Acorns are true nuts, but the way they differ from other nuts is in their carbohydrate content. They have a very high carbohydrate content — about 65 percent — most of which is starch, and a low oil con-



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tent of about 5 percent. When used for brewing, the starch should be converted into fermentable sugars in the same way that the starch from rice, corn, malted barley and wheat is converted. Although it sounds like your acorn ale tastes pretty good, you may possibly end up with a very hazy beer because you didn't mash the acorns.

I would highly recommend trying this brew again, but this time you should use a different method. Before you start, prepare the acorns by boiling and roasting and then treat them just like a grain in mashing. The acorns can easily be milled in a flour mill, for example a Corona mill, or they can be ground up in a regular kitchen blender.

After you have milled the nuts, add the ground acorns to a mash along with malted barley. Acorns don't contain enzymes and the starch will not be converted in the mash unless barley malt is added.

The rest of the brewing procedure would be just like any other. I think "Squirrel Nut Stout" sounds like a great name for a dark ale that is brewed with toasted acorns, roasted barley, chocolate malt and pale malt. ■

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



Do you have a question for Mister Wizard? Write to him c/o Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255 or send your e-mail to wiz@byo.com. If you submit your question by e-mail, please include your full name and hometown. In every issue, the Wizard will select a few questions for publication. Unfortunately, he can't respond to questions personally. Sorry!

The Replicator

For Valentine's Day: Arrogant Bastard and Two-Hearted Ale

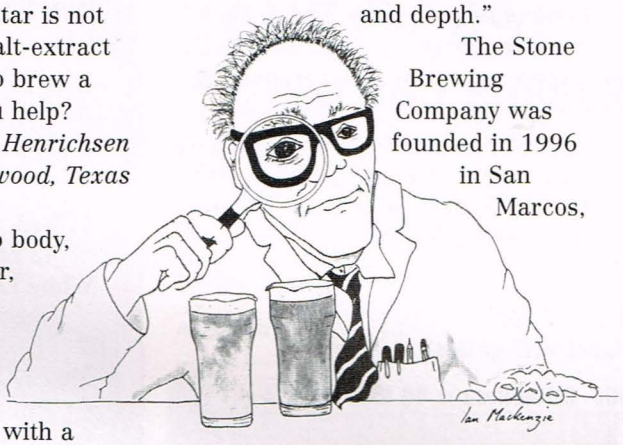
by Dawnell Smith

Dear Replicator:

On a recent business trip to San Diego, I tried some of the Stone Brewing Company's "Arrogant Bastard Ale." It was like nothing I had ever tasted before!

Unfortunately, I live in Texas and this super-hoppy nectar is not available here. I am a malt-extract brewer and would love to brew a batch for myself. Can you help?

Craig Henrichsen
Kingwood, Texas



When it comes to body, color and flavor, Arrogant Bastard has a serious attitude. This huge mahogany-colored ale packs a mighty hop kick, with a hint of grapefruit aroma and a sturdy malt backbone. "This is an aggressive beer," says the label on the bottle. "You probably won't like it. It's quite doubtful that you have the taste or sophistication to be able to appreciate an ale of this quality and depth."

The Stone Brewing Company was founded in 1996 in San Marcos, California by Greg Koch and brewer Steve Wagner. They refuse to pigeonhole this beer into a style category, let alone divulge the recipe. But Koch did offer a few useful details about the beer: The OG is around 1.074, the ABV is about 7% and the bitterness is over 70 IBUs.

The grain bill for this beer probably contains about 90% pale malt and 10% dark crystal malt. Use Chinook hops all the way through. For yeast: "You can go with California Ale Yeast (WLP001) or Dry English Ale Yeast (WLP007)," says Chris White, president of White Labs, which grows and banks the house yeast exclusively for Stone.

For more information, go to www.stonebrew.com. Or call the brewery at (760) 471-4999.

Arrogant Bastard Pale Ale
(5 gallons, extract with grains)

OG = 1.074 FG = 1.018 Bitterness = 75 IBUs



Ingredients

8.5 lbs. Briess amber dried malt extract (DME)
1.5 lbs. crystal malt (120° Lovibond or darker)
12.5 AAUs Chinook pellet hops (1 oz. of 12.5% alpha acid)
6.25 AAUs Chinook pellet hops (0.50 oz.of 12.5% alpha acid)
6.2 AAUs Chinook pellet hops (0.50 oz. of 12.4% alpha acid)
1 tsp. Irish moss
Starter of Dry English Ale Yeast (White Labs WLP007)
3/4 cup corn sugar for priming (or 1 cup unhopped light dried malt extract)

Step by step

Steep crystal malt in 3 gallons of water at 150° F for 45 minutes. Remove grains, add 8.5 pounds amber DME. Bring to boil and add 1 ounce of Chinook pellet hops.

Boil for 1 hour and add 0.50 ounces of Chinook hops and Irish moss. Boil for 30 additional minutes and remove from heat. Add the last 0.50 ounce of hops.

Cool to around 70° F and transfer to fermenting vessel with yeast. Ferment at 68° F until complete (7 to 10 days). Transfer to secondary or rack into bottles or keg with corn sugar.

Aging will mellow the Bastard. So drink it young if you want to prove your mettle.

All-grain option: Omit extract and mash 11.5 lbs. pale malt with crystal malt in 19 quarts of water to get a single-infusion mash temperature of 152° F for 45 minutes.

Sparge with hot water (170° F or more, depending on your system) to get 5.5 gallons of wort. Next, bring to a boil and use the hopping and fermentation schedule seen above.

Dear Replicator:

I was wondering if I could get an extract and specialty grains recipe for "Bell's Two-Hearted Ale." This has got to be the best pale ale around, although it's only a seasonal beer here in Michigan.

Mark Baxter
Ann Arbor, Michigan

Beer lovers relish this copper IPA for its quenching, bold flavors. With almost 7 percent alcohol by volume and a healthy dose of dry hops, this beer packs a punch. Yet it has light fruit and citrus notes, a floral introduction and a delicate body. It's named for the legendary Two-Hearted River on Michigan's Upper Peninsula, made famous in short stories by Ernest Hemingway.

The Kalamazoo Brewing Company has made a slew of tasty brews since it was founded in 1985 as a homebrew supply shop where Larry Bell brewed in a 15-gallon soup kettle. Today, the brewery runs a 30-barrel brew kettle, a 15-barrel kettle, a two-barrel kettle and the old soup pot, cranking out well over 20,000 barrels a year.

Aside from the Two-Hearted, the brewery makes Bell's Amber Ale, Bell's Pale Ale, Third Coast Beer, Bell's Porter and Bell's Kalamazoo Stout, along with a bunch of seasonal and specialty beers.

"You don't need an extravagant grain bill when making Two-Hearted Ale," says Larry Bell. "The recipe includes mostly pale malt, rounded out with about four percent light crystal malt. For hops, use Centennial across the board, but really go for broke with dry hops during secondary fermentation." ■

For more information on the Kalamazoo Brewing Company, call (616) 382-2338 or go to its Web site at www.bellsbeer.com.

Two-Hearted Ale

(5 gallons, extract with grains)

OG = 1.062 FG = 1.008 Bitterness = 46 IBUs

Ingredients

7.5 lbs. Muntons light extract syrup
0.5 lb. crystal malt (10° Lovibond)
0.5 lb. aromatic or dark Munich malt
0.5 lb. carapils
7.5 AAUs Centennial whole hops (0.75 oz. of 9.9% alpha acid)
5 AAUs Centennial whole hops (0.5 oz. of 9.9% alpha acid)
15 AAUs Centennial whole hops (1.5 oz. of 9.9% alpha acid)
9.9 AAUs Centennial whole hops (1 oz. of 9.9% alpha acid)
1 tsp. Irish moss
Wyeast 1056 (American Ale)

Step by step

Steep specialty grains in 3 gallons of water at 150° F for 45 min. Remove grains, add 7.5 lbs. Muntons light extract syrup. Bring to boil for 30 min., then add 0.75 oz. of Centennial. Boil 40 min. and add 0.50 oz. Centennial and Irish moss. Boil 15 min., add 1.50 oz. Centennial. Boil 5 min. Cool to 70° F, transfer to fermenting vessel with yeast. Ferment at 68° F until complete (7 to 10 days). Transfer to secondary with 1 oz. of Centennial. Hold one week, rack into bottles or keg with corn sugar. Age for a few weeks.

All-grain option: Omit extract syrup and mash 8.5 lbs. pale malt with specialty grain in 13.5 quarts of water to get a single infusion mash temp. of 152° F for 45 min. Sparge with water (170° F or more), to get 5.5 gallons of wort. Bring to boil and use above hopping and fermentation schedule.

ReaderRecipes

Show Low Pale Ale

(5 gallons, extract with steeping grains)
OG = 1.054
FG = 1.013 IBUs = 32

To me, so many pale ales are just over the top with hops, so I made my own. This one's hoppy and clean.

Gary Wilder
Tucson, Arizona
(Brew Your Own Brew)

Ingredients

6 lbs. Muntons light dried malt extract
0.5 lb. crystal malt (20° Lovibond)
5.1 AAU of Perle hops (1 oz. at 5.1% alpha acid)
11 AAU of Cascade hops (2 oz. at 5.5% alpha acid)
White Labs California Ale yeast (WLP001)

Step by Step

Put grains in a grain bag. Put in pot with 5 gallons water, bring temperature to 155° F and steep for 20 minutes. Remove grains from wort and squeeze out. Bring wort to a boil. Add extract and Perle hops and boil 45 minutes. Add 1 oz. Cascade hops and Irish moss and boil for an additional 15 minutes.

Remove from heat and cool to 72° F. Pitch yeast. Rack to secondary after fermentation is over (about 4 to 5 days). Add 1 oz. Cascade hops for dry hopping. Bottle when clear and final gravity reads 1.013.

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Dark Lager and Cream Stout

A smooth dark German-style beer and a silky English stout

2001

by Tess and Mark Szamatulski

February is one our favorite months to brew. We are fortunate enough to have a warm kitchen and a cold basement, exactly what we need to ferment the two styles we have chosen for this month.

Since it's the middle of winter we will take advantage of the cold temperatures and brew a dark lager. This beer is perfect to brew now and drink in the spring. It is light, effervescent and thirst-quenching, a wonderful brew to sip after turning over the garden and saying goodbye to winter. The second style we have chosen is a silky cream stout. This style is smooth and full-bodied. Enjoy the cream stout while you are waiting for the lager to finish fermenting.

DARK LAGER
OG = 1.040 to 1.050 FG = 1.010 to 1.021 IBUs = 14 to 20 SRM = 10 to 20

The dark lager is a smooth, easy drinking beer. It is slightly sweeter than its pale cousins and has more body. Brilliantly clear with a deep copper to dark brown color, there is minimal, if any, roasted or chocolate character contributed by the dark grains.

Dark lagers retain their light taste with little malt or hop flavor or aroma. This style will erase any misconceptions about dark beer. It is lively and light and not too assertive. A dark lager is a perfect beer to introduce to a light beer drinker who doesn't know the pleasures of dark beer.

This month's recipe is our clone of Löwenbräu Premium Dark Original Munich Formula. In the Middle Ages, Bavarian brewers discovered that when they stored their beer in wooden casks in subterranean caves, the naturally occurring Bavarian yeast would continue to ferment the beer in near-freezing temperatures and then settle at the bottom of the vessel. This cool fermentation and storage produced a crystal clear, smooth beverage. Because the beer remained in the caves for a long time this beer was called "lagern," which in German means "to store."

Löwenbräu Dark has a dense head that sits on a rich, effervescent brown beer. The aroma is a pleasing mix of caramel malt with a slight hop nuance. Medium-bodied, this dark lager has a crisp, smooth mouthfeel. Löwenbräu finishes dry and doughy, with a mild residual sweetness. This beer is delicious fresh, so plan to drink it as soon as the lagering is complete.

Commercial Beers To Try

Many breweries make a dark version of their light lager. Classics to try are Michelob Dark, Abita Amber, Beck's Dark and Saint Pauli Girl Dark. There should be little or no roast malt aroma and a light, flowery hop character. There may be some fruity aromas due to the

THE YEAR IN BEER

JANUARY:
Baltic Porter & German Pilsner

FEBRUARY:
Cream Stout & Dark Lager

MARCH:
Oktoberfest & American Brown Ale

APRIL:
British IPA & Old Ale

MAY:
Dunkelweizen & English Bitter

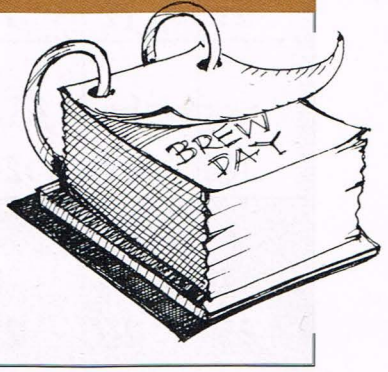
JUNE:
Fruit Ale & Belgian Strong Dark Ale

SEPTEMBER:
Kölsch & Robust Porter

OCTOBER:
Celebration Ale & Pale Lager

NOVEMBER:
Strong Scotch Ale & Vienna Lager

DECEMBER:
English Barleywine & Doppelbock



yeast and/or hop variety used. The color should be copper to dark brown with bright clarity. Hop bitterness is very low to nonexistent with no diacetyl or fruitiness. Along with two- or six-row barley, dark lager can contain some adjuncts such as corn or rice.

HOPS, MALT and YEAST

Only bittering hops are commonly used in this style. Some of the more popular ones are Cluster, Chinook, Columbus, Northern Brewer and Tettnang.

The base grains that can be used are U.S. two- or six-row pale malt or pilsner malt. Munich malt can be used to achieve a slightly bready character. Cara-Munich or crystal malt can be added to impart a caramel flavor. Just a touch of chocolate malt can be used to achieve the dark color.

Many different lager yeasts can be used. Our favorites are Munich Lager (Wyeast 2308), Bavarian Lager (Wyeast 2206), German Lager (White Labs WLP830) or American Lager (Wyeast 2035 or White Labs WLP840). If cool lager temperatures (47° to 55° F) cannot be maintained, then California Lager (Wyeast 2112) yeast can be used. Ferment at 58° to 65° F.

Serving Suggestions

Serve at 48° F in a pilsner glass with grilled, medium-rare lamb chops smothered in a gravy made with dark lager, rosemary, wild mushrooms and shallots.

Accompany with whipped potatoes infused with garlic and lemon zest, and steamed baby spinach topped with feta cheese and Kalamata olives.

LÖWENBRÄU DARK

(5 gallons, extract with grains)
OG = 1.051 to 1.053 FG = 1.012 to 1.013 SRM = 31 IBUs = 28

Ingredients

18 oz. Belgian cara-Munich malt
8 oz. German Munich malt
2.5 oz. British chocolate malt
3.5 lbs. Bierkeller light malt extract syrup
3 lbs. Muntons extra light dry malt extract
5 AAUs Northern Brewer (0.50 oz. of 10% alpha acid) (bittering)
3.2 AAUs Tettnanger (0.75 oz. of 4.3% alpha acid) (bittering)
1 tsp. Irish moss
Munich Lager yeast (Wyeast 2308) or American Lager (White Labs WLP840)
1-1/4 cup Muntons extra light 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 168° F water. Add the dry malt, malt syrup and

February 2001

S	M	T	W	THURSDAY	F	SATURDAY
				PREP DAY • Prepare starter for dark lager 1	2	BREW DAY • Sanitize equipment • Brew dark lager • Record OG • Ferment in the primary for 7 days 3
4	5	6	7	PREP DAY • Prepare starter for cream stout 8	9	BREW AND RACK DAY • Rack dark lager to secondary • Sanitize equipment • Brew cream stout • Record OG 10
11	12	13	14	15	16	RACK DAY • Rack cream stout to secondary 17
18	19	20	21	LAGERING DAY • Check pilsner (Jan. BYO) and begin lagering if clear and FG = 1.012 • Check porter (Jan. BYO) and begin lagering if clear and FG = 1.017 22	23	24
25	26	27	28			

bittering hops. Bring the total volume in the brewpot to 2.5 gallons.

