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Brew

THE HOW-TO HOMEBREW BEER MAGAZINE

MAY-JUNE 2009, VOL. 15, NO. 3



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make more beer for less

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Kölsch and Vienna Lager**

**Combining Beer Styles
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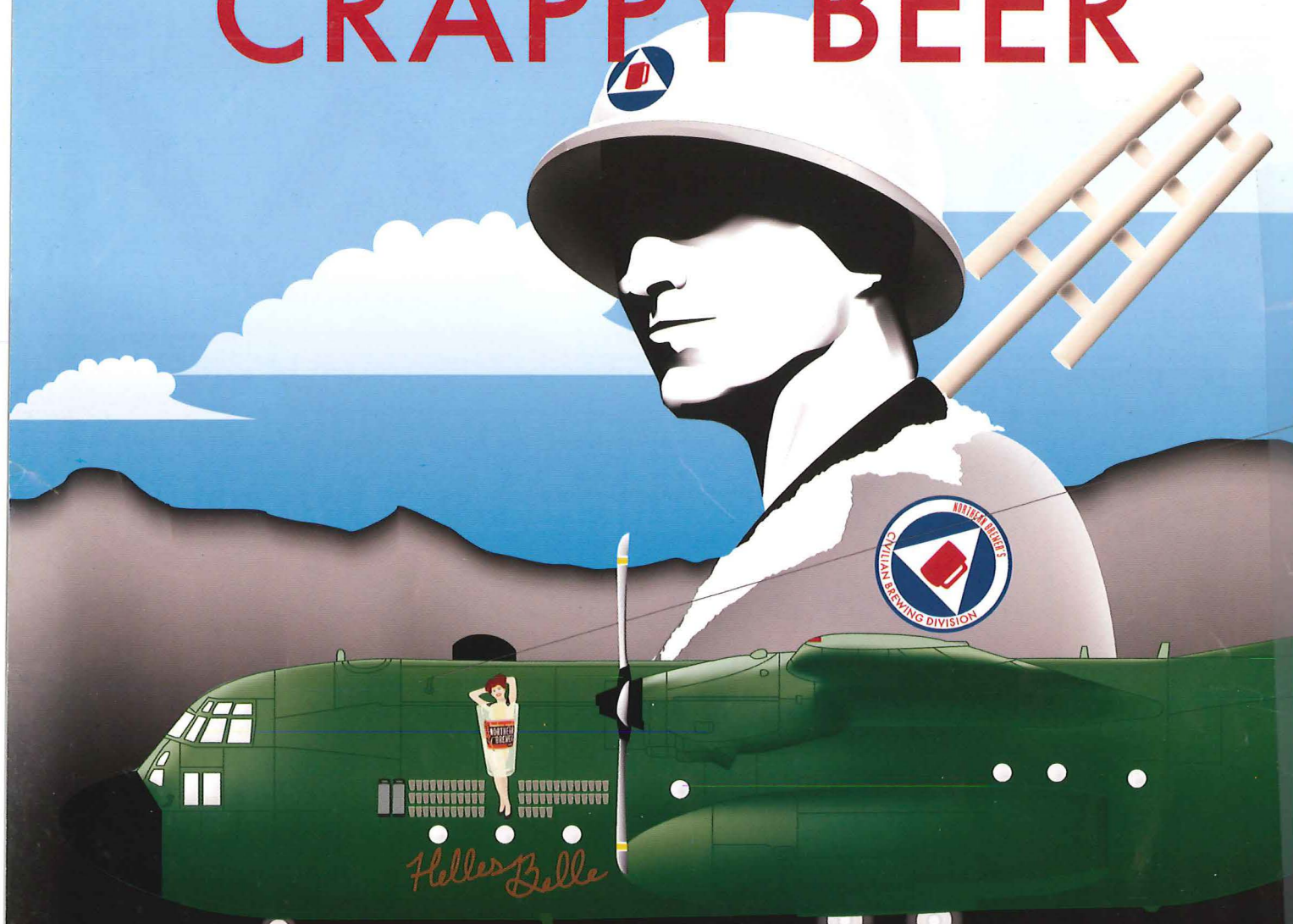
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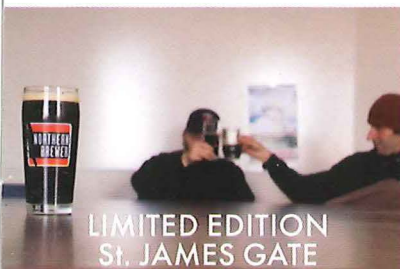
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info-packed pages,
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and 36
hoppy recipes

We've collected and updated the best hops information from the past 12 years of *BYO* and included updated charts with the specs for 83 hop varieties including new varieties and suggested substitutions for hard-to-find hops. We've also detailed different hopping methods, hop growing info, hop-related build-it projects and 36 hoppy recipes. A few of the reasons you will love this new reference...

- Hopping methods for extract & all-grain brewers to get the most out of their hops
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by Horst Dornbusch

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by Chris Colby

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50 Build Your Own Glycol Fermenter

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An Oklahoma homebrewer found a "really cool" solution to keep his fermentations at a constant temperature — building a glycol-jacketed fermenter. Find out how to build and operate his "Ultimate Chiller." Did we mention it's cool?



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Is there any good way to shorten the brew day? The Wiz explores the options. **Plus:** the business side of going pro.