Boil for 45 minutes, then add the Irish moss. Boil for 15 minutes and remove the pot from the stove. Cool wort for 15 minutes in an ice bath or with a 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 47° to 52° F for 7 days, then rack into secondary (glass carboy). Ferment at 47° to 52° F for 4 weeks, then bring the fermenter to 60° to 62° F until target gravity has been reached and the beer has cleared (approximately 2 weeks). Then prime and bottle. Carbonate at 70° to 72° F for 2 to 3 weeks. Store at cellar temperature.

Partial-mash option: Mash 1.25 lbs. German two-row pilsner malt and the specialty grains in 1 gallon water at 150° F for 90 minutes. Sparge with 1.5 gallons water at a temperature of 168° F. Then follow the extract recipe, omitting 1.75 lbs. of Muntons extra light dry malt extract from the boil.

All-grain option: Mash 8.33 lbs. German two-row pilsner malt and the specialty grains in 2.5 gallons of water at 150° F for 90 minutes. Sparge with 5 gallons of water at 168° F. The total boil time is approximately 90 minutes.

Add 6.6 AAU of bittering hops for the last 60 minutes of the boil. Add the Irish moss as indicated by the extract recipe.

CREAM (Sweet) STOUT
OG = 1.035 to 1.066 FG = 1.010 to 1.022 IBUs = 20 to 40 SRM 35+

Cream or milk stouts are English in origin. In response to the popularity of Guinness, the English and Scottish made their own version of stout beer. The addition of milk sugar (lactose) created a sweeter, creamier version than the drier Guinness. The practice of adding milk to beer was thought to soften and create a healthier beer.

Stouts are thought by some to have nourishing qualities. In Australia during the 1800s, "Nurse Stout" was thought to be nourishing for invalids. In Asia, bathing a baby with stout is thought to be good for the baby's sensitive skin. In Ireland, nursing mothers drink stout to produce milk for their baby.

Cream stout is a substantial drink to have in place of an after-dinner cappuccino or to make a "stout float" with chocolate ice cream, whipped cream, maraschino cherries and a sprinkling of chocolate syrup and walnuts.

Commercial Beers To Try

The classic English example is Watney's Cream Stout; the classic

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American example is Samuel Adams Cream Stout. Other great commercial versions are Mackeson Stout (once called Mackeson Milk Stout) and St. Peter's Cream Stout, both from England, and Columbia Cream Stout from Canada.

The aroma should be of mild roasted grains and caramel malt. Fruitiness can range from low to high. Hop bitterness should be low to emphasize the malt sweetness. Hop aroma can be low to non-existent and diacetyl can be medium to none. The color should be brown to black with a creamy beige to light-brown head. Roasted grains and malt are predominant in the flavor, with medium sweetness. Cream stouts should always be full-bodied and creamy. The carbonation is low to moderate.

HOPS, MALT and YEAST

Hops are used just for bittering in the cream stouts from the U.K. In some American versions, a small amount of hops might be used for flavor. Hop varieties can include Target, Challenger, Fuggles and East Kent Goldings.

The base malt should be either English or American two-row pale malt. Specialty grains are chocolate, crystal and small amounts of roasted barley and black malt. Carapils, dextrin malt, flaked barley and wheat malt can also be used. Final gravities are high (up to 1.022), so when making extract batches, malto-dextrin should be added to accomplish this.

A wonderful yeast for this style is London Ale yeast (Wyeast 1028) or London Ale III (Wyeast 1318). London ESB (Wyeast 1968) or English Ale (White Labs WLP002) are also good choices.

Serving Suggestions

Serve in a pint glass at 50° to 55° F with herb-encrusted, horseradish infused oysters topped with buttery cornbread crumb topping on a bed of spinach.

ENGLISH-STYLE CREAM STOUT
(5 gallons, extract with grains)
OG = 1.053 FG = 1.016 to 1.017
SRM = 100+ IBUs = 22

Ingredients

13 oz. British chocolate malt
10 oz. British crystal malt (55° Lovibond)
8 oz. torrefied wheat
4 oz. roasted barley
5.5 lbs. Muntons extra light dry malt extract
12 oz. malto dextrin
6.4 AAUs East Kent Goldings (1.25 oz. of 5.1% alpha acid) (bittering)
1 tsp. Irish moss
London Ale yeast (Wyeast 1028) or English Ale (White Labs WLP002)
1-1/4 cup Muntons extra light DME

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CIRCLE 21 ON READER SERVICE CARD

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 168° F water. Add the dry malt, malto-dextrin and bittering hops. Bring the total volume in the brewpot to 2.5 gallons. Boil for 45 minutes, then add the Irish moss. Boil for 15 minutes, then remove the pot from the 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 then rack into secondary (glass 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 lbs. British two-row pale malt and the specialty grains in 1 gallon water at 150° F for 90 minutes. Sparge with 1.5 gallons of water at 168° F. Then follow the extract recipe, omitting 2 lbs. of Muntons extra light dry malt extract from the boil.

All- grain option: Mash 8 lbs. British two-row pale malt and the specialty grains in 2.75 gallons of water at 156° F for 90 minutes. Sparge with 5 gallons of water at 168° F. The total boil time is approximately 90 minutes. Add 5.2 AAU of bittering hops for the last 60 minutes of the boil. Add the Irish moss as indicated by the extract recipe.

Tess and Mark Szamatulski are the authors of "Clonebrews" and "Beer Captured." They also are the owners of Maltose Express, a homebrew and winemaking supply store in Monroe, Connecticut. ■

Defining a Few Terms

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

IBU (International Bittering Units) is a measurement of hop bitterness in beer. For comparison, an American IPA can have up to 70 IBUs, while a mild brown ale can be as low as 10.

Alpha acid units (AAUs) are calculated by multiplying the alpha-acid content of hops by the weight in ounces of the hops. For instance, 1 ounce of 4% alpha acid hops contains 4 AAUs.

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GERMANY

by Tess and Mark Szamatulski

GERMANY CONJURES UP IMAGES of magnificent scenery, breathtaking castles, oompah bands, lederhosen, steins, cuckoo clocks and, most of all, beer! From the boisterous Oktoberfest celebrations in the beer halls to the picturesque villages with their prized local brews, Germany is a beer-loving nation.

German beers span the style spectrum, from refreshing wheat beers to potent dopplebocks. These beers are all very different, yet they have two common threads: They are all brewed according to the German Purity Law (Reinheitsgebot) of 1516, and they are all delicious!

Archaeological evidence indicates that beer has been brewed in Germany since approximately 800 BC. Historians tell us that the German tribes were all brewers of beer and drank beer before going into battle. Beer was offered to the gods and consumed by everyone, slaves and kings alike. Bread baking and beer brewing were the work of women in the Middle Ages. The most popular present for a new bride was a brew kettle. The better a woman brewed, the better a housewife she was thought to be.

In later centuries, monks began brewing in their cloisters. Monks at the Brabant Cloisterzum Würzen were reportedly the first to put hops in beer under the guidance of the Duke of Brabant, Gambrinus. Though Gambrinus was Belgian, he is honored in German history as the patron saint of brewing because he was thought to have invented the idea of a malt-hop beer. He is also said to have invented the custom of "toasting" before drinking a beer.

Monks found that using hops improved the flavor and preservative qualities of their beer. Many of the monasteries began growing hops and soon most monasteries had a brewery. The monks brewed beer for themselves and were also allowed to sell it in the abbeys' "Kloisterschenken" or taprooms.

The nobility, seeing what a lucrative tax source beer had become, banned the cloisters from selling their beer and took over the beer industry. They built many breweries, which led to exporting the beer and gave rise to such world-famous German brewing cities as Munich, Bamberg, Cologne and Dortmund.

In 1516, Duke Wilhelm IV of Bavaria instituted the famous Reinheitsgebot (Purity Law). The law states that beer can only be brewed from malt, hops and water. The law says nothing about yeast, since it had not yet been discovered. This law is the oldest food regulation in the world that still exists in its original form. If a beer was not brewed according to the Reinheitsgebot, it was destroyed. In another example of how serious the Germans were about their beer, King Wenceslaus, of the famous hop-growing region of Bohemia, would put to death anyone caught exporting hop plants.

The late 1700s and 1800s were a time of remarkable innovation and discovery in the brewing industry, and German brewers and scientists were among the leaders. In the mid-1800s, the legendary brewer Gabriel Sedlmayr II — whose family still owns his Spaten brewery — began to perfect the lagering techniques that had been invented centuries earlier in the caves and foothills of the Alps. Sedlmayr also invented a steam-powered engine for firing up the kettles in brew houses. Artificial refrigeration, at that time called a "cold machine," was invented by Carl von Linde at Sedlmayr's request.

In 1843, a German scientist named Carl Joseph Napolean Balling invented the hydrometer, which was later perfected by Dr. Fritz Plato. This was a big leap for brewing. Before the introduction of the hydrometer, the only way to determine if beer was finished fermenting was to pour some of the beer on a wooden stool. A brewer with leather pants, called the "ale-conner," sat on the stool for 30 minutes. If he stuck to the chair after that time, additional fermentation was required due to the amount of residual sugar in the beer.

Meanwhile, the French scientiest Louis Pasteur was studying microorganisms and the fermentation process, and in Denmark in 1872, Emil Hansen perfect the isolation and cultivation of yeast strains. Brewing, once a primitive tradition, became scientific and controlled.

Following are recipes for five outstanding German beers. We hope that you enjoy brewing and drinking them as much as we have. Prost!

Munich Helles

OG: 1.044 to 1.055
FG: 1.012 to 1.017
IBUs: 18 to 25

"Helles" means "clear" or "bright" in German. So when it comes to beer, helles refers to everyday pale lagers, especially those from Bavaria.

Grain and malt should dominate the aroma, with a hint of hops permissible. The color should be medium to deep gold and brilliantly clear. The flavor should have a slightly sweet malt profile, with

From helles to doppelbock, here are step-by-step recipes for recreating five delicious German beers at home.



PHOTO BY CHARLES A. PARKER/IMAGES PLUS

IN A GLASS

grain and malt predominate. Hop bitterness should just be enough to balance the malt. A slight hop flavor can be evident, with the finish malty and clean. There should be no fruitiness or esters. The carbonation and body should be medium, with no trace of astringency.

Spaten Premium Lager

Spaten-Franziskaner-Bräu
Munich, Germany

(5 gallons, extract with grains)
OG: 1.048 to 1.051
FG: 1.011 to 1.013
IBUs: 18

Spaten's roots can be traced back to the 1300s. The name of the brewery is derived from the Spaeth family, who purchased the 225-year-old brewery in 1622. Spaten's modern tradition began in Munich in 1807 when Gabriel Sedlmayr I, brewmaster for the Royal Court of Bavaria, took over the brewery. His son, the legendary innovator Gabriel Sedlmayr II, later became brewmaster and created Munich helles as an alternative to pilsner.

Spaten's Munich helles is smooth, delicate, simple and subtle. It has an enticing balance between hop bitterness and malt. Spaten is a beautiful yellow-gold color and has a creamy head. This is a delicious, easy-drinking lager.

Ingredients

12 oz. German light crystal malt (2.5° Lovibond)
6 oz. German Munich malt
4 oz. Belgian aromatic malt
5.75 lb. Muntons extra-light dried malt extract (DME)
2 AAU German Northern Brewer hops (0.5 oz. at 4% alpha acid) (bittering)
3 AAU Spalt hops (0.5 oz. at 6% alpha acid) (bittering)
1 tsp. Irish moss (for 15 minutes)
Starter of Wyeast 2206 (Bavarian Lager) or White Labs WLP920 (Old Bavarian Lager)
1-1/4 cup Muntons extra-light 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 168° F water. Add the dry malt and bittering hops. Bring the total volume in the brewpot to 2.5 gallons. Boil for 45 minutes, then add the Irish moss. Boil for 15 minutes, then remove the pot from the 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.

Start fermentation at 60° to 62° F until fermentation begins (approximately 24 hours). Bring primary fermenter to 47° to 52° F for 7 days, then rack into secondary (glass carboy). Ferment at 47° to 52° F until target gravity has been reached and the beer has cleared (approximately 4 weeks). Then prime and bottle. Carbonate at 70° to 72° F for 2 to 3 weeks. Store at cellar temperature.

Partial-Mash: Acidify the mash water to below 7 pH. Mash 1.75 lbs. German two-row pilsner malt and specialty grains in 1 gallon water at 150° F for 90 minutes. Sparge with 1.5 gallons water at 5.7 pH and 168° F. Then follow the extract recipe, omitting 2 lbs. Muntons extra-light DME from the boil.

All-Grain: Acidify the mash water to below 7 pH. Mash 8 lbs. German two-row pilsner malt and specialty grains in 2.5 gallons of water at 122° F for 25 minutes, then at 150° F for 90 minutes. Sparge with 5 gallons of water at 5.7 pH and 168° F. The total boil time is approximately 90 minutes. Add 4.2 AAU of bittering hops for the last 60 minutes of the boil. Add the Irish moss as indicated by the extract recipe.

This Munich helles is ready to drink as soon as it is carbonated. It will peak between one and five months and will keep for eight months at cellar temperatures.

Bavarian Weizen

OG: 1.040 to 1.056
FG 1.010 to 1.014
IBUs 10 to 20

This is a traditional wheat beer from southern Germany. At least 50 percent of the grist should be malted wheat, with the remainder being pale barley malt.

The aroma should be one of vanilla and clove phenols and fruity banana ester. Some wheat aroma may be present, with little or no hop aroma and no diacetyl. The head is thick and long-lasting. Most wheat beers are cloudy, except in the filtered weizen version that's called "kristall."

The wheat imparts a fluffy, creamy fullness that leads to a light finish. Wheat flavor is essential. Hop flavor is low to none, and hop bitterness is very low. The beer has a tart character from the yeast, along with spicy clove phenols and fruity banana esters. The yeast typically produces spicy and fruity essences during the warm fermentation.

Hacker-Pschorr Weisse

Hacker-Pschorr
Munich, Germany

(5 gallons, extract with grains)
OG: 1.055 to 1.056
FG: 1.011 to 1.012
IBUs: 13

Hacker-Pschorr brewery was established in 1417 in Munich and is now owned by Paulaner. The brewery uses only the finest Bavarian barley and wheat malts, noble hops from Germany and Bohemia, and spring water from the Alps to brew its beers.

Hacker-Pschorr Weisse is brewed with 60 percent wheat and 40 percent barley malt. After it's finished fermenting at warm temperatures, it is aged for a short time at cold temperatures. It is unfiltered, which provides a hazy yellow color with an off-white, feathery head. This is a classic example of a wheat beer with a wheat and estery aroma. The flavor is crisp, clean and well-balanced.

Ingredients

12 oz. German Munich malt
6.25 lbs. Muntons wheat dry malt extract (DME)
4 AAU Tettnanger hops (bittering) (1 oz. at 4% alpha-acid)
Starter of Wyeast 3638 (Bavarian Wheat) or White Labs WLP300 (Hefeweizen)
1-1/4 cup Muntons wheat DME

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 1/2 gallon of 168° 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 the pot from the 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 then rack into secondary (glass 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.

Mini-Mash: Acidify the mash water to below 7 pH. Mash 1 lb. German two-row pilsner malt, 20 oz. German wheat malt, 12 oz. German Munich malt and 4 oz. rice hulls or oat hulls in 1 gallon water at 150° F for 90 minutes.