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Commercial Kölsch is really only Kölsch if it's brewed in the German city of Cologne. Kölsch brewed at home, however, can be refreshing and crisp on a spring or summer day.

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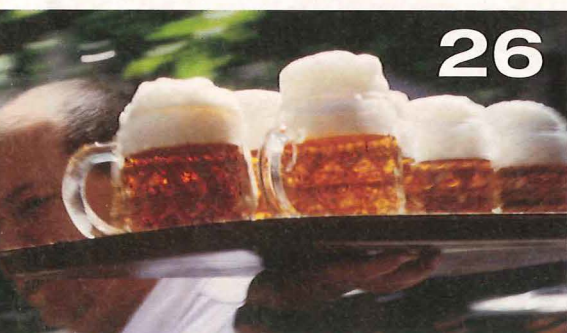
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Can Chuck Norris influence the quality of homebrews? A group of Bellingham, Washington brewers explain how.



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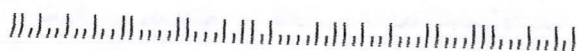
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BYO RECIPE STANDARDIZATION

Extract efficiency: 65%

(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one gallon of water, would yield a wort of 1.024.)

Extract values for malt extract:

liquid malt extract
(LME) = 1.033–1.037
dried malt extract (DME) = 1.045

Potential extract for grains:

2-row base malts = 1.037–1.038
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033–1.035
chocolate malts = 1.034
dark roasted grains = 1.024–1.026
flaked maize and rice = 1.037–1.038

Hops:

We calculate IBUs based on 25% hop utilization for a one hour boil of hop pellets at specific gravities less than 1.050.

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Cover Photo: **Charles A. Parker**

Cranberry Question (I)

I enjoyed reading the recipe for Carissa Sweigart's Cranberry Wit ("Top Honors," by Betsy Parks, March-April 2009), but find myself wondering about a couple of details:

The instructions call for just a 20 minute boil, followed by hop additions, spices and immediate cooling. Especially with so much Pilsner malt, isn't that going to cause excessive DMS?

I'm also curious about the addition of cranberry juice at kegging time. I would normally expect this to trigger a second fermentation, since it is adding both fruit juice and a significant amount of sugar. Is the beer intended to ferment in the keg, or do the potassium additions prevent that? (I'm not familiar with these additives).

Shawn Hargreaves
via email

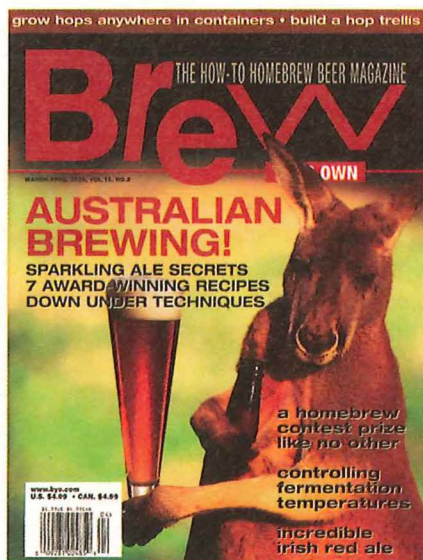
Cranberry Question (II)

On page 26 of the recent issue, the recipe listed for Carissa Sweigart's Cranberry Wit said to add the cranberry juice to the keg. However, I don't have the kegging option yet. So if I bottle, do I use the same amount of juice instead of priming sugar? I'm afraid to experiment too much due to previous juice bottling over-carbonation. Or should I add the juice to a secondary and use priming sugar as usual?

Chris Brake
via email

Carissa Sweigart's recipe had a few unconventional elements to it, including a short boil and the addition of potassium sorbate and potassium metabisulfite. We did not alter any of the winning recipes, however, because "the proof is in the pudding," as they say.

In beers with a lot of light-colored malts, DMS is produced from s-methyl-methionine (SMM). In darker malts, s-methyl-methionine is converted to DMS during the kilning phase of malting. The DMS, which is volatile, is then vaporized by the heat of the kiln and the result is a malt with low levels of SMM. In lighter malts, less SMM is converted to DMS during malting and thus light malts have higher SMM levels. When brewing a beer with Pilsner or other light-colored malts, the usual recommendation is to boil your wort for at least 90 minutes, so that the SMM in your wort can be converted to DMS,



volatilized and carried away by the surrounding air. Residual DMS in beer has a flavor reminiscent of cooked corn, and it is usually considered a defect. This flavor, however, is an intentional element in some lagers, most notably Rolling Rock.

A 20-minute boil may not drive off all the DMS from the Pilsner malt, but another factor affecting DMS retention is cooling time. As a beer is cooled, DMS is still produced while the wort is hot (over around 160 °F/71 °C). DMS produced during cooling is volatilized at a lower rate due to the lower temperatures. Thus, slow cooling results in higher DMS levels in finished beers. We suspect that a vigorous boil, followed by a quick chill will result in a beer with DMS levels low enough that they are not detected over the cranberry flavor and sweetness of the brew.

When the cranberry juice is added, Sweigart also added potassium sorbate and potassium metabisulfite. These are common additives in wine. Sorbate prevents dormant yeast from "awakening" and restarting a fermentation when sugar is added. (Adding sorbate will not stop an active fermentation.) Adding sugar and sorbate is the most common way that sweet wines are made.

Metabisulfite is added to unfermented wine (called must) to knock down the levels of wild yeast and bacteria that end up in the grape juice from the skins of the grapes. It is added after fermentation to retard oxidation and to keep a wine stabilized against contaminants. Levels of free sulfur dioxide (SO₂), the gas released by metabisulfite, depend on a wine's pH. At normal beer pH (in the low 4s), metabisulfite would be fairly ineffective. However, in a cranberry beer, the pH is most likely down in the wine range (in the low-to-mid 3s) and the metabisulfite may be aiding in warding off



HORST DORNBUSCH was born in Germany in 1947 and has lived in North America since 1969. He arrived by boat as a Fulbright Scholar and earned a B.A. from Brandeis University. He is

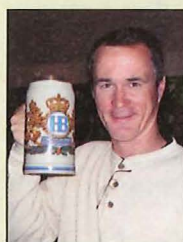
a regular contributor to *Brew Your Own*, including writing "Style Profile" from 2002 through 2007. In addition to writing, Horst is a member of BYO's editorial review board, and reviews manuscripts for technical accuracy.

In this issue Horst takes us to Austria to explore the history and techniques of brewing Vienna lager. Read his story on page 26.



GORDON STRONG is the President of the Beer Judge Certification Program, (BJCP), led the development of the 2004 and 2008 BJCP Style Guidelines and is the only Grand Master V beer

judge. A prolific brewer and meadmaker, he has won Best of Show in more than a dozen competitions, recently won the 2008 Ninkasi Award and is a past winner of the Mazer Cup. He was Technical Editor of *Radical Brewing* and *Wild Brews*, a contributor to *Brew Like a Monk*, and is a regular panelist on *Zymurgy's* "Commercial Calibration" column. He has spoken on brewing, judging and beer styles at three AHA National Conferences and a MCAB. Gordon discusses brewing hybrid beer styles on page 34.



MARTY CORNELIUS retired after 25 years as a Petroleum Engineer living in Sand Springs, Oklahoma. After homebrewing for 15 years he recently completed the World Brewing Academy

diploma program in Chicago and Munich. Intrigued by the mechanics and science of brewing, Marty now divides his time between perfecting his homebrew shop, traveling to visit breweries and, of course, drinking beer with friends and family.

In this issue, Marty debuts his first article about building your own glycol-cooled fermenter at home. Read it on page 50.

oxidation, which would eventually turn a red cranberry wit into a brown cranberry wit.

The addition of sorbate to this brew means that you don't have to worry about the cranberry juice starting a secondary fermentation. The sorbate will prevent that and result in the cranberry sugars contributing to the sweetness of the brew. Likewise, the addition of sorbate rules out trying to bottle condition this beer. The yeast won't ferment the bottling sugar and the beer will remain flat.

Treated Trellis Wood

I liked your article on the home hop trellis ("Home Hop Trellis," by Andy Sparks, March-April 2009). I am going to upgrade my ghetto tech hop trellis and I like this set-up. Very pleasing to the eyes. Just one gripe. I would refrain from using pressure treated wood in or around the garden especially if you are consuming anything that feeds from the ground around it. A lot of harmful chemicals in pressure treated. Cedar posts cost almost double, but last just as long. And if you are using the same method with the fence post sleeve, you can take these down in the winter and

store them away from the elements for an even longer life. Nice work Andy, the solar caps are the icing on the cupcake! An article on how to split and store your hop rhizomes would be nice!

Colin Ryan

New Jersey Cascade grower

In Andy's set-up, the pressure treated post sits in a PVC sleeve embedded in concrete, so it's unlikely that any chemicals used to preserve the wood are leaching directly into the soil. In addition, the way pressure treated wood is made has changed in recent years. In gardening circles, the debate about using treated wood in the garden — for example, when constructing raised beds — is long-standing. Early attempts to prevent wood from rotting involved treating it with creosote or pentachlorophenol. (Railroad ties are still treated with creosote.) You wouldn't want wood treated with these anywhere near your garden.

Later, wood began to be treated with chromated copper arsenate (CCA). All three elements of CCA are toxic, but most people who resisted using treated wood for any garden installation focused on the arsenic. However, studies showed

that little arsenic actually made its way out of the wood and into the edible parts of plants. Still, for a variety of reasons, CCA was banned from sale to home users in 2004. These days, the treated wood you find at a home improvement center is either treated with alkaline copper quaternary (ACQ) or micronized copper quaternary (MCQ). These are considered safer than CCA-treated wood, but you can decide for yourself whether to use them or opt for a cedar post.

Questions, concerns, comments?

Contact us!

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reader **PROFILE** and **RECIPE**

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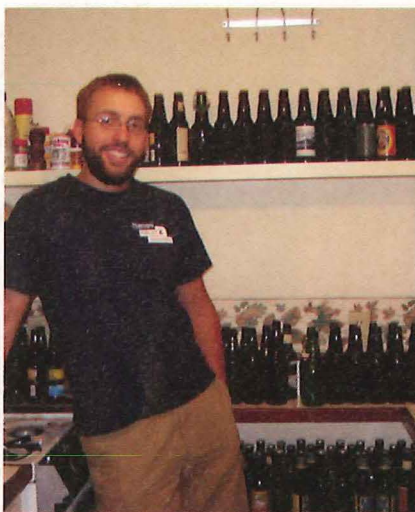
by Joshua Colt Gambrel • Johnson City, Tennessee

the majority of my life has been spent in the foothills of the Appalachian Mountains. The region instills within me a sense of rootedness to a timeless past, reaching back to the first days my family encountered these mountains.