Sparge with 1.5 gallons of water at 5.7 pH and 168° F. Then follow the extract recipe, omitting 1.75 lbs. Muntons wheat dried malt extract from the boil.

All-Grain: Acidify the mash water to below 7 pH. Mash 6 lbs. German wheat malt, 3.75 lbs. German two-row pilsner malt, 12 oz. German Munich malt and 8 oz. rice hulls or oat hulls in 2.75 gallons of water at 149° F for 90 minutes. Sparge with 5 gallons of water at 5.7 pH and 168° F. The total boil time is approximately 90 minutes. Add 3.2 AAU of bittering hops for the last 60 minutes of the boil.

This beer is ready to drink as soon as it is carbonated. It will peak between 1 and 3 months and last for 7 months at cellar temperatures.



PHOTO COURTESY OF THE GERMAN TOURIST BOARD

In heaven, there is no beer ... but there's plenty of it in the beer tents of Munich during the city's annual Oktoberfest. Above, divinely happy patrons imbibe together under a banner that proclaims Hacker Bier the "Heaven of Bavaria."

Munich Dunkel

OG: 1.046 to 1.058
FG: 1.012 to 1.017
IBU: 20 to 28

These dark German lagers have a Munich malt aroma with slightly sweet notes of chocolate. There should be no fruity esters or diacetyl, but a slight hop aroma is acceptable. The color is medium amber to dark brown with a garnet tint. The head is light tan.

Dunkels have a rich flavor of Munich malt and can be slightly sweet, but should have no pronounced crystal or caramel malt flavor. There should be no bitterness from roasted malts. Hop bitterness is low but perceptible and the beer should be more malty than hoppy. Hop flavor should be minimal. In the finish, malt should be dominant, although hop bitterness may become more apparent.

Versions of this style from the Kulmbach region are brewed from a slightly higher starting gravity with a stronger flavor profile. In some beers, the grist is comprised of 100 percent Munich malt, while in others, the Munich is supplemented with a bit of German pilsner malt. Very small amounts of crystal malt can be added, but should not compete with the Munich. Roasted malts can be used for color, but should not impart any flavor.

Altbairisch Dunkel

Brasserie Ayinger
Aying, Germany

(5 gallons, extract with grains)
OG: 1.057
FG: 1.015
IBUs: 23

The Ayinger brewery was established in 1878 and has been named one of the "Top Ten Breweries in



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The Hofbräuhaus, which means Royal Court Brewery, is located in Munich. It's one of the most famous breweries, beer gardens and beer halls in the world.

the World" for four consecutive years at the World Beer Championships. The brewery lies some 15 miles outside of Munich, in a picturesque valley at the foot of the Alps, in the 1200-year-old village of Aying.

The trademark of the Aying beers is their incredible maltiness. This dunkel is a classic example of its style. It has a rich, chestnut-brown color with a creamy beige head. The aroma of warm, sweet malt has nuances of toffee. There is a big, round malt palate that ends with a hint of coffee and hops.

Ingredients

13 oz. Belgian Cara-Munich malt
12 oz. German Munich malt
6 oz. German dark crystal malt (65° Lovibond)
1.5 oz. British chocolate malt
3.5 lb. Bierkeller light malt extract syrup
3.25 lb. Muntons extra-light DME
4 oz. malto-dextrin
7 AAU German Hallertauer Hersbrucker hops (bittering) (2 oz. at 3.5% alpha-acid)
1 tsp. Irish moss
Starter of Bohemian Lager (Wyeast 2124) or Southern German Lager (White Labs WLP838)
1-1/4 cup Muntons extra-light DME

Step by step

Bring one gallon of water to 155° F, add the crushed grain and hold for 30 minutes at 150° F. Strain the grain into the brewpot and sparge with one gallon of 168° F water. Add the dry malt, malt syrup, malto-dextrin and bittering hops. Bring the total volume in the brewpot to 2.5 gallons.

Boil the wort for 45 minutes, then add the Irish moss. Boil with Irish moss for 15 minutes, then remove the brewpot from the stove. Cool the 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.

Start the primary fermentation at 60° to 62° F until fermentation begins (approximately 24 hours). Bring primary fermenter to 47° to 52° F for 7 days, then rack into secondary (glass carboy).

Ferment at 47° to 52° F until the target gravity has been reached and the beer has cleared (approximately 4 weeks). Then prime and bottle the beer. Carbonate at 70° to 72° F for two to three weeks. Store at cellar temperature.

Mini-Mash: Acidify the mash water to below 7.2 pH. Mash 1 lb. German two-row pilsner malt and the specialty grains in 1 gallon water at 152° F for 90 minutes. Sparge with 1.5 gallon water at 5.7 pH and 168° F. Then follow the extract recipe, omitting 2 lbs. Muntons extra-light dry malt extract from the boil.

All-Grain: Acidify the mash water to below 7.2 pH. Mash 7.25 lbs. German two-row pilsner malt, 2.75 lbs. German Munich malt, 13 oz. Belgian Cara-Munich malt, 6 oz. German dark crystal malt (65° Lovibond) and 1.5 oz. British chocolate malt in 3 gallons of water at 153° F for 90 minutes. Sparge with 5.5 gallons of water at 5.7 pH and 168° F. The total boil time is approximately 120 minutes.

Add 4.8 AAU of bittering hops for the last 60 minutes of the boil. Add the Irish moss as indicated by the extract recipe.

This tasty Munich dunkel is ready to drink as soon as it is carbonated. The beer will peak between two and five months after it is carbonated and will last for up to eight months at cool cellar temperatures.

Oktoberfest

OG: 1.050 to 1.064
FG: 1.012 to 1.016
IBU: 20 to 30

Oktoberfests are dark gold to reddish amber in color, with bright clarity and a solid head. The aroma is one of lightly toasted malt, created by the Munich or Vienna grains. There is no fruitiness, diacetyl or hop aroma.

The flavor is dominated by malt, with a toasted aspect. Hop bitterness is moderate and hop flavor low to none. Balance gives the nod to malt but the finish is not sweet. These beers have a medium body with a creamy mouthfeel and medi-

um carbonation. The grist is usually Vienna and Munich malt; a touch of crystal malt is acceptable. The hops should be a noble variety.

Hofbräuhaus Oktoberfestbier

Hofbräuhaus
Munich, Germany

(5 gallons, extract with grains)
OG: 1.059 to 1.060
FG: 1.015 to 1.016
IBU: 23

The first Oktoberfest took place in 1810, to celebrate the wedding of the Bavarian prince Ludwig to Princess Therese. All of the people of Munich were invited to celebrate with them in the fields by the front gates of the city. The fields were nicknamed Theresienwiese, or "Theresa's fields," in honor of the princess. The festival has been celebrated every year since then. Oktoberfest beers traditionally are brewed in the spring, lagered during the warm summer months and served in September during the annual festival.

All the Munich breweries prepare an Oktoberfest for the celebration. The Hofbräuhaus, which means "Royal Court Brewery," is probably the most famous of the city's breweries. In fact, the Hofbräuhaus may be the most famous brewery, beer garden and beer hall in the world.

Hofbräuhaus Oktoberfest has a creamy, tight, off-white head and a luscious amber color. The nose is aromatic malt the palate is smooth, with intense malt and nutty, bread-like nuances. The finish is one of semi-sweet malt.

Ingredients

16 oz. German Munich malt
4 oz. Belgian Cara-Munich malt
3.75 lbs. Muntons extra-light DME
3.5 lbs. Bierkeller light malt extract syrup
2 oz. malto-dextrin
4 AAU Tettnanger hops (1 oz. at 4% alpha acid) (bittering)
3.2 AAU German Hallertau Hersbrucker hops (1 oz. at 3.2% alpha acid) (bittering)
1 tsp. Irish moss
Munich Lager (Wyeast 2308) or Oktoberfest Lager (White Labs WLP820)
1-1/4 cup Muntons extra-light DME

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 168° F water. Add the dry malt, malt syrup and bittering hops. Bring the total volume in the brewpot to 2.5 gallons.

Boil for 45 minutes, then add the Irish moss. Boil for 15 minutes, then remove the pot from the stove. Cool wort for 15 minutes in an ice bath or chill with wort chiller. Strain into fermenter and add water to obtain 5-1/8 gallons. Add yeast when wort has cooled to below 80° F. Oxygenate-aerate well.

Start fermentation at 60° to 62° F until fermentation begins (approximately 24 hours). Bring primary fermenter to 47° to 52° F for 7 days, then rack into secondary (glass carboy). Ferment at 47° to 52° F for 4 weeks, then bring the fermenter to 60° to 62° F until target gravity has been reached and the beer has cleared (approximately 2 additional weeks). Prime and bottle. Carbonate the beer at 70° to 72° F for 2 to 3 weeks. Store at cellar temperature.

Mini-Mash: Acidify the mash water to below 7.2 pH. Mash 1.5 lbs. German two-row pilsner malt, 1.5 lbs. German Munich malt and 4 oz. Belgian Cara-Munich malt in 1 gallon water at 152° F for 90 minutes. Sparge with 1.5 gallon water at 5.7 pH and 168° F. Then follow the extract recipe, omitting 2 lbs. Muntons extra-light dry malt extract from the boil.

All-Grain: Acidify the mash water to below 7.2 pH. Mash 8.75 lbs. German two-row pilsner malt, 2.75 lbs. German Munich malt and 3 oz. Belgian Cara-Munich malt in 2.75 gallons of water at 122° F for 25 minutes then at 152° F for 90 minutes. Sparge with 5 gallons of water at 5.7 pH and 168° F. The total boil time is approximately 90 minutes. Add 6.6 AAU of bittering hops for the last 60 minutes of the boil. Add the Irish moss as indicated by the extract recipe.

This beer will peak between three and seven months after it is carbonated and will last at cellar temperatures for nine months.

Doppelbock

OG: 1.073 to 1.120
FG: 1.018 to 1.030
IBU: 20 to 40

Dopplebock, which means "double bock," is a strong, rich Bavarian lager that's often served as a winter warmer. Most beers of this style are dark, but there are a few pale examples. Munich and Vienna malts are used for the darker dopplebocks, and occasionally a small amount of dark roast malt. Pale lager malts are used for the pale versions. Continental European hops are used in both.

The aroma is one of intense maltiness with no hops evident. Diacetyl should be low to none, but there can be a fruity aspect to the aroma. In darker versions, a minute roasty aroma might be present. The color can vary from gold to dark brown, with good clarity.

The flavor is very rich and malty, with a touch of roastiness in a few instances. Alcohol presence should be warming, not harsh or burning. In doppelbocks, malt always dominates the flavor. There is little or no hop flavor and very low bitterness. They are full-bodied with low carbonation.

Optimator

Spaten-Franziskaner-Bräu
Munich, Germany

(5 gallons, extract with grains)
OG: 1.077 to 1.079
FG: 1.021 to 1.022
IBU: 26

IT'S THE WASSER

The **helles** and the **weizen** should be brewed with soft water. If you have soft water, less than 50 ppm hardness, do not treat it. If you have very hard water, over 200 ppm hardness, use spring water.

If you have soft water, treat the **Oktoberfest** water with 3/4 tsp. gypsum, 1/8 tsp. non-iodized table salt and 1/4 tsp. chalk. If you have very hard water, mix it 50-50 with distilled water.

If you have soft water, treat the **dunkel** water with 1/4 tsp. non-iodized table salt, 1 tsp. chalk and 1/4 tsp. epsom salts. If you have very hard water, mix it 50-50 with distilled water.

If you have soft water, treat the **doppelbock** water with 1/4 tsp. gypsum, 1/2 tsp. non-iodized table salt and 1.5 tsp. chalk. If you have very hard water, mix it 50-50 with distilled water.

The brothers of St. Francis of Paula invented this style in Munich. During the 18th century, monks continued to brew these strong beers to sustain them during their Lenten fast. Malty and fulfilling, doppelbock is one of the reasons why beer is called "liquid bread." The monks would give the poor who gathered at the monastery gates doppelbock for sustenance.

Word spread about this incredible beer and it found its way into the town taverns. Beer patrons eagerly anticipated the spring tapping of the doppelbock. They called this "taking the cure." The strong beer would lift their spirits and make them forget about the cold, dreary winter.

Optimator is brewed and then lagered in the brewery's deep cellars. This smooth beer is a beautiful ruby brown color with a whipped-cream head. The aroma is one of smooth, sweet malt and warming alcohol. It sits rich and malty on the palate, with alcohol a defining presence. This dopplebock will peak between five and nine months after it is carbonated and will last for up to one year at cellar temperatures.

Ingredients

24 oz. German Munich malt
18 oz. Belgian Cara-Munich malt
4 oz. Belgian aromatic malt
1 oz. British chocolate malt
5.5 lb. Muntons extra-light DME
3.5 lb. Bierkeller light malt extract syrup
8 oz. malto-dextrin
7.8 AAU Tettnanger hops (2 oz. at 3.9% alpha-acid) (bittering)
1 tsp. Irish moss
Munich Lager (Wyeast 2308) or Old Bavarian Lager (White Labs WLP920)
1-1/4 cup Muntons extra-light DME

Step by step

Bring one gallon of water to

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155° F, add 24 oz. German Munich malt and 4 oz. Belgian aromatic malt and hold for 30 min. at 150° F. In another pot, bring 1/2 gallon water to 155° F, add 18 oz. Belgian Cara-Munich malt and 1 oz. British chocolate malt and hold for 30 min. at 150° F.

Strain the grain into the brewpot and sparge with one gallon of 168° F water. Add the dry malt, malt syrup and bittering hops. Bring the total volume in the brewpot to 3.5 gallons. Boil for 45 min., then add the Irish moss. Boil for 15 min., then remove the pot from the stove. Cool wort for 15 min. 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.

Start fermentation at 60° to 62° F until fermentation begins (approximately 24 hours). Bring primary fermenter to 47° to 52° F for 7 days, then rack into secondary (glass carboy). Ferment at 47° to 52° F for 4 weeks, then bring the fermenter to 60° to 62° F until target gravity has been reached and the beer has cleared (approximately 2 additional weeks). Then prime and bottle. Carbonate at 70° to 72° for 2 to 3 weeks. Store at cellar temperature.

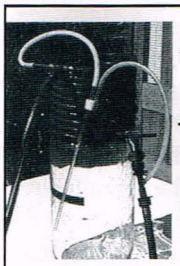
Partial-Mash: Acidify the mash water to below 7.2 pH. Mash 12 oz. German two-row pilsner malt and the specialty grains in 1 gallon water at 153° F for 90 min. Sparge with 1.5 gallon water at 5.7 pH and 168° F. Then follow the extract recipe, omitting 2 lbs. Muntons extra-light DME from the boil.

All-Grain: Acidify the mash water to below 7.2 pH. Mash 7 lbs. German two-row pilsner malt, 7.5 lb. German Munich malt, 14 oz. Belgian Cara-Munich malt, 4 oz. Belgian aromatic malt and 1/2 oz. British chocolate malt in 3.75 gallons of water at 153° F for 90 min. Sparge with 7 gallons of water at 5.7 pH and 168° F. The total boil time is 3 hours. Add 6.3 AAU of bittering hops for the last 60 min. of the boil. Add Irish moss as indicated by the extract recipe.

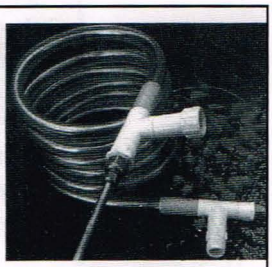
Decreasing the pilsner malt by 5 lbs. and adding 3 lbs. Muntons extra-light DME into the boil will make this mash more manageable. This will reduce your mash water to 2.75 lbs., sparge water to 5 gallons and boil time to 90 minutes.

Dopplebock will peak between four and eight months after it is carbonated and will last for ten months at cellar temperatures. ■

Tess and Mark Szamatulski own Maltose Express in Monroe, Connecticut. They're the authors of "Clonebrews" (Storey Books, 1998) and "Beer Captured" (Maltose Press, 2000).



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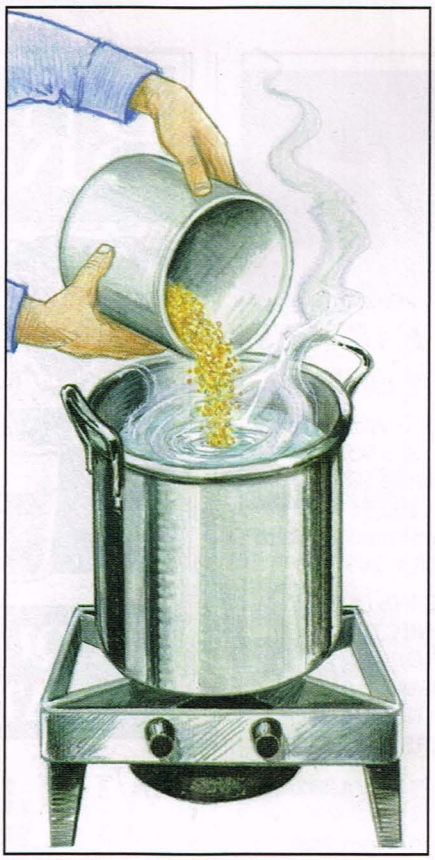
by LYNNE O'CONNOR

Tips and techniques for doing a double decoction mash

Mention the word "decoction" to most homebrewers and you can expect a puzzled reflection. Even among the most ardent all-grain brewers, decoction may elicit a bit of skepticism. Decoction mashing has a reputation for being time-consuming, difficult to control and not worth much in comparison to other mashing methods. I hope to convince you that at least two of the three preconceptions are wrong.

There are three basic mashing regimens. Single infusion is the easiest, both conceptually and in practice. This is the method used in English breweries. It involves the "infusion" of the grist (milled malt) with hot water to attain the "saccharification rest" at 148° to 158° F. (Saccharification is the process of breaking starch into simpler sugars.) This mash schedule is appropriate for well-modified malts — which constitute virtually all malts available to homebrewers over the past dozen years. Single infusion is the most common mashing regimen employed by homebrewers, brewpubs and micros for the production of both lagers and ales.

The other two mash schedules, decoction and step-mash, are similar to each other in that the mash includes additional rests at lower temperatures, typically a protein rest at 122° F and perhaps an acid rest at 100° F. The main role of the acid rest is to increase the acidity — lower the pH — of the mash and subsequently the beer. The principle roles of the protein rest are to provide nutrients essential for healthy fermentation, reduce haze and increase foam.



ILLUSTRATIONS BY DON MARTIN

Double decoction for a five-gallon batch: Bring 4.25 gallons of water to 101° F. Mix in 8.5 pounds of malt and let sit for 10 to 15 minutes. Raise to 122° to 127° F and hold 15 minutes.

Decoction differs from step-mash in the manner in which the mash temperature is raised. In step-mashing, the mash tun is heated (on a stove or outdoor cooker) to raise the mash from one rest to another. In decoction mashing, a portion of the mash is removed from the mash tun, brought to a boil in another kettle and then added back to the mash tun to "jump" the temperature to the next rest.

Decoction mashing was historically used throughout central Europe, including Germany and the Czech Republic. Decoction brewing is widely used in the Czech Republic to this day. However, many German breweries have moved to step-mashing. This trend away from the traditional decoction mash is likely to continue in Germany, and it is my expectation that many Czech breweries will ultimately move away from decoction as well.

There are two forces driving decoction toward, if not extinction, then rarity. The first is simple economics and the second is malthouse efficiency and technology.

In the simplest terms, malting and mashing are both processes along the continuum in the conversion of the food reserves of the barl-

eycorn into sugars. (In fact, the Czech word for brewer and maltster is the same, "sladek.") The maltster first changes the hard barleycorns with insoluble starches into soft malt with soluble starches. The brewer then breaks the starches down to sugars in the mash. But there's a region in which malting and mashing overlap. The malting process may be stopped at a point that requires the brewer to employ an acid and protein rest in the mash — such malt is said to be "under-modified." Or the malting process may be extended to a point that renders these rests unnecessary — this malt is "well-modified."

The cost of conducting acid and protein rests in the brewery is considerable, while the additional cost to the maltster of producing well-modified malt is negligible. That explains the economic motivation towards single infusion and away from decoction. Step-mashing is also less time-consuming and uses less energy than decoction.

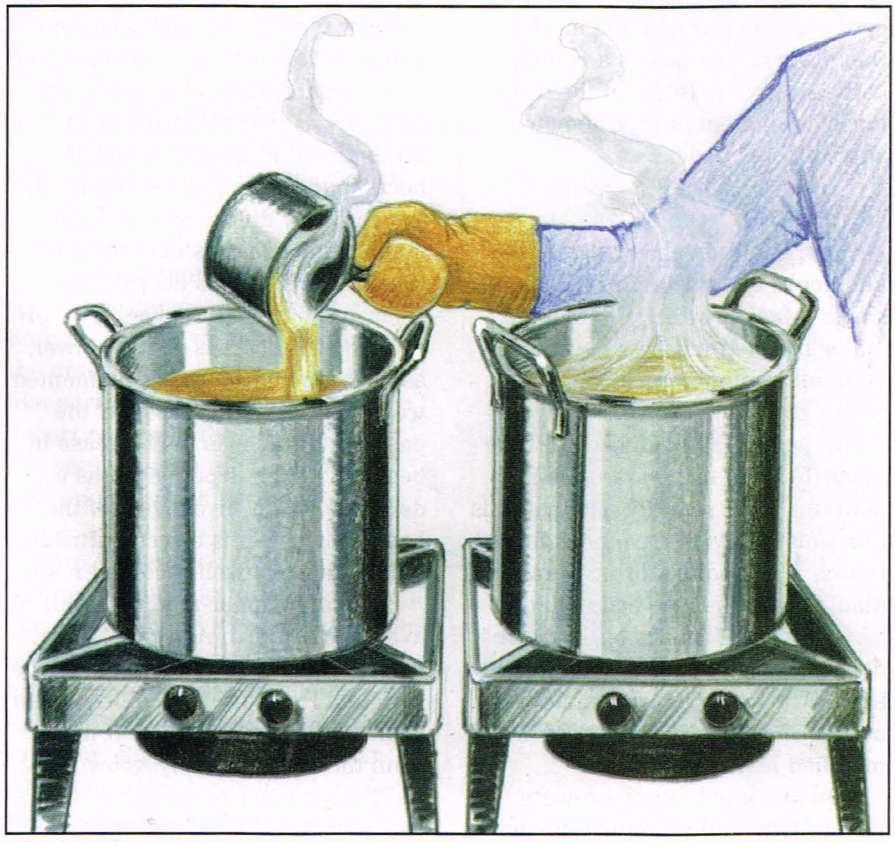
This begs the question, why did anyone ever use a decoction mash? Prior to the last part of the 20th century, malting was a poorly controlled process by today's standards. The greatest difficulty in malting is getting all the barleycorns to march in lockstep toward modification. Imagine a field of corn in which all the plants spring from the earth at the same moment! That is essentially the task of the maltster. The reality is that there is a distribution of modification within each batch of malt — some under-modified, some well-modified and everything in between. This distribution is usually very small today, due to the technology employed in malthouses and the systematic control of farming practices and seed selection. However, modification distribution was quite varied prior to this century. And decoction is preferable when malt has different levels of modification.

Daniel Fahrenheit invented the mercury thermometer in the early 18th century. Beer, thank goodness, was invented much earlier. So the decoction mash predates the thermometer. A decoction mash does not actually require the use of a thermometer, since the temperature of each rest is determined solely by mixing a known volume of boiling mash with a known volume of the remaining mash.

Although decoction is the traditional mashing method of continental Europe, this is not the case for the British Isles, where single infusion has its roots. The reasons for this appear to be a complex interplay of agricultural conditions, barley varieties and beer styles. Historically, England has favored the production of ales, while in other parts of Europe, lagers have long been favored. Because pale ales are darker golden in color than pilsners, the pale-alt malt needed to be kilned longer than the malt used to make lagers.

Furthermore, the weather in Great Britain is wet and warm, without harsh winters, while northern continental Europe has harsh winters followed by relatively dry and occasional hot summers. This led to English barley varieties that were lower in protein and plumper than those of Europe, which in turn led to both easier modification of English barleys, as well as production of clear beer without the rigorous decoction mash. Much of this may be a chicken-and-egg question; did desire for ale lead to these barleys or did the growing conditions lead to barleys suitable for ale?

This underscores one of the reasons that under-modified malt has become increasingly scarce, even in continental Europe. The market demand for well-modified malt has resulted in the development of hybrids best suited to a high degree of modification, while varieties suitable for under-modified malt have been phased out.



The first decoction: Use a small pot to ladle 2.65 gallons of the mash into another kettle. Take the thin mash at the top, leaving most of the thick mash at the bottom. Now heat the thick mash (the decoction), resting at 145° to 149° F and again at 163° to 165° F, before bringing it to a boil for 20 minutes. Stir occasionally.

I had the pleasure of traveling extensively in the Czech Republic over the past two years, visiting numerous breweries and maltings. I spent an entire day, 14 hours, quizzing a Czech brewmaster as a dark lager moved from doughing-in to pitching yeast. The decoction procedure detailed here reflects that experience. But the procedure is tailored to common homebrewing equipment and includes several tips that make the process easier and less time-consuming.

The Kettles

Decoction requires 3 kettles, or 2 kettles and a plastic pail or cooler. The kettles should be 7-gallon capacity or larger if you are making 5-gallon batches. Both kettles need drains, and one must also have a false bottom.

The third kettle, or the plastic pail, will be used for pure water — first for cool water, which we will use to adjust rest temperatures, and later to hold hot sparge water. Two kettles are needed for the mash. One of these doubles as a boiling kettle. You will also need the usual mash equipment of thermometer and spoon or paddle.

The Malt

Scores of homebrewing articles and books cite this mantra: "Use single infusion with well-modified malts and step-mash or decoction with under-modified malts." Although this counsel certainly has merit, homebrewers have had little opportunity to use under-modified malt due to its scarcity. The result is that homebrewers have been forced to use well-modified or moderately-modified malts in decoction and step-mashes. This has led to much debate over the past decade regarding the merits of decoction, as well as step-mashing, with modern well-modified malts.

On one hand, many brewers believe acid and protein rests and decoctions impart desirable and authentic flavors, as well as improve foam. This was the prevailing view in most homebrewing books and articles until recently. However, scientific literature has documented the negative effects of using malts intended for single infusion mashing in decoction or step-mashing. In particular, a protein rest at 122° F may actually result in poor foam! This, ironically, is quite the opposite of one of the supposed benefits of a protein rest. This is the reason that Anheuser-Busch skips the protein rest and many German breweries use a mash schedule called "hochkurz maischverfahren" (high-short mashing scheme), a simplified decoction mash that begins at a high temperature, 140° F, thus skipping the protein rest.

There are numerous other defects — or at least differences — in decoction beers brewed with well-modified malts. Higher pH, sulfur dioxide levels, and the levels and types of esters and higher alcohols all reflect on the perceived quality of the beer.

Homebrewers have used virtually every type of malt for decoction mashing. Regardless of the opposing views regarding protein rests (my own view is that the negative effects are minimal if the rest is brief), beers made from a decoction mash are certainly different from those made from step-mash or single infusion. The decoctions deepen the color and flavor of the beer. The pH of decoction beers is slightly lower, as well. One of the well-documented trends in German beers over the past two decades is the increase in beer pH, which is perceived as a decrease in the "liveliness" of the beer. This defect is directly attributable to modern well-modified malts.

The only under-modified malt available in North America is Budvar malt. Budweiser Budvar, the "original Budweiser," is a Bohemian brewery that insists on malt made from the Forum variety, grown in the Hana region of Moravia. The brewery specifies malt that is under-modified to match the decoction mash employed at the brewery for over a century.

The English pale malts (Beeston, Muntons, Pauls, Hugh-Baird, Crisp) as well as the American pale malts (Briess, Great Western, Schreier) and the Belgian DeWolf-Cosyns malts are all well-modified. The modification differences between lager (a.k.a. pilsner) malts and pale ale malts from these maltings are generally quite small. Some German malts, such as those from Weyermann, Weisheimer and Durst, are moderately-modified.

The Water

Czech lagers are brewed with very soft water. The water of northern Germany is less soft, but great pilsners are brewed there as well. If your water source is hard and alkaline, I would suggest diluting by half or perhaps two-thirds with RO or distilled water. If you are not sure about the calcium content, add a pinch of calcium chloride.

Double Decoction

Many German breweries employ single decoction, while most Czech breweries use double decoction. Triple decoction is reportedly employed at Pilsner Urquell. Single, double, and triple simply refer to the number of portions of the mash that are removed and boiled. Both triple and double decoction typically involve the same four temperature rests. For clarity, I will give details for a double-decoction mash of five gallons of pilsner beer.

Step 1: Dough-In and Acid Rest

Doughing-in, also calling mashing-in, is mixing the strike water with the crushed malt. To do it, bring 17 quarts (4.25 gallons) of water to 101° F. Mix in 8.5 lbs of milled malt. Add a couple of pounds at a time, then stir with a spoon to thoroughly mix. The temperature should be 98° F, but don't worry if it's anywhere between 96° and 100° F. Let this sit for 10 to 15 minutes.

The decoction mash for pilsner is a very thin mash, with roughly 2 to 2.5 quarts of water per

pound of malt. This is at least 50 percent more water than for a single-infusion mash.

Here's an equation for determining the temperature of the strike water. This equation applies to single-infusion mashes as well:

$$T_W = \frac{TD[2.08 \times M + 0.4] - [0.4 \times T_g]}{2.08 \times M}$$

Where TD is the dough-in temperature in °F, T_g is the temperature of the grist in °F, M is the water/grist ratio in quarts/pound, and T_W is the strike water temperature in °F.

Tip 1. Use 2 quarts of water per pound of grain for doughing-in. This allows you to add more water later in the mash to adjust the temperature. Applying the above equation, the strike water need only be at 101° F if you're using 2 quarts/lb. for a 98° F dough-in (assuming the grain is 70° F). Note that 1 pound of malt in 2 quarts of water results in 2.5 quarts of mash. For this mash (17 quarts of water and 8.5 lbs. of grist), the total mash volume will be 21 quarts (5.25 gallons).

Step 2: Protein Rest

Turn burner on and raise the mash temperature — at a rate of 2° F per minute — until it is between 122° and 127° F. Hold at this temperature for 15 minutes.

At this point, you are conducting a step-mash. It is important that you apply sufficient heat to move quickly to the protein rest stage. Stir the mash occasionally to even out the heat and prevent scorching.

Step 3: First Decoction

Use a small pot to ladle 10.5 quarts (almost 2.65 gallons) of the mash into another kettle. Take the thin mash at the top, leaving the thick mash at the bottom.

Apply heat to the thick mash that you left behind in the original pot to bring the temperature to 145° to 149° F (again, at 2° F per minute). Rest for 10 to 15 minutes. Then raise the temperature to 163° to 165° F for a 10 to 15 minute rest.

Now bring this to a boil for 20 minutes. Stir the mash occasionally, particularly as it reaches a boil. Note: The thin part of the mash, which you moved to another kettle, should be kept between 122° and 127° F during this entire step.