Being born into the lineage of a long line of East Kentucky subsistence farmers, much of my childhood was spent in story and song; letting my imagination weave worlds from the yarns spun by the storytellers around me. The rolling Appalachian Mountains have nourished and brought happiness to generations of my ancestors. My elders stressed the importance of appreciating and revering one's land or place. During summers when I was a boy I'd go stay with my grandparents over in Knox County, East Kentucky. We would dig potatoes and pick tomatoes, but most of our time was spent breaking beans. I would sit inches away as my grandparents told me tales from their lives and upbringing.

The difficult daily work of making due in south-central Appalachia would seem to necessitate a relaxing, cold beer at the end of the day while you rock away your aches on the front porch. On my mother's side was Great-Grandpa Clifford. He was a farmer, a trickster and an accomplished homebrewer, although my great-grandmother claims he had a few bottles explode in nearly every batch. In his cellar, Grandpa made both wine and beer, which he would share with family and friends when they came to visit. Before she passed away last year, I asked my Great-Grandma if Grandpa left any recipes behind that I could attempt to recreate.

"Ohhhh . . . no son, he didn't use



Joshua Colt Gambrel can trace his brewing roots back through many generations.

recipes. He would just go down there and make something like what his Paw made when he was young. All I knew was that he made one hell of a ruckus in the cellar," she said.

Although today I am still unaware of the recipes or methods my Grandpa used, I'm sure he would be proud of me carrying on the family's homebrewing tradition. In every brew I create I try to pay homage to a certain aspect of my ancestral home. Names such as Nolichucky Stout, Max Patch Grassy Pale, Blue Ridge Brown, Great Smoky Stout or Roan High Red help regionalize my homebrews and express the reverence our family has long held for south-central Appalachia. Today my father and I continue our family's tradition together and regularly share one of our original craft beers while telling our own stories. I can only hope that my own children will continue to carry on the Appalachian traditions of simple living.

Great Smoky Stout

(5 gallons/19 L, extract w/grains)

This imperial stout is made with a generous helping of smoked barley to give it an assertive smoky note. It is thick, full-bodied, bittersweet and roasty. With loads of malt and a variety of hops, this beer is bound to leave a lasting impression.

Ingredients

7 lbs. (3.2 kg) hopped liquid malt extract
3.5 lbs. (1.6 kg) light liquid malt extract
3 lbs. (1.4 kg) smoked malt
0.5 lb. (227 g) roasted barley
0.5 lb. (227 g) black patent malt
0.5 lb. (227 g) Cara-Munich malt
2 oz. (57 g) British chocolate malt
3 oz. (85 g) Nugget hops
1 oz. (28 g) Tettnanger hops (boiling)
1 oz. (28 g) Tettnanger hops (flavor)
2 oz. (57 g) Cascade hops (aroma)
Ale yeast

Step by Step:

Add all the grains to one gallon (3.8 L) of water and bring to a near boil. Then allow the grains to steep for approximately 10 minutes.

Remove the grains, then add the extract, Nugget hops, and first ounce (28 g) of Tettnanger hops and boil for 50 minutes. Add the second ounce (28 g) of Tettnanger hops and boil for 10 minutes more. Add the 2 ounces (57 g) of Cascade hops at the very end of the boil.

Cool the wort, add water to top up to 5 gallons (19 L), and pitch the yeast. Follow your typical fermentation procedure, priming with dextrose before bottling.

club **PROFILE**

The Pacific Gravity Ladies

Nathalie Balandran • Culver City, California

I came upon the local homebrewing club, Pacific Gravity, and decided to join with the hopes of learning more about my new homebrewing hobby. What I came to realize after going to a few of the meetings was that not only was there a lack of women, but I also noticed that there was less brewing discussion among them. I know for myself, I felt a little intimidated by all of the men and the lack of women to talk beer and brewing with. I thought it would be great if there could be a place where women could get together to learn, ask questions, share beer and most importantly meet other women who share the same passion for brewing. I brought up the idea of the women's-only meeting to the board and they agreed it would be something worth trying, and thus the Pacific Gravity ladies branch was born.

The PG ladies meet on the second Thursday of every month at the Culver City homebrew supply store. The group

includes five regular members with varying levels of brewing skill, as well as a few new faces each month. A few were already members of Pacific Gravity and others joined after hearing about the ladies' branch. Our meetings always consist of a brewing demo and we also bring in a range of beers (both commercial and homebrew) to sample. Our brews (generally partial-mash batches) are based on what style Pacific Gravity is featuring the following month. This gives us a chance to gain experience brewing all different styles of beer as well as a place to showcase our brews. No one woman takes the credit for the beers, it is a team effort. We also get to learn about putting together a recipe as well as putting our own little twists into it. Sometimes, just from hearing ideas from the other women while brewing, the recipes can change on the spot. In one instance, a basic dry stout we were brewing for the Pacific Gravity holiday party evolved into a chocolate stout, which then



Nathalie Balandran spearheaded the ladies chapter of the Pacific Gravity homebrewers.

eventually became a chocolate peppermint stout. As much as we all love commercial beers, the beauty of brewing at home is making a beer that tastes exactly how you want it to. We get inspiration from seasonal flavors as well as from books like Sam Calagione's *Extreme Brewing*.