The greatest difficulty in decoction brewing is pulling the proper amount off the mash, which when boiled and added back, will raise the entire mash temperature the precise amount.

Tip 2. The volume of the first decoction will depend on your system, but I would suggest taking 45 to 50 percent of the total mash. This will likely result in overshooting the temperature. Keep some cold water handy, and if you overshoot, bring the temperature down with the water *(see Tip One)*. The following equation (adapted from "Technology Brewing and Malting" by Wolfgang Kunze) provides an estimate of the amount of your decoction:

Decoction Volume in quarts = (temperature increase in °C) x (Total Mash Volume in quarts)/(90 °C - temperature of unboiled mash in °C).

The decoction is the thick portion of the mash, which is at the bottom. In a single-infusion mash, the entire mash is said to "float" like porridge. However, in a thin decoction mash, the grain sinks to the bottom while the thin watery portion remains at the top.

Tip 3. How do you get the thick portion off the bottom of the kettle if you cannot pump it from the bottom as is done in commercial breweries? Quite simply, you don't. Remove the thin portion from the top (you will also need to remove some of the thick mash to achieve the 50 percent left for the decoction). I use a small pot to ladle the mash over. In other words, the decoction is what is left behind.

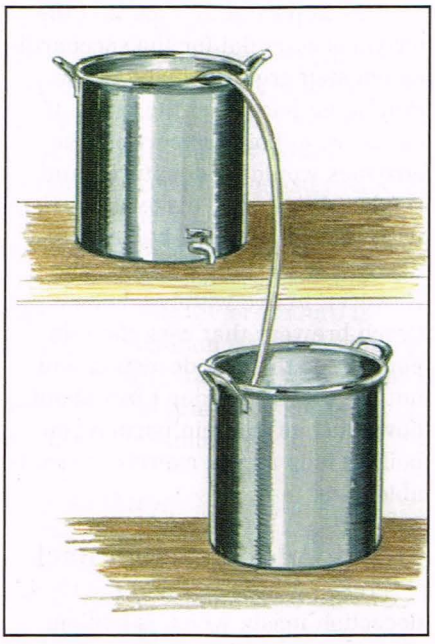
It is important to note that the enzymes essential for the saccharification step are principally in the thin liquid portion of the mash. If one were to boil this portion, the enzymes would be denatured and rendered useless. This explains the wise counsel to never boil all the mash or even the thin portion. However, I have witnessed one Czech brewery that uses the thin portion for the first decoction, but not the second. So don't fret about how much of the thin portion you boil, as long as you exercise reasonable care.

Step 4: Add Decoction Back

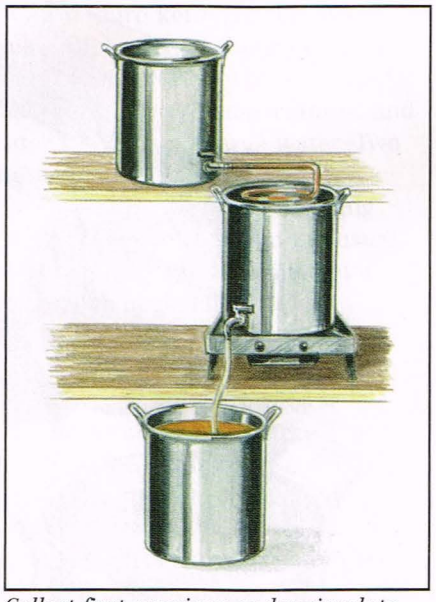
Turn off heat and add the thick decoction mash, which is boiling,



Turn off the heat and add the thick decoction mash, which is now boiling, into the kettle that has the thin mash.



After the second decoction, simply siphon the thin top of the mash, which will be very clear, into the brew kettle.



Collect first runnings and recirculate until clear. This should take just one minute. Sparge to collect 5.5 gallons.

into the kettle that has the thin portion of the mash. (Remember that the thin portion of the mash has been sitting at 122° to 127° F during this time.) The entire mash should now be at 145° to 149° F. If it is too high, add some water. Rest 10 to 15 minutes. Be careful when handling the boiling liquid. I recommend using the small pot to ladle at least some of the boiling mash over.

Step 5: Second Decoction

Use a small pot to ladle 8.5 quarts (a little over 2 gallons) of the mash into another kettle. Take the thin mash at the top, leaving the thick mash at the bottom.

Apply heat to the thick mash that you left behind to bring the temperature to 163° to 165° F (at 2° F per minute) and rest for 10 to 15 minutes. Now bring this to a boil for 20 minutes. Stir the mash occasionally to prevent scorching.

The second decoction will be larger than the first, on the order of 50 to 60 percent of the mash. I recommend using the upper range of 55 to 60 percent. So ladle the thin top portion and some of the thick mash to another kettle.

Step 6: Add Decoction Back

Turn off heat and add the thick decoction mash, which is boiling, into the kettle that has the thin portion of the mash. This thin portion has been sitting at 145° to 149° F. This should bring the entire mash to 171° to 172° F. If it is too high, add some cold water to bring it within range. Rest for 30 minutes.

Step 7: Siphon off the Top

Now you're ready to lauter, the process of collecting the extract from the mash tun. You will find the thin portion of the mash to be extremely clear — much of the break material, typically found in the boiling kettle, is in the mash tun due to the boiling of the decoctions.

Siphon the top, clear portion from the mash into the boiling kettle. Do not siphon the cloudy wort. To start the siphon, fill plastic tubing with water and quickly immerse one end into the mash and the other into the kettle.

Tip 5. The top portion is so clear that you need not lauter it. The first wort can actually come off the top through a siphon hose. This will be as much as 40 percent of the total mash volume (about 2 gallons in this recipe). It is common in Czech breweries to remove the first runnings in this manner. This is a great time-saving technique.

Step 8: Lauter and Sparge

Heat 3 gallons of plain water to 176° F. This water will be used for sparging — rinsing the extract from the mash. Now begin lautering by opening the valve on your mash tun. Collect the first runnings, which will be cloudy, in a small pot until the runnings become clear. Pour the runnings back into the mash tun. Recirculate the runoff until it becomes clear; this should only take a minute for a decoction mash.

Note that the rate of the run-off depends on the surface area of the grain bed. In a typical homebrew set-up, this equates to about 1 pint per minute.

Carefully monitor the depth of the liquid above the grain bed. When it reaches a depth of less than 1 to 2 inches, add sparge water at the same rate that you are collecting the runoff. Continue to collect the runoff until you reach a boiling kettle volume of 5.5 gallons

You will not need to add any sparge water for some time because of the thin mash. Note: If the wort drops below the level of the grain bed, and then you add sparge water, you run the risk of getting a stuck mash.

Tip 6. Expect a decoction mash to get stuck. In fact, it's unusual for the mash *not* to get stuck. There are two reasons for this. First, you have precipitated a lot of break material during the decoction boils. Also, boiled husks do not make a good filter medium.

Here's a little trick that I have used with great success. Add a pound of rice hulls to the mash during the last rest. The rice hulls improve the filter medium and thus ease the lauter.

If the runoff gets stuck, stop the lautering process, add some 176° F sparge water and stir gently. Then lauter again, remembering to recirculate for a minute until the runoff clears. You may have to repeat this

two or three times if you do not use rice hulls during the last rest.

Step 9: Boil and Ferment

Now you are ready to move on to the usual boil and fermentation stages. Traditional Central European breweries employ a 1.5- or even 2-hour boil. In the interest of time, I never exceed 1.5 hours. A good rolling boil with about 10 percent evaporation is fine.

German and Czech brewers historically have used 3 hop additions in equal amounts: the first addition for 1.5 hours, the second for 1 hour, and the final for 20 to 30 minutes. Budweiser Budvar uses a method called "first-wort hopping," in which hops are added to the first runnings during lautering *(for more on first-wort hopping, see page 45)*. The second addition is at the beginning of the boil; the final addition is 30 minutes before the end of the boil.

Decoction Differences for Dark and Strong Beers

The decoction procedure I have detailed is appropriate for pilsners or other pale lagers. There are a couple of differences when brewing dark beers. The rests for pilsners are each 10 to 15 minutes, except the last, which is 30 minutes. When brewing a dark lager, the rests are typically 5 to 10 minutes longer. Additionally, black malt is never boiled; it is added during the last rest only. Furthermore, dark or strong beers such as bock and Oktoberfests are typically made from thicker mashes than are pilsners. For example, a water/grist ratio of 1.5 quarts/pound would be appropriate for a bock. ■

Lynne O'Connor (nee Karas), a second-generation Texas Czech, owns St. Patrick's of Texas Brewers Supply in Austin. She is greatly indebted to the following Czech brewers and maltsters: Petr D., Rosta R., Jiri R., Josef V., Vlastimil Z., and two anonymous Czechs. Their knowledge is exceeded only by their patience.

Four Beers, Double Decoction

Hoppy Czech Pils

(5 gallons, all-grain)
OG = 1.051 FG = 1.010 IBUs = 45

Ingredients

8.5 lbs. under-modified or moderately-modified malt
Three 1 oz. additions of Czech Saaz hops (at 90 minutes, 60 minutes, 20 minutes)
Czech Pils yeast (Wyeast 2278)
1 cup corn sugar for priming

Step by Step

Follow double-decoction procedure outlined in the article. Primary fermentation at 48° F for 12 days. Lager at 32 to 36° F for 3 to 9 weeks.

Original Budweiser

(5 gallons, all-grain)
OG = 1.051 FG = 1.010 IBUs = 22

Ingredients

9.75 lbs. under-modified or moderately-modified malt
Three 0.75 oz. additions of Czech Saaz whole leaf hops (at first runnings, 60 minutes and 30 minutes)
Budweiser Budvar (Wyeast 2000)
1 cup corn sugar for priming

Step by Step

Follow double-decoction procedure. If using pellet hops, slightly reduce the amount of hops. Primary fermentation at 48° F for 12 days. Lager at 32° to 36° F for 3 to 9 weeks.

Note: This recipe uses more grain than the previous pilsner recipe, although they have the same starting gravity. Budweiser Budvar does not sparge the spent grains to the extent employed at most breweries. This results in decreased efficiency (only 27 to 28 points per pound) but produces a beer that is smoother, with a rounder flavor.

German Bock

(5 gallons, all-grain)
OG= 1.068 FG = 1.016 IBUs = 25

Ingredients

6 lbs. under-modified or moderately-modified malt
5 lbs. light Munich malt (10° Lovibond)
1/2 lb. crystal malt (50° to 60° Lovibond)
1/3 lb. black patent malt
Three 1 oz. additions of Hallertau Mittelfrueh hops (at 90 min., 60 min. and 30 min.)
Bavarian Yeast (Wyeast 2206)
1 cup corn sugar for priming

Step by Step

Follow double-decoction procedure, with the exception of using a thicker mash. Do not add the black patent malt until the last rest. Primary fermentation at 48° F for 16 days. Lager at 32° to 36° F for 5 to 12 weeks.

German Märzen

(5 gallons, all-grain)
OG = 1.058 FG = 1.012 IBUs = 26

Ingredients

8.5 lbs. under-modified or moderately-modified malt
3.25 lbs. light Munich malt (<10° Lovibond)
8 oz. DeWolf-Cosyns aromatic malt or Weyermann melanoidin malt
1 oz. addition of Hallertau Mittelfrueh hops (at 90 min.)
0.5 oz. additions of Tettnang (at 60 min. and 30 min.)
Bohemian yeast (Wyeast 2124)
1 cup corn sugar for priming

Step by Step

Follow double-decoction procedure, with a thicker mash. Primary fermentation at 48° F for 15 days. Lager at 32° to 36° F for 5 to 12 weeks.

Hot Rocks!

by Thomas J. Miller

To make a traditional German "stein beer," use superheated granite to boil your wort

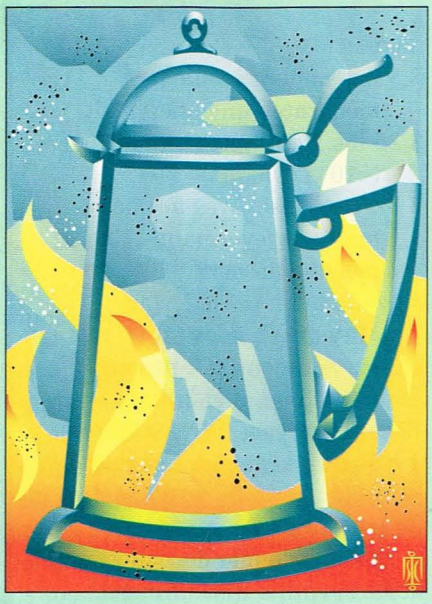


ILLUSTRATION BY SHAWN TURNER

Homebrewers spend lots of time pondering the merits of certain beer styles. Should they brew a brown ale or a pale ale, a pilsner or a helles? But in the early days of brewing, brewers were much more concerned with method than style. Heating the water and boiling the wort were probably the greatest obstacle to making a decent beer. How in the heck were you supposed to brew without the modern conveniences of steam jackets or direct heat?

For brewers in the Middle Ages, hot rocks were the most logical means of conducting heat. When dropped in a wooden vat filled with wort, the heated rocks had a cauldron effect, causing the wort to boil vigorously over a period of several minutes. This resulting brew became known as "stein beer."

From the name — "stein" is German for "stone" — we can gather that Germans developed this traditional brewing method. Stein beer was most common in the Alpine regions of Europe, where stones were easily quarried and transported back to the brewery. With the Industrial Revolution came easier means of heating wort, and by the start of the 20th century, the method was obsolete.

Stein beer might have been forgotten had not Rauchenfels revived the technique in 1982. Located in Marktoberdorf, Bavaria, Rauchenfels is the original steinbeer brewery of the modern era. The brewers use "graywacke," a dark sandstone that resists shattering under superhot temperatures.

Homebrewers take note: Stein beer is all about a brewing method, not about a style. Any beer can be a stein beer, as long as you use rocks in the brewing process!

Rocks and Wood

From start to finish, everything about making stein beer is just like any of your favorite brews. The only twist is how you boil the wort.

First: You'll need some rocks. Granite rocks are the only choice for homebrewers, since they can be superheated in a high-temperature fire. Other types of stones, like sedimentary rocks, might explode as the temperature rises. Local quarries are a good place to procure rocks, or try your favorite gardening store.

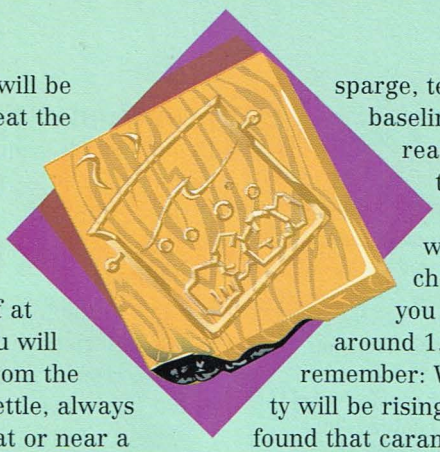
The size of your rocks will depend on your boiling vessel. Obviously, they must easily fit inside the kettle. More important, though, is that they do not displace too much of the wort (thus leading to a major boilover). Fist-sized granite stones are a good choice for homebrewers. Not only do they complement the size of an average home brewery, they also heat faster and are easily transported from the fire to the kettle. You should acquire 10 to 15 rocks of this size.

For a fire, good hardwood is the best choice. Hardwood burns hot and long, and it also gives subtle flavors to the stone. This will be imparted to the wort when you immerse the stones. Cherry and oak are two types of wood that burn well and add flavor to your brew.

Once you have a red-hot bed of coals, about one-inch deep or more, use long, well-insulated metal tongs to place the rocks in the fire. *(Note: You must be extremely careful! See "Stein Beer Safety Tips" on page 38.)* Cover the rocks with coals. The rocks will start to "glow" after a little while, turning somewhat red as they heat up. When they turn white they have become superheated.

Use the tongs to extract 3 or 4 rocks from the fire. Place the rocks in a stainless-steel colander and, using an insulated tong to grab each handle, place the colander in the wort. Almost immediately, your wort will rise to a boil. After about ten minutes, that boil will fade. Remove the colander and place the "cool" rocks back in the fire.

You should have left some rocks in the fire. These will be superheated. Repeat the process, placing these new "hot rocks" in the colander and then in the beer. Over the course of at least one hour, you will rotate the rocks from the fire to the brew kettle, always keeping the wort at or near a constant boil.



As you come to the end of the boil, start setting your "cool" rocks aside in a container (sterilized, if possible). You will use these again during secondary fermentation.

Creating a Recipe

Recipes for the stein-beer method vary widely. Many homebrewers will insist on brewing a lager. This is the German tradition, after all! Remember, though, that Germans also enjoy the occasional ale: kölsch, altbier and hefeweizen are three examples. Why not tack stein beer onto that list?

That's why I chose an ale yeast strain. I like the English Ale Yeast by White Labs (WLP002) because it is highly flocculant. It also leaves a nice residual sweetness and ferments well between 65° to 68° F, which are much easier temperatures for the average homebrewer to maintain.

My malt bill produces a light copper color. The heavy use of Munich (which makes up 50 percent of the malt bill) will result in a very malty palate. Another 45 percent of the malt bill is pale malt. Crystal malt is the remaining 5 percent. This adds some color and body.

I also bumped up the malt content, figuring that some fermentable sugars are going to be lost each time I submerge new, superheated rocks in the wort. Why? Because a portion of the sugar will caramelize and solidify against the rocks. This sugar will be lost for fermentation purposes. For this reason, my preference is to "shoot high" with the malt bill.

At the end of the lauter and the sparge, test the wort for a baseline specific gravity reading. Then, throughout the process of boiling with the rocks, keep checking it. Stop when you get a reading of around 1.055. One thing to remember: While specific gravity will be rising as you boil, I have found that caramelization can also cause it to temporarily fall. (As sugar sticks to the rocks, there is less sugar in the water, which causes the specific gravity to drop ... until that water is boiled away.) Balancing out these opposing forces is the key to hitting your recipe's gravity targets.

Another note: When you take wort samples, you will need to rapidly reduce the temperature of the sample to around 65° to 70° F to get an accurate specific gravity reading. A good way to do this is to spin the sample rapidly in an ice water bath. Use heavy plastic or metal for the sample, as glass may crack due to the rapid temperature change. After spinning for several minutes, the wort will drop to the right temperature.

I kept the bitterness very low, shooting roughly for 20 to 25 IBUs. Hop flavor and aroma is practically nonexistent. I'm looking for a finished beer that is malty in texture and flavor, with bitterness only to round out the palate.

Beyond the use of rocks to boil your brew, they also come in handy during secondary fermentation. You will notice that the rocks have been coated with a hard, malty residue. This occurred when you added the superheated rocks to the wort and a portion of the malt sugars caramelized against the stone.

Before transferring the beer to a secondary fermenter, place several of the caramelized rocks inside (you need a bucket to do this). Then rack the beer on top of the rocks. You may experience slight secondary fermentation from remnant sugars. Mostly, though, the rocks will just impart additional flavor.

STEIN BEER SAFETY TIPS

SAFETY MUST BE YOUR TOP priority when making stein beer, because the superheated rocks can be dangerous. First, the rocks are extremely hot. Second, they will make the tongs and colander hot. Third, they will make the wort boil vigorously. And fourth, some rocks might explode when heated (that's why granite is the only option).

The crucial moment comes when you move the rocks from the fire to the wort. I suggest using well-insulated tongs and a colander to move the rocks around. I say "colander" in the generic sense, meaning anything that will let wort flow around the rocks.

Insulated tongs will let you lift and carry the colander while keeping your hands a safe distance from the rocks. You can fashion these tongs by purchasing 16-inch restaurant-style tongs and wrapping insulated rubber on the part of the tongs you'll be holding. You can also find heat-resistant tongs from companies like Crestware. (Before you buy, be sure they can handle the heat of superheated rocks!)

Thanks to the tongs' length, you can use them to remove rocks from the fire. After you have placed several rocks in the colander, simply hook the tongs through the colander handles and carry it to the boiling vessel. The colander needs to be deep enough to sit at least halfway down into your wort.

The best choice is a steam kettle. These look like metal buckets with holes and have a large "bucket handle" that extends above the top of the brew kettle. A regular colander is trickier, because it might fit all the way down into your brew kettle. This makes for some troublesome handling as you put the colander in the wort and take it out. To prevent problems, the best solution would be to fashion a sturdy metal "bucket handle" so the colander works like a steamer basket. You can grab this handle with your tongs to raise and lower the colander.

If the colander handles rest securely on the edge of your brew kettle, you can set it down and let it stay there as the wort boils. The colander needs to be deep enough to vigorously boil the wort. You'll also need to be careful not to tip the colander into the kettle. —*T.M.*

Stonehenge Stein Beer

(5 gallons, all-grain)
OG = 1.054 FG = 1.014
IBUs = 20 to 25

Ingredients

5.5 lbs. Munich malt
5 lbs. American two-row malt
0.5 lbs. crystal malt (40° Lovibond)
5 AAU Hallertauer hops (1 oz. of 5% alpha acid)
Starter of White Labs English Ale yeast (WLP002)
3/4 cup corn sugar for priming

Step by Step

Start hardwood fire in a large grill. Spread the hot coals out to form a bed at least one-inch deep. Place the granite rocks in the coals.

As the rocks are heating, mash grains in 2.5 gal. water in a single infusion at 150° F for 60 min. or until iodine test is negative. Sparge with 170° F water to collect 6 gal. When all the wort is collected in the boiling vessel, remove 3 to 5 superheated rocks from the fire. Use a heat-resistant barbecue-type brush to flick any embers from the rocks. Place the rocks in a stainless-steel colander and submerge them in the wort. Repeat this process for the entire boiling period.

At start of boil, add Hallertauer hops. Total boil is 60 to 90 minutes, depending on how quickly your specific gravity drops. Chill to 65° F and pitch a one-quart starter of yeast. Ferment at 65° to 68° F. When krausen drops back, check specific gravity. Rack into secondary on top of the "caramelized" rocks when gravity hits 1.015. Age at cellar temperatures (or lower) for 7 to 14 days. Bottle and prime. Condition in the bottle 30 to 60 days.

Simple Stein Beer

(5 gallons, extract with grains)
OG = 1.055 FG = 1.015
IBU = 20 to 25

Ingredients

0.5 lb. crystal malt (crushed)
6.5 lbs. Ireks amber dry malt extract (DME)
5 AAU Hallertauer hops (1 oz. of 5% alpha acid)
1/2 tsp. Irish Moss
White Labs English Ale Yeast (WLP002)
3/4 cup corn sugar for priming

Step by Step

Crush the grains with a rolling pin. Put them in a cheesecloth bag and submerge them in 5.5 gallons of cold water. Turn on the heat to high, and let the grain bag steep while the water is heating. Remove the grains when the water hits 170° F.

Separately, start a hardwood fire. When you have plenty of coals, spread out the bed to at least one-inch in depth. Place the rocks in the bed and cover them with coals.

Bring the water to a boil, turn off the heat, and slowly stir in the extract. When the extract is dissolved, check the specific gravity for a baseline reading. Now, remove several superheated rocks from the fire, flick off the embers and place them in a stainless-steel colander. Add this to the wort (you will need fewer rocks because the water is already near-boiling). The wort will boil vigorously, so beware of a boilover. Add the hops. Continue removing rocks and adding new, superheated ones during the 60-minute boil. Check the specific gravity after 60 minutes. Boil until you near 1.054. Add the Irish moss 2 minutes before the end of boil.

Cool rapidly to 65° F. Siphon or pour into a primary fermenter. Pitch the yeast. Ferment with an airlock in the primary fermenter, and move to a secondary on top of the "caramelized" rocks when the krausen subsides. Age in the cellar at or below fermentation temperatures. Bottle after 7 to 14 days. Boil the priming sugar in 3 cups of water, cool, and add it to the secondary before bottling. Store at cellar temperatures for several weeks. ■

Special thanks to Peter Kreinheder of Ellicottville Brewing Company in Ellicottville, New York for his help and tips in preparing this article.

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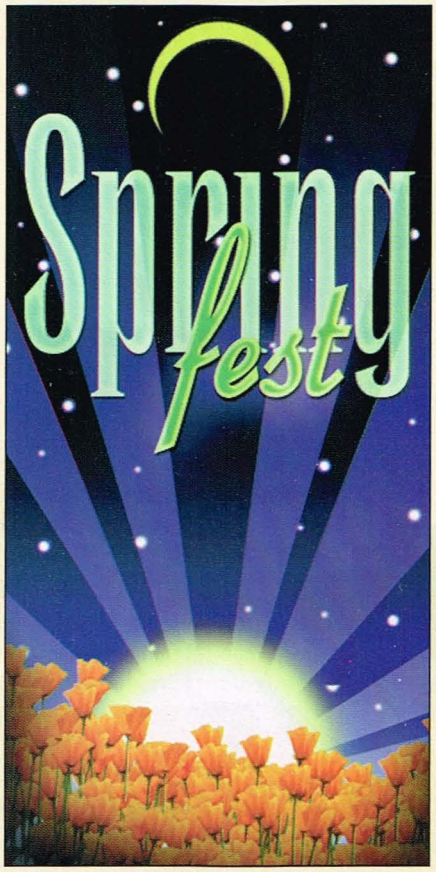


STEP UP to the challenge! Send us your finest labels: Winners receive fabulous prizes and get to see their artwork in the Summer issue of BYO. For tips on label design, turn to page 40.

label design 101

by KEITH YAGER

How To Make Great-Looking Beer Labels At Home



Keith Yager composed this sunrise over a field of flowers using Adobe Illustrator, Adobe Photoshop and Corel Painter: "The label border, the type, the crescent moon and the sunrays were all drawn and composed in Adobe Illustrator. Each element was brought over separately into a Photoshop document. The sun is a combination of white and yellow spheres blurred with the 'gaussian blur' filter under Photoshop's filter menu. Using Photoshop's layer tool, an inner glow effect was added to the type. The document was then saved as an 'eps' and opened in Corel Painter. Under the tools pallete, I selected the 'nozzle' brush and then selected these flowers and painted them on the bottom of the label. Then for the finish, I cast a shadow around the base of the flowers using Painter's airbrush."

Put an artsy label on your favorite bottle of homebrew and you've instantly increased its coolness factor. The bottle not only becomes more appealing to the visual senses, but the beer tastes better, too. I swear to it! Why? Because the mind has already determined that the beer has a degree of quality depending on the aesthetics of the bottle. Face it, there's nothing exciting about a plain, brown bottle. Which is why it's important to have labels on our homebrew.

Another important reason is because of the sixth annual BYO Label contest *(see page 39 for details)*. Besides the chance to win great prizes, there is also the chance of seeing your very own label grace the pages of BYO. What could be cooler than that? Of course, not everyone out there has an art degree. So here are some professional graphic design tips to help you to make winning labels.

Design 101

There is a saying in the graphic design business: "Good artists innovate, great artists steal." That being said, the best way to come up with great-looking designs is to look at great-looking designs. Look around your favorite beer store for label design inspiration. But don't limit yourself to beer packaging. Look at all kinds of creative product packaging — soft drinks, compact discs, old vinyl LP's, wine bottles, anything you can think of. Study the way the type and the art are composed on the packaging. Use similar color schemes and type styles.

This is a homebrew label, not a corporate label, so don't have any qualms about ripping off art or designs. On the other hand, try to keep it original. Pull various elements — color schemes and type ideas — from two or three different designs.

The first rule in design is to use proper type styles effectively. Use type styles that are distinctive and creative, but make sure they are easy to read. Stay away from illegible scripts and italics. Stay away from ALL CAPS as much as possible. Using upper- and lower-case typefaces generally creates more visual play in the wording, thus making the type more interesting and appealing to the eye. The most common mistake made by beginning

designers is using all caps with script faces. Some folks can't resist using script faces even when they're impossible to read.

Of course, the other graphic design rule is that there are no rules. If it looks good — it works.

Finding Art

With the Internet, art is extremely easy to find. Say you're looking for the likeness of Elvis Presley, or some other famous person, for your beer label. Simply turn to your favorite search engine (perhaps google.com or lycos.com) and type in the name of your famous person. Suddenly you have thousands of images to choose from (the King has over 200,000 sites). One thing to remember is that Web developers save their images at low resolution, usually 72 ppi (or pixels per inch), to save memory and download time. For print, resolution needs to be fairly high (at least 150 ppi), or the image size will be fuzzy and "pixilated." To change image resolution, look for a menu item called "resolution" or "image size" to make the necessary adjustments. Do not enlarge images because you will lose resolution quality. Instead, you should find fairly large, clean images and reduce them to enhance pixel integrity.

Scanning images is probably the best way to incorporate art in labels. Scanners can be purchased very inexpensively today. A typical home scanner will generally cost between $90 and $200. The lower-end scanners may not have all the bells and whistles that a more expensive scanner has, but is sufficent for almost any home use.

Scan images at a fairly high resolution (at least 150 ppi). When scanning images from magazines, newspapers or other print, you may notice strange patterns appearing on the scan. This is called a "moiré pattern" and it happens when the dots in the image overlay the pixels of the scan. The result is misshapen pixels on your monitor. Check to see if your scanner software has a "descreen" option and turn it on. There are usually three descreening choices: newsprint, magazine and art print. Click the appropriate option for the type of art being used or try each option until the best scan is found.

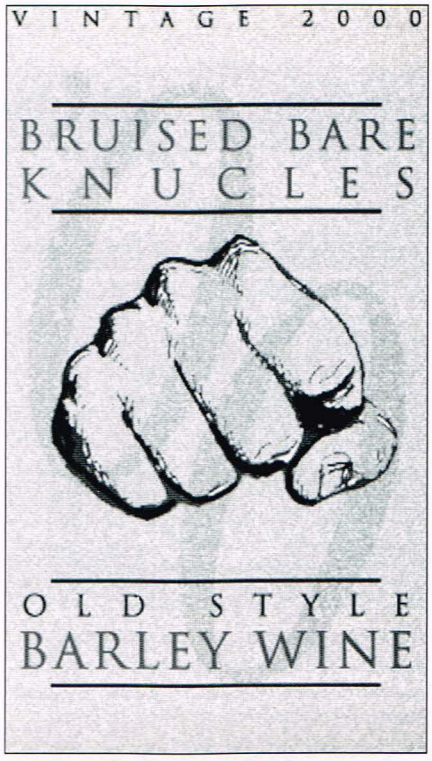
If your scanner does not have a descreen option, try tilting the image at several different angles until you find a scan with the clearest image. By tilting the image, you will be changing the way the pixels and the dots overlay. Remember that with photographs or other continuous tone prints that descreening is not necessary because the image is not composed of dots.