We are hoping with each month we can bring in new women and share the excitement of brewing. In the coming months as we keep improving our brews, we will start entering more competitions. If you are interested in more information, or you know someone that might be, you can visit the Pacific Gravity website at www.pacificgravity.com or contact me at ladiesevents@pacificgravity.com. Cheers!

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Yes, I like experimenting **76%**

No, I'm a traditionalist **24%**



Do you grow any of your own hops?

No, but I've considered it **52%**

Yes, all the time **23%**

Yes, sometimes but not often **16%**

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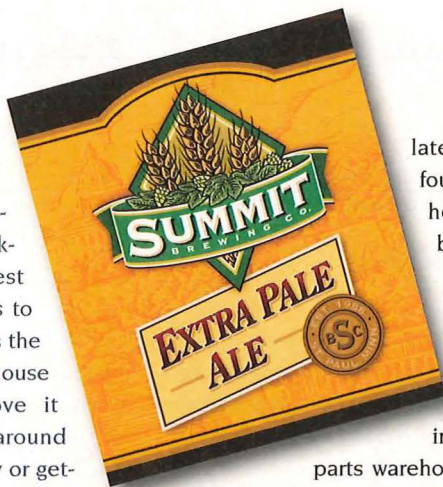
replicator

by Marc Martin

Dear Replicator,

A few years ago I discovered Summit Extra Pale Ale. It forever changed my beer drinking habits. In the Midwest there are many great brews to choose from but this beer is the best. It has become my house beer of choice and I love it whether I'm lounging around watching football on Sunday or getting a keg load for a party in my garage on Saturday night. When it's fresh, I really like the coppery foretaste on my tongue and the medium bitterness followed by a smooth finish. I would love to replicate this beer and wonder if you have any insight. All-grain, extract or mini-mash, it makes no difference. I'll do what it takes.

Manny Manzano
Minneapolis, Minnesota



later when he found a used 30-hectoliter (25-barrel) 2-vessel, direct-fired brewhouse in Heimertinger, Germany.

After locating an old auto parts warehouse in St. Paul,

Minnesota the vessels were shipped and installed. Knowing that this would catapult him well beyond homebrewing, Mark enrolled and attended the Siebel Institute of Technology.

The first commercial keg of beer was sold in September of 1986. It was a variation of one of his favorite homebrew recipes, the Extra Pale Ale. This became their flagship beer and has been the best seller ever since. Judges at the GABF obviously approve as it achieved bronze medal status in 2007 and 2008.

Excellent beers led to rapid growth and by 1997 expansion was needed. In 1998 a 150-barrel brewhouse was installed in a brand new facility. This was the first ground up construction of a brewery in Minnesota in 75 years. Now Summit's beers are distributed to fourteen states with a split of 50/50 between bottled and keg. Mark reports that 80% of their sales are in the Twin Cities, attesting to the local loyalty of the brand.

It's easy to see why the Extra Pale Ale is a favorite. A dense white head tops this beautifully clear, copper colored beer. Aroma reveals a pleasant citrus hop nose followed by subdued malt. The flavor is base malt forward with a caramel malt background. The hop bitterness is evident both in the flavor and the finish but overall well in balance. Mark explained that the more time consuming step mash process accentuates the wonderful grain flavor profile.

So Manny, next fall when your friends come over to watch a Vikings game you can surprise them with your Extra Pale Ale because you "Brewed Your Own".

For further information about the Summit Brewing Company and their other fine beers visit the website www.summitbrewing.com or call them at 651-265-7800.

Summit Brewing Extra Pale Ale

(5 Gallons/ 19 L,
extract with grains)

OG = 1.049 FG = 1.010

IBUs = 45 SRM = 13 ABV = 5.2 %

Ingredients

3.3 lbs. (1.5 kg) Briess light, unhopped, liquid malt extract

2.5 lb. (1.13 kg.) light, dried malt extract

2 oz. (57 g) crystal malt (60 °L)

10 oz. (0.28 kg) crystal malt (90 °L)

7.8 AAU Horizon pellet hops (60 min.)

(0.6 oz./17 g of 13% alpha acid)

2.4 AAU Fuggle pellet hops (30 min.)

(0.5 oz./14 g of 4.75% alpha acid)

2.9 AAU Cascade pellet hops (30 min.)

(0.5 oz./14 g of 5.75% alpha acid)

2.9 AAU Cascade pellet hops (0 min.)

(0.5 oz./14 g of 5.75% alpha acid)

½ tsp. Irish moss (last 15 minutes of the boil)

White Labs WLP 001 (American Ale) or

Wyeast 1056 (American Ale) yeast

¾ cup (150 g) of corn sugar for priming (if bottling)

Step by Step

Steep the crushed grain in 3 quarts (2.8 L) of water at 152 °F (67 °C) for 30 minutes. Remove grains from the wort and rinse with 3 quarts (2.8 L) of 175 °F (79 °C) water. Add 1 gallon (3.8 L) of hot water and the malt extracts and bring to a boil. While boiling, add the hops and Irish moss as per the schedule. During the boil, use this time to thoroughly sanitize a fermenter. Now add the wort to 2 gallons (7.6 L) of cold water in the sanitized fermenter and top off with cold water up to 5 gallons (19 L).

Cool the wort to 75 °F (24 °C). Pitch your yeast and aerate the wort heavily. Allow the beer to cool to 68 °F (20 °C). Hold at that temperature until fermentation is complete. Transfer to a carboy, avoiding any splashing to prevent aerating the beer. Let the beer condition for 1 week and then bottle or keg. Allow to carbonate and age for two weeks and enjoy your Extra Pale Ale.

All-grain option:

This is a single infusion mash. Replace the malt syrup and dry extract with 10 lbs. (4.5 kg) 2-row pale malt and increase both crystal malts by 2 oz. (57 g). Mix the crushed grain with 3.5 gallons (13.2 L) of 170 °F (77 °C) water to stabilize at 152 °F (67 °C) for 60 minutes. Sparge slowly with 175 °F (79 °C) water. Collect approximately 6 gallons (23 L) of wort runoff to boil for 60 minutes. Reduce the 60-minute hop addition to 0.5 oz. (14 g) to allow for the higher utilization factor of a full wort boil. The remainder of this recipe and procedures are the same as the extract with grains recipe.

Minnesota is known as the "Land of 10,000 Lakes" and as the Hamms bear told us, "The land of sky blue waters." At the turn of the century there were over fifty breweries in the state but by the early 1980s only a handful had survived.

The year is 1980 and we find Mark Stutrud, a beer lover and a man with a new hobby — homebrewing. He had decided that if he wanted to drink beers with real flavor like those in Germany or England he had better make them himself. After several successful batches his hobby sparked a fantasy. Possibly quality, flavorful beer — like those once brewed throughout the Upper Midwest — could again be sold to the public.

Embarking upon starting a brewery was far removed from Mark's current vocation as a family therapist, but reasoning dictated that beer could also provide good therapy. In 1984 he traveled to Oregon and Washington where the burgeoning craft brewing industry was gaining ground. After visiting the Redhook brewery in Seattle he traveled to Portland to meet with Kurt and Rob Widmer. After tasting their authentic German alt he had all the additional motivation necessary and went back to Minnesota determined to start his own brewery.

His fantasy became reality two years

Homebrew CALENDAR

May 16

Homebrew at the W.E.B. Competition Frankenmuth, Michigan

The Cass River Homebrewers's annual homebrew competition held in conjunction with the World Expo of Beers (W.E.B.). Entries are \$7 for the first, \$5 for each additional entry. The deadline is April 24. The beer selected as Best of Show will be brewed by and served on tap at the renowned Sullivan's Black Forest Brew Haus. More information and online registration available at <http://hbd.org/cassriver/>.

May 30

The Sasquatch Brew Fest Homebrew Contest Eugene, OR

The 2009 homebrew competition held in coordination with the Cascade Brewers Society during the Sasquatch Brew Fest. Judging will take place on May 30 and Best of Show judging will take place June 6. More information is available at <http://www.northwestlegendsfoundation.org/homebrew.html>.

June 6

Arlington, Texas 12th Annual Celtic Brew Off

Sponsored by the Knights of the Brown Bottle Homebrew Club, the Brew Off is one of the largest Homebrew competitions devoted to beer, mead, and cider of Celtic origin. The competition is held each May to coincide with the Texas Scottish Festival and Highland Games. For more info, visit <http://www.celticbrewoff.com/>.

June 22

Athens, Ohio Ohio Brew Week Homebrew Competition Entries accepted

Entries for the annual homebrew competition held during the Ohio Brew Week Festival on July 12–18 will be accepted from June 22 through July 5, \$7 for the first entry, \$5 for each additional entry. 2008 BJCP Style Guidelines apply. Only online entries are accepted this year. For more information and to register, visit <http://www.ohiobrewweek.com/homebrew.html>.

BEGINNER'S block

Siphoning

by Betsy Parks

moving fermented wort around by siphoning can sometimes be tricky. Follow these basic steps to make siphoning a little simpler — and smoother.



To siphon, the container filled with beer needs to be higher than the empty vessel.

want to add more equipment, both a fermenter and a bottling bucket with spigots makes siphoning much simpler. If you are transferring from a vessel without a spigot, however, you will need to get used to getting the siphon started. Before you siphon any beer, consider practicing siphoning with a fermenter filled with water to get the hang of it and so you don't lose any beer.

Start the siphon by placing the fermenter of liquid (water if you're practicing, or beer if you're not) someplace higher than the secondary container you plan to fill — for example, put the primary fermenter on a kitchen counter or table and the secondary vessel on the floor. Next, attach the racking cane and tubing together and fill them with water from a faucet, pinching off the end of the tubing when it is filled. As you fill the tube, hold the racking cane high enough to prevent the water from leaking out before you pinch the other end. Now, put the racking cane into the fermenter of liquid then open the pinched end of the tubing into the vessel you want to transfer the liquid into. Once you let go of the pinched end, the pull of gravity should start the siphon. It's also possible to start the siphon suction by sucking on the tube with your mouth, however, mouths are filled with bacteria, so definitely steer clear of that method.

Why siphon?