Software

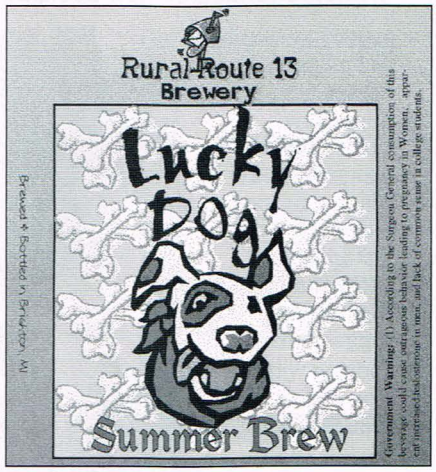
Simply stated, anyone with access to good design software will have an advantage over those who do not. Design applications such as Adobe Illustrator, Macromedia Freehand, QuarkXpress, Adobe Photoshop or Corel's Painter will give the user superior design capabilities. The great thing about all of these applications is that they can be downloaded free from the Internet. The downside is that they are only demos and expire after thirty days. Worse than that, these applications can cost between $350 and $1,000. These applications can also be challenging for the beginner, especially when unlocking some of the more advanced secrets.

But don't be daunted. To download the programs go to adobe.com, quarkxpress.com, macromedia.com and corel.com. Play, experiment and have fun with the various effects each program has to offer. Software like Illustrator or Freehand will give you maximum control over colors, shapes and type. Experiment by playing with type sizes, shapes and effects. To import your scanned art in Illustrator or Freehand, use the place command ("file" menu, "place" command). In Photoshop, experiment with the different filters and distortions (under the "filters" menu). Painter has some really impressive oil and water color brushes that look very realistic.

Remember that these applications can be quite extensive and complicated for the novice designer.



Yager says: "My barleywine is a tough ale brewed with plenty of malts and aged over a year. I wanted a simple 'old style' label for this brew, so I drew a rough fist with pen and ink and then scanned it into Photoshop. The faint '00 behind the fist uses the same color as the background but was darkened slightly using the curves under the image-adjust menu. I derived the background texture using the noise filter under the filter menu. The type was composed in Illustrator and then copied and pasted onto the Photoshop document."



This label won first place in the 2000 contest and was made by Gary Shewchuck. Gary used Microsoft Publisher Printmaster Gold software. He downloaded the dog clip-art from the Web. He used presentation paper and a label template and made color copies on a laser printer.



This label won Glen Nichols an Editor's Choice award in our label contest. Glen's son was responsible for the color and design. He used a digital photo and Photoshop. For the band, Glen soaked off an old Grölsch label and scanned it for size. He then superimposed his picture into the center. He used photo-quality paper, which he cut out and laminated. He uses double-stick tape to affix them to the bottles.

You should use the tutorial if available, or ask a more experienced friend for help in exchange for a few of your homebrews.

Another option for Windows users is a shareware application called Paint Shop Pro. Paint Shop Pro is a drawing and painting application with some fairly powerful image-editing tools. The demo version lasts for 30 days, but the shareware program is relatively inexpensive, costing around $99. Download the demo at www.paintshoppro.com.

Another relatively inexpensive option for both Mac and PC users is Adobe Photoshop LE. This is a limited edition of Photoshop but many of the powerful image-editing tools are preserved and the full price of the software costs only around $150.

Although not as powerful as design applications, most computers come with free drawing and painting software that can be used to make decent labels. Every iMac sold comes with an application called "AppleWorks" that has a basic drawing and painting application. Windows users also have a very basic painting and drawing program called Windows Paint. Both applications offer the ability to import scanned art, to manipulate colors and add type.

If you are having problems importing your scanned or manipulated image into your editing software, make sure that you have the image saved in a universal format (such as .tif, .jpg or .gif) before importing. These formats make the image recognizable to the different software. Check with the software's tutorial to see which format works with which program.

Label Diagnostics

It's important when making labels to keep in mind the image area that is viewable on the bottle.

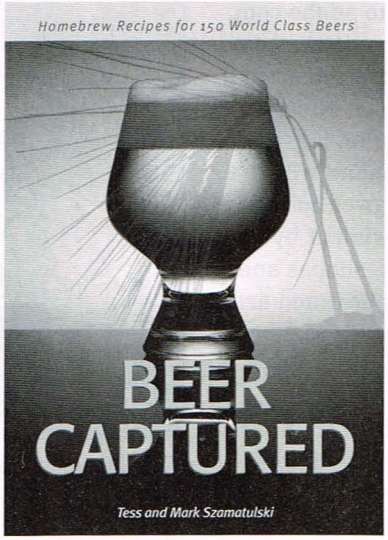
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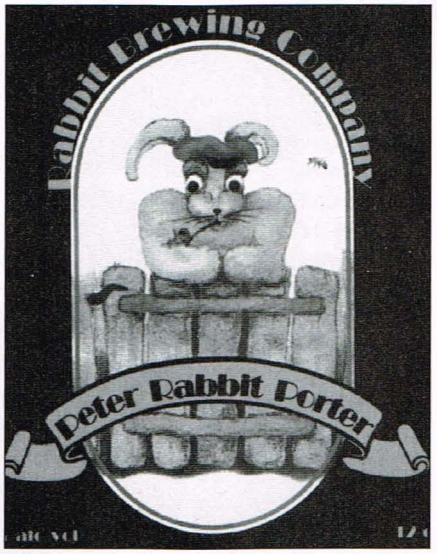
A good label design should be completely viewable from one angle (it should not be necessary to rotate the bottle to read the beer's name). Most labels read horizontal and are taller than they are long.

An average professional beer label measures approximately 2 3/4-inch wide by 4 inches high. This is a good, generic size to go by. However, designers can be creative with size too. A couple of years ago a very innovative design won grand prize in the annual BYO label contest, although the label was just about too tiny to read. The creative touch was the plastic magnifying glass that was neatly tied to the neck of the bottle. Just goes to show the art that graces the bottle can be as creative as the brew inside.

Paper, Adhesion and Bottles

A lot of homebrewers use prefabricated, self-adhesive mailing labels that they can run through their printer. These labels are easy to use because the brewer need not worry how to affix the label to the bottle. The design is merely centered in a template, printed, then peeled and pasted on the bottle. This works well enough, but a huge amount of creativity is lost here because one is forced to use the restricted dimensions and paper color provided by the manufacturer. Also, the adhesive used on these labels can be rather hard, if not impossible, to remove.

A better idea is to use a glue stick to apply your label. Glue sticks are easy to find and can be bought in any craft store. Simply dab the corners of your label, apply a small amount of glue in the center, and carefully apply to the bottle. The label peels off quite easily and this gives the designer more freedom when determining label size, paper style and shape.



Chris Witbeck won honorable mention with this label. The rabbit image was hand-drawn by a friend, then Chris scanned the image into Corel Draw. He printed the labels with a laser jet printer onto regular paper. He then used a glue stick to affix them to his bottles. This way he can reuse the bottles. He just immerses them in water and they come off easily.

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Reader John DiGiorgio made this label for his annual Oktoberfest. He uses a digital camera and then designs in Photoshop 5. This program allows him to layer images and superimpose them into other backgrounds. He scans the Web for cool graphics and fonts. He prints his labels on regular laser paper. To affix them to the bottles, John uses a quick drying adhesive spray called Super 77 (available at Home Depot or at an art store). He is not too concerned with reusing the bottles and instead likes to give them to friends to keep as party favors.

There are many really cool paper styles out there, from colored, textured and marbled paper to onionskin and more. Look for specialty paper shops in your yellow pages and go check out their selection. Onionskin looks fantastic on a clear bottle.

Which brings us to the last touch — bottles. Don't be afraid to stray from the norm when packaging your beer. Sure, this is about labels, but creative designers are concerned with the entire visual field of the package. Try some unique bottles, painted bottle caps or interesting accessories. Go all out! The judges are anxiously awaiting your entries. ■

Keith Yager is a graphic designer, freelance writer and avid homebrewer who loves to contribute to BYO. For more label design, check out his homebrew, beer and bourbon website at www.majorvices.com.

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CIRCLE 29 ON READER SERVICE CARD

First-Wort Hopping

Adding bittering hops to the kettle before the boil

by Chris Colby



First-wort hopping is an old German method that can provide a more rounded bitterness and elegant hop nose.

IF THERE IS ONE THING THAT symbolizes small-scale brewing in the United States, it's hops. Some of the hoppiest beers in the world are brewed here in the States. In large part, this is because American homebrewing, and the craft-brewing wave that followed, was a reaction to the total market domination of the notoriously unhoppy American megabrews. These days, homebrewers continue to experiment with new ways of using our favorite plant's cones. One method of using hops that is new to most homebrewers is actually an old German method called "first-wort hopping."

In first-wort hopping, some of the bittering hops are added to the kettle along with the very first runoff from the mash. This differs from the usual homebrew practice of adding hops after the wort has begun boiling (and perhaps after the first signs of a hot break are visible). In a blind taste test cited in "Principles of Brewing Science" by George Fix *(Brewer's Publications, 1999)*, beer drinkers showed a preference for pilsners brewed using first-wort hopping over pilsners brewed the traditional way. Specifically, the subjects in this test — originally published in a German magazine called *Brauwelt* — felt that first-wort hopped beers have a more rounded bitterness and a more elegant hop nose. Although the studies of first-wort hopping have been confined to pilsners, the same would presumably hold true for other lagers.

The results for first-wort hopping of ales are less clear. Anecdotal evidence, in the form of opinions posted to online homebrewing forums, suggests that some prefer first-wort hopped ales, some don't and some can't tell the difference.

The Procedure

The procedure for first-wort hopping is simple. Take a portion of your bittering hops (the hops you would normally add early in the boil) and add them to the first wort that is run off from the mash. If you are an extract brewer, heat your brewing water to between 150° to 168° F. Dissolve the malt extract in this water and add your first-wort hops. Then bring the wort to a boil.

Typically between 1/4 to 1/2 of the bittering hops are used for first-wort hopping, although some brewers have used more. Using less than 1/4 will probably not make much of a difference in your finished beer. You may want to decrease the amount of hops slightly, since they will be boiled longer. Consult a hop utilization chart to see if the added boiling time will make a difference.

Take a portion of bittering hops and add them to the first wort that's run off from the mash.

Begin heating the wort once there is enough to cover the bottom of the kettle, but keep the wort temperature below boiling until the entire volume is collected. The first-wort hops steep in the hot wort during the entire sparging process. For extract brewers, the hops steep as the wort is heated from temperatures in the mashing and mash-out range (150° to 168° F) to the boil. Extract brewers may wish to heat the wort slowly, taking approximately 45 minutes to bring the wort to a boil, to match the amount of time the hops would steep in an all-grain first-wort hopped beer.

Once all the wort is in the kettle, bring it (along with the first-wort hop charge) to a boil. Add the remainder of your bittering hops at the usual time and finish boiling the wort as you normally would.

Although the procedure is simple, the reasons why it produces a better beer are more complex. Although detailed research on this method is lacking, it seems that the process reduces the levels of the harsher molecules in hops while leaving levels of the desirable molecules unchanged.

The mechanisms of first-wort hopping are not yet entirely clear, and some brewers believe that the benefits of this practice are questionable. You can find more information on this interesting method in Fix's book. Better yet, you can draw your own conclusions by giving first-wort hopping a try.

The Theory of First-Wort Hopping

To discover the possible reason that first-wort hopping produces a finer bittering and more elegant aroma, you need to know about the biochemistry of hops. Hops have two classes of components that are relevant to brewing: resins and essential oils.

Hop resins can be divided into hard resins and soft resins. The hard resins do not contribute much to beer flavor. The soft resins, in contrast, give beer its bitterness. The soft resins are divided into the alpha and beta fractions. There are also some uncharacterized soft resins. Although the beta resins have some influence on beer flavor, when it comes to brewing, the most focus has been placed on the alpha resins. Hops are rated according to their alpha acid content.

There are many alpha resins, or alpha acids, but the important ones are humulone, cohumulone and adhumulone. During the boil, they are isomerized into iso-alpha acids. Isomerization is a change in molecule conformation. The molecule doesn't gain or lose any atoms or electrons, it just re-arranges them. The isomerized alpha acids are what give beer their bitterness.

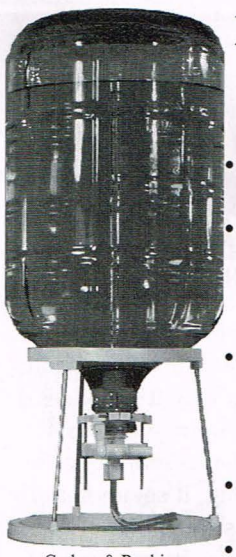
Of the three alpha acids, cohumulone (in its isomerized form) gives the harshest, least pleasing bitterness. In addition, cohumulone is also the most soluble of the three alpha acids. Therefore, when you add hops to your kettle the cohumulone dissolves more quickly into the wort.

Lager brewers often choose hops with a low cohumulone fraction, such as the noble hops, and may minimize late hop additions because it favors the cohumulone fraction. In a prolonged boil, some of the isomerized alpha acids may be hydrolyzed to molecules that do not impart a bitter taste.

Beers brewed with first-wort hopping have less isomerized cohumulone than beers brewed the traditional way using the same hops. Less cohumulone means the hop bitterness is more pleasing. Somehow, in the first-wort hopped beer, the levels of cohumulone get reduced.

The essential oils are the second important class of compounds in hops. They can be divided into two groups, the hydrocarbons and the oxygenated fraction. There are many hydrocarbons in hops, and they vary among hop varieties. However, myrcene, caryophyllene, and humulene are the major components in most hop varieties. Analysis of first-wort hopped beers and "normal" beers showed little difference in oil retention.

There are also a variety of oxygenated oils, the most well-studied being linalool and geraniol. These



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Top 10 Worst Things Homebrewers Say on Valentines Day

10 ROAD TRIP!!! Romantic weekend in Ozark Missouri.

9 Happy Valentines Day, the guys at The Home Brewery said that this would be perfect for you!

8 Sorry honey, I didn't buy those chocolates for you, they are for the Chocolate Stout.

7 What better way to say I love you than with a hop rhizome?

6 Don't worry, I've got our whole day planned out for us, Bob's coming over and we're all doing a triple decoction mash.

5 Instead of lingerie this year I bought you this sexy little Home Brewery T-Shirt.

4 Dinner Reservations✔ Roses✔ Party Pig✔

3 Everybody gives diamonds for Valentines Day, I thought you would get more use out of this Mash Tun.

2 I did not forget your present! I got you these...uh, bottle caps and...uh this siphon hose and...

1 Hold on Honey, I'm coming to bed right after I place this order on **WWW.HOMEBREWERY.COM**

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oils are present in high concentration in Cascades, Columbus and other "floral" hops. These molecules are desirable components of West-Coast style pale ales, but are less favored in lagers. In contrast with the hydrocarbons, first-wort hopped beers appear to have lower levels of the oxygenated oils.

Conflicts with Traditional Homebrewing Wisdom

The practice of first-wort hopping seems to fly in the face of conventional homebrew wisdom. In homebrewing, hop charges are typically divided into bittering hops, flavor hops and aroma hops. Bittering hops are added early in the boil and are supposed to produce the bitterness in our beer. Bittering hops are usually boiled from 60 to 90 minutes. Flavor hops are added somewhat late in the boil, usually for the last 15 to 30 minutes. These hops are supposed to provide the hop fla-

FIRST-WORT HOPPED HOMEBREW

Here's a recipe for a first-wort hopped beer. It's a "pseudo-lager" interpretation of a classic American pilsner. The California lager strain exhibits lager characteristics at temperatures up to 60° F. The Wyeast 1056 loses some of its estery ale characteristics at around 65° F.