Unlike transferring hot wort to the primary fermenter, where splashing and aerating is encouraged, after primary fermentation is finished, beer is vulnerable to contamination and oxidation, and needs to be separated from the sediment that has settled at the bottom of the primary fermenter. Many brewers move their beer by racking, and siphoning is a method of racking that transfers beer from one place to another without any of the sediments.

The process

One of the simplest ways to siphon is using a racking cane and 5 or 6 feet (1.5 to 1.8 m) of food-safe plastic tubing of the same diameter as your racking cane. If you

Be watchful

Once the secondary vessel starts to fill up, be sure to keep the end of the tubing under the surface of the beer to prevent splashing. At the same time, keep the tip of the racking cane in the fermenter below the surface of the liquid, but above the bottom of the fermenter. This prevents any sediment at the bottom of the fermenter, as well as any air from above the surface, from getting sucked into the tube. Once you get down to a few inches or centimeters from the bottom of the primary fermenter, pull the racking cane out and let the rest of the liquid in the tubing empty into the secondary vessel. 

Vienna Lager

Crisp, malty and subtle

Tips ^{from} the pros

by Betsy Parks

Vienna lager's origins come from its namesake city in Austria, and some of the most popular commercial examples are brewed in Mexico. But you don't need a passport to find some great Viennas. We found three US brewers who understand what it takes to brew a good Vienna lager.



JAMES MORIARTY,
Head Brewer at
Pennichuck
Brewing Company
in Milford, New
Hampshire. James

was lured into brewing as a volunteer at a microbrewery across the street from his college. After attending the Siebel Institute's distance learning program, he was later hired as the Assistant Brewer at Pennichuck and took over as Head Brewer in March, 2009.

Our Vienna lager recipe comes down from the original head brewer and it's since taken on its own character and become lighter in color than what it may typically be style-wise. Ours is more of a pale gold to a light copper color. We are planning on releasing it either this year or next year as Ladder 1 Lager, though it was originally on the market as 2-6-0 Mogul. I think people were kind of uncomfortable with the original name — for example, we attended a festival and it just wasn't pouring so we swapped out the tap handle for a Ladder 1 Lager and we couldn't stop pouring it.



DAVID BERG, Assistant Brewmaster at August Schell Brewing Co. in New Ulm, Minnesota. David earned a B.S. in Aerospace Engineering in 1988 and graduated from the American Brewers Guild Craft Brewer's Apprenticeship Program in 1996. He was the Head

Brewer at Water Tower Brewing Company in Eden Prairie, Minnesota from 1996 to 2002, the Head Brewer at Bandana Brewery in Mankato, Minnesota from 2002 to 2006 and has been the Assistant Brewmaster at August Schell since 2006.

The philosophy behind Firebrick was to create a malt-forward amber lager with enough bitterness to prevent the beer from becoming cloying. The sweet malt character needed to come from high-temperature kilned malts rather than crystal malts.

Firebrick is an all-malt lager. The grain bill consists of Rahr 2-Row, Munich malt, medium crystal and black malt. The Munich malt provides the toasty, breadlike character while the small amount of black malt provides a nice red color.

Vienna lagers should exhibit a very clean bitterness. Good hop choices include German Noble varieties (Hallertau, Tettnang)

We use three types of malts to brew our Vienna: standard two-row pale, Vienna and Caramunich 40 °L. We also use a single bag of wheat malt in 30 barrels to help with head retention and give a little bit of mouthfeel. For hops we use Nugget as the bittering hop, Czech Saaz and Hallertau as the aroma and flavor hops. I think it comes out to about 19 or 20 IBUs.

We do a single infusion mash where we mash in at 152 °F (67 °C), give it a 40 minute rest then sparge at 165 °F (74 °C). We have a 15-barrel brewhouse and when we do a 30-barrel batch we split the mash temps between the two days — 149 °F (65 °C) on the first day and get a lot of the fermentables. On the second day we'll do 151 to 152 °F (66 to 67 °C) to get more of the body.

We use Wyeast German Lager for yeast, although we are a little tough on our yeast so we kind of beat the esters out of it. To cut down on the lag time we like to pitch at 65 °F (18 °C), then over the course of two days we bring it down to the fermentation temperature — around 50 °F (10 °C). If I was a homebrewer I would forgo the airlock during primary and setup a blowoff tube to let the sulfur escape.

We don't use any finings, but you're going to want to get the beer as clear as possible, especially if it is on the lighter side. When you're ready to bottle you can use something like isinglass.

or their American counterparts (Liberty, Mt Hood). Firebrick uses all Liberty hops, with additions at first wort and the start of boil yielding a low, but present, amount of hop flavor. The bitterness is 22 IBUs.

We ferment Firebrick with one of our house lager yeast strains, which is a descendent of the Christian Schmidt strain. It's a workhorse yeast that likes higher temperatures, so we ferment at 57 °F (14 °C). Fermentation completes in seven days and is followed by a 21-day lagering period.

At home, build your grain bill around the concept of creating a beer with a nice toasty malt character. Vienna and Munich malts will give you what you're looking for. Some Caravienne would also go a long way towards achieving your goal. A small amount of Black malt (0.5%) will give you a nice red color without affecting the flavor. Shoot for an original gravity somewhere between 12 and 14 °Plato, and use enough hops to balance the malt sweetness without becoming overbearing.

Homebrewers should be able to brew world-class Viennas (or any lagers for that matter) as long as they remember to pitch enough yeast and control your temperature. The amount of yeast you pitch for a lager should be 1.5 to 2 times the amount you use in an ale. Yeast companies list the temperature range for their yeasts. Follow their advice.