Pseudo-Pilsner

(5 gallons, all grain)
OG = 1.052 FG = 1.012
IBUs = 28 or higher

Ingredients

7 lbs. six-row pale malt
1-3/4 lbs. flaked maize
5 AAU Northern Brewer hops
(1/2 oz of 10% alpha acid)
4 AAU Liberty hops
(1 oz of 4% alpha acid)
Wyeast 2112 (California Lager)
or Wyeast 1056 (American Ale)

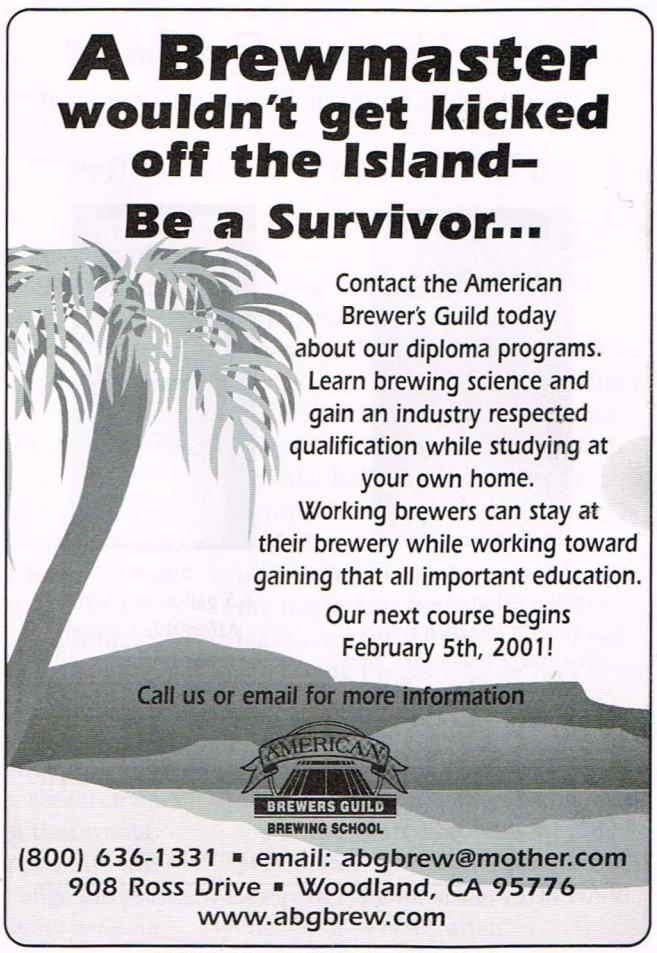
Step by Step

Single-infusion mash at 150° F for 60 min. Add one half of both types of hops to the first-wort (2.5 AAU Northern Brewer and 2 AAU Liberty). Bring wort to boil and boil for one hour. Add remaining hops for the final 45 min. Ferment at 60° F with Wyeast 2112 (California Lager) or at 65° F with Wyeast 1056 (Amercan Ale).

Extract option: Substitute 7 lbs. unhopped liquid malt extract of the American, Canadian or Australian lager variety for the pale malt and maize. Heat water to 150° F. Dissolve malt extract and add first-wort hops. Boil wort and follow instructions above.



CIRCLE 26 ON READER SERVICE CARD



CIRCLE 2 ON READER SERVICE CARD

vor in the beer. Finally, the aroma hops are added late in the boil, usually from the last 5 minutes to sometime just after the heat has been turned off.

Bittering hops are usually chosen for their alpha acid levels. For bittering, many homebrewers choose high alpha hops with a low percentage of oils. Flavor and aroma hops typically have a higher oil content and lower levels of alpha acids. The reason homebrewers use separate hop charges and choose hops with different characteristics is due to our understanding of how hops are altered in the boil.

Conventional homebrew wisdom states that the oils from hops added early in the boil are all blown off in the boil. So, the oil component of bittering hops could be overlooked. This makes some sense.

Immediately after the hops are added, the smell of hops is given off and this smell dissipates over time. We know that at least some hop oils are lost in the boil. But all of them?

Some hop oils remain in beer even after a long boil. Once homebrewers began choosing high alpha acid/low oil hops for bittering hops and following them up with flavor and aroma hops, the possibility of discovering that hop oils remained in beer was lost. The early-addition hops had little oils to begin with, and any aroma detected was attributed to the flavor or aroma hops.

Another belief at odds with this procedure is that prolonged boiling of hops yields a coarser, less pleasurable bitterness. In first-wort hopping, the hops are boiled longer and have been steeped. Yet, pilsner drinkers in the *Brauwelt* study seem to prefer first-wort hopping.

Is First-Wort Hopping for Me?

Although first-wort hopping may conflict with some long-accepted practices, the study in Fix's book shows a preference for first-wort hopped pilsners. Brewing science is still evolving, so don't let your old homebrew book dissuade you from trying this.

But what if you brew ales, as many homebrewers do? First-wort hopping reduces some of the oils expected in some styles of ale. West-Coast style pale ales, for example, would suffer if they lost their floral hop nose. Many styles of ale may not lend themselves to a more "refined" hop bitterness. Many ales demand aggressive hops that stand up to their malt and yeast flavors. This method may, however, improve summer ales, alts, or ales brewed with clean yeast and without aggressive malt or specialty grain flavors.

If you brew pilsners or other lagers, you should definitely give first-wort hopping a try. The method is simple and the rewards are potentially great. ■

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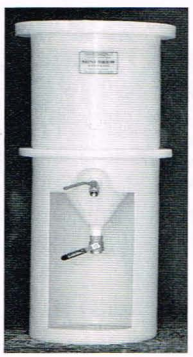
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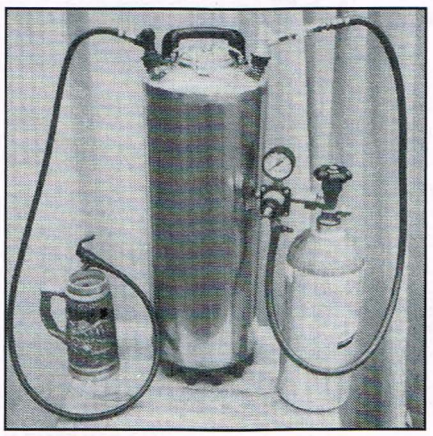
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CIRCLE 1 ON READER SERVICE CARD

Pump It Up

How a boating bilge pump can circulate and clarify your wort

by Paul Zocco

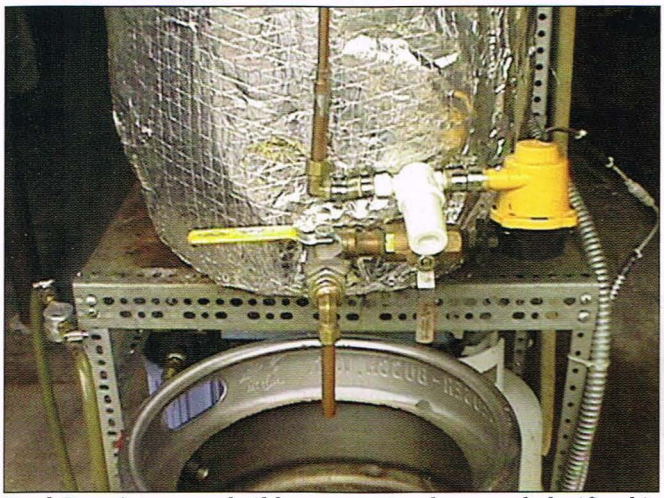


PHOTO BY PAUL ZOCCO

Paul Zocco's easy-to-build pump recirculates and clarifies his wort, enhancing his backyard half-barrel brewing system.

WHEN I WAS FINISHED fabricating my backyard half-barrel brew system, I knew there were more gadgets that could be added. The set-up was great, but I wanted more! Some sort of quasi-RIMS (recirculating infusion mash system) seemed the likely next step.

There seem to be a lot of homebrew-magazine articles these days about RIMS-related topics. But the store-bought systems that are available — the kind that pump the wort out of the mash tun, run it through an electronically-controlled inline heater and return it to the mash — cost more than the average homebrewer would want to spend. And building your own full-blown RIMS requires the ability to work with complicated electronic components.

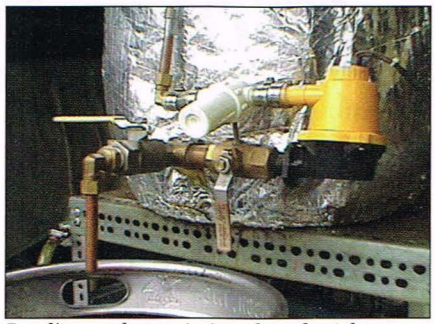
I knew I could design a pseudo-RIMS with easily found components. It would be relatively simple to build at home and it would cost a whole lot less. No, I wouldn't have the electronic temperature-control system with all the bells and whistles, but my system would be almost as effective.

The purpose of a standard RIMS is to allow homebrewers to easily raise and control the temperature of their mash without overshooting the target temperature. My brew system is extremely well-insulated, and I have no problem keeping the mash temperature steady — even when brewing outdoors in winter. So controlling my mash temperature wasn't an issue. Still, I wanted a pump that would recirculate my wort during the mash to clarify it, which would eliminate the need for a separate "vorlauf" (recirculation) step after the mash. When the mash was over, I'd have crystal-clear wort ready for the brew kettle.

The first step in this project was to find a pump that would be cost-effective and also do the job. It had to withstand temperatures of 150° to 160° F. After looking through numerous catalogs and visiting local air-conditioning and plumbing supply shops, I learned that a suitable pump would cost around $100 to $200. After extensive research on where to find a pump that would cost less, an idea popped into my head: Why not use a bilge pump, the kind that's commonly used on boats? I took a ride down to the local boat shop and found many pumps that were suitable. The prices ranged from $20 to $35. (A safety note: I didn't ask whether the bilge pump was made of food-grade plastic, and to be honest, it doesn't really worry me. If you're concerned that something nasty might leach into your beer, be sure to locate a food-grade plastic pump for your own system.)

Would the pump withstand the heat of the mash? After brewing with mine, I found that it did. My pump operates on 12 volts DC. The other bilge pumps I saw were all powered by the same voltage. So I needed a converter. Luckily, 110-AC to 12-DC power converters are available inexpensively at electronic shops like Radio Shack. A common battery charger might also suffice.

The inlet of my pump is threaded in standard plumbing half-inch NPT. My half-barrel brew system (affectionately known as "The Brewpig") has a ball valve threaded the same, making a retrofit a simple job. I added a threaded brass half-inch "T" fitting between the mash tun exit ball valve and the bilge pump inlet. The exit of the pump is threaded to 3/8 inch NPT. I attached a threaded fitting to the exit port of the pump and connected a short length of copper tubing to it. I ran the tubing up the outside wall of the mash tun and bent it into a loop that goes over the top and into the mash tun. I attached a short length of plastic tubing that would lie on top of the grain bed. This would prevent any excessive splashing of the recirculated wort, which could cause hot-side aeration.



Paul's mash tun is insulated with ordinary foil-covered duct wrap.

When testing my wort pump for the first time, I found that the initial gulp from the mash tun into the pump was almost all grain. This plugged up the exit tube. To remedy this, I placed an in-line screen filter between the exit of the pump and the looped tubing. After the initial operation of the pump, I would disassemble and clean the grain out of the screen filter. This ensured that the system would not plug up again and would run very nicely, filtering out most, if not all, of the grain hulls and residue. After this modification, the wort would run very clear to the brew kettle.

I would operate the system for 5 or 10 minutes at a time throughout the mash cycle. My mash temperatures tended to vary by little more than 1 or 2 degrees F during the mash sequence. By the way, my mash tun is insulated with ordinary foil-covered duct wrap (the type used to insulate hot air ducting) and has a propane "Cajun cooker" burner under it. It also has a motorized mash mixer. All of these features help keep my mash evenly mixed and evenly heated. I never have to fire up the burner to maintain temperature, but it is an option, especially in a step-infusion mash.

This system is simply a recirculating device, designed to clarify your wort. There is not any temperature control. But after brewing a few batches, I found that there was an insignificant amount of heat loss from the pump or recirculating tubing. I had briefly considered insulating the entire assembly, but eventually found it to be unnecessary.

This system was built to fit my half-barrel home brewery that uses old Sankey kegs, but it could also be adapted to a tabletop mash tun of your own personal design. With a little ingenuity, some commonly found plumbing fittings and plastic tubing, you could mount a small bilge pump onto the side of a picnic cooler and simply re-circulate your wort back into it. There are endless combinations that the homebrewer can experiment with. If you use your imagination, you can design a system that suits all of your needs. ■

Paul Zocco is a homebrewer and beer gadgeteer from Andover, Connecticut. He is a certified BJCP judge and a member of The Hop River Brewers Homebrew Club.

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Brewing Under Adversity

An intrepid American makes a batch of homebrew in the Ukraine

by Roger Savoy



PHOTO COURTESY OF ROGER SAVOY

Savoy and some students try to smile while choking down some warm, flat Pivo L'vivski.

IN 1994, I SPENT THE SUMMER in the Ukraine, teaching basic business skills to potential entrepreneurs in the cities of Kiev and L'viv. As a devoted homebrewer and the owner of a homebrew supply shop in Rensselaer, New York, I was determined to brew a batch of beer while I was abroad.

Since I was traveling so far, I knew I had to keep it simple. I figured — correctly — that I wouldn't find a homebrew supply store, so I took along some light DME, hops, dry yeast, a bottle capper and some caps. I opted against bringing corn sugar, since I didn't want to explain a bag of white powder to suspicious Ukranian customs officials.

Before organizing my brew session, I spent some time learning about the local beers. Commercial Ukrainian beer took some getting used to. There was only one kind of beer sold in the whole city: "Pivo L'vivski." Pivo is the Slavic word for beer. Pivo is never sold cold. Even in the bars, it was cool at best. If you were really thirsty, you drank it at room temperature. During my two weeks in L'viv the temperature ran up to 36° C (97° F) or more every day. "Room temperature" took on a whole new meaning.

If you didn't want to drink on premises, no problem. You, or your kids, could just bring a container and fill it up to go. While we were at one bar, a small truck pulled up and a large hose was run from the truck to the bar. The bar was closed while the tanks were refilled.

Another way to get beer was from the "pivo truck." Pick-up trucks pulling 500-gallon beer tanks would park around town and people would gather around them and drink under an awning. We often walked to the pivo truck and got six or seven liters.

The only problem was, this beer wasn't good. It resembled a pilsner, light-colored and lightly-hopped, but it was watery and weak and often flat. This just fueled my determination to brew my own beer.

My American friend, Mark Kapij, met me in L'viv. Mark, who's of Ukrainian descent, spoke the language like a local. We made our brewing plans and began the search for equipment.

We only needed three things: a large pot, beer bottles and sugar. But finding these items was not as easy as it sounds. At the time, the country was in economic upheaval. Inflation ran about 100 percent per month. Since the price of gas was sky high, few cars were on the road and we used a 100-year-old trolley system to get around.

After much searching, we found a five-gallon pot at a plumbing store. Sugar was not available at the state food store, so we ended up borrowing some sugar and scrounging 20 half-liter beer bottles. Once we had procured our supplies, we were ready to make a batch of beer.

Getting water was the final challenge. The city water supply was only on for three hours in the morning and again for three hours in the evening. Cool boiled water was commonly kept in covered pots. We drank a toast of "Pivo L'vivski," then started our beer.

We boiled three pounds of DME in a half-gallon of water with an ounce of Cascade hops for 45 minutes, then added another half-ounce for aroma. Since raspberries were abundant, a liter of them went in while we cooled the wort. Water went into the pot to the 2.5-gallon mark. We pitched yeast into the wort. We had no lid, so we put a towel over the pot and stuck it under a table. It was hot in the apartment, so the beer finished quickly. We racked the beer, boiled our table sugar, bottled it and stashed the bottles under the table. A week later we had a few raspberry beers and toasted our work. In the Ukraine, drinking and making pivo was always an adventure. ■

Roger Savoy is the owner of Hennessy Homebrew Emporium in Rensselaer, New York.

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