JAMIE FULTON, Brewmaster at The Covey Restaurant and Brewery in Fort Worth, Texas. Jamie studied brewing at the Institute and Guild of Brewing of London and the World Brewing Academy, a combined offering of the Siebel Institute of Chicago and Doemens Brewing

Academy of Munich, Germany and worked for Blue Star Brewing Company in San Antonio. After completing his brewing education, Jamie founded The Covey.

The Vienna lager served at The Covey is brilliantly clear, light copper in color with a thick, off-white head. The aroma is clean, with sweet malt dominating and faint noble hop aroma in the background. When I formulated my original recipe, I wanted to highlight the subtleties of the lightly toasted malts, predominantly Munich malt. Fairly low hopping rates allow the malt to shine through, but there is just enough bitterness to keep it very drinkable.

Munich malt and Pilsner malt, in equal amounts, account for three-fourths of the grist. For specialty malts, I use two different light crystal malts and a portion of Vienna malt. Using dark crystal malts will add a harshly toasty/caramel flavor that I think detracts from the drinkability and balance that is so important to this

beer's character. The Munich malt adds the hallmark bready and lightly toasted flavors. The addition of the light crystal malts, in small amounts, adds to the overall complexity of the beer, making it rounder and more balanced.

I use noble, low alpha acid hops for the bittering and flavor additions. I would not recommend using high-alpha varieties for a beer this mild. I aim for around 20 IBUs for the finished beer, with 20% coming from the flavor addition.

I use a Bavarian lager yeast for the ferment. I like the small amount of sulfur these yeasts produce. The strain that I use from White Labs leaves the beer malty with very slight sulfur. Our fermentation regime is to pitch at around 47.5 °F (8.6 °C) with moderate O₂ levels.

Some tips for homebrewers: acidify sparge water with lactic acid to just below pH 7 and do not sparge at a temperature higher than 170 °F (77 °C). Use fresh, liquid yeast, preferably do a starter and pitch one to two pints of slurry per 10 gallons (38 L). Oxygenation of the cooled wort is critical: use a sterile in-line filter and a carbonation stone to infuse the cooled wort with O₂, but do not do this so vigorously as to create lots of foam. Use your best, low-alpha hops for bittering and preferably noble hops for flavor. Controlling the temperature is one of the most difficult aspects of homebrewing, but is crucial to crisp Vienna lager. Do not ferment over 55 °F (13 °C) maximum. Rack from secondary five to seven days after lowering the temp to around 40 °F (4 °C).



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Brew Day Breakup

Opening a commercial brewery

*"Help Me,
Mr. Wizard"*

by Ashton Lewis

Curbing the brew day?

I am an all-grain brewer and I was thinking of ways to lessen the wrath from my wife over how long it takes to brew. One idea I came up with was to mash and sparge (which takes about two hours) the night before, collect the runoff and store it. Then the next day start my boil and be done with that in two hours. Will I run into any contamination or other problems?

Steve Patrick
via email

Whenever I am thinking about alternate approaches to brewing methods I usually ask myself if my idea or something akin has been done previously. To me there is comfort in precedence, especially in a craft as old as brewing. Your question does have precedence and an example of splitting wort production into two phases can be seen with malt extracts. But instead of prolonged storage of unhopped wort you want to just briefly store it before resuming the brew day some eight to 12 hours later.

The biggest concern with wort storage is microbiological. There are bacteria that do grow in wort and lend undesirable flavors. While *Lactobacillus* may be the first bacterial genus that comes to mind it does not concern me nearly as much as *Obesumbacterium proteus*. This fat little bugger produces a variety of off-flavors including very potent variants of phenolic, sulfur and fecal aromatics. Not a very pleasant bacterium to have growing in your wort and one that you will certainly remember like your birthday if you ever are confronted by its signature aromas!

The thing to know about wort spoilers is that they grow best at elevated temperatures. *Lactobacillus* species are anaerobic bacteria that have an optimal growth temperature around 120 °F (49 °C). *Obesumbacterium proteus* does best in a aerobic environment at 104 °F (40 °C).

If I had all tools at my disposal I would collect wort from the mash in a small buffer tank, pump the wort through a flash

pasteurizer equipped with a chiller section and store my cold, pasteurized wort at about 32 °F (0 °C) in a clean and sealed vessel before use. When I was ready to move it to the kettle I would run it through another heat exchanger and heat it up during the transfer to the brew kettle. A variation of this process is used by juice producers who process fruit into so-called

"The biggest concern with wort spoilage is microbiological. There are bacteria that do grow in wort and lend undesirable flavors."

"single strength" juice that is pasteurized and aseptically stored before packaging. Many fruit juices are prone to the same spoilage organisms as beer and storing single-strength juice (as opposed to frozen concentrate) for very long time periods is commonly used.

Back to homebrewing reality . . . you certainly do not have a pasteurizer at home equipped with a chiller section and you probably do not have a heat exchanger sitting around that you could use to heat the wort on the way to the kettle. But you do have a brew kettle and (hopefully) a wort chiller. With this equipment you could collect the wort from your mash tun in your kettle and maintain the wort temperature between 180 and 200 °F (82 and 93 °C) during wort collection.

Once you have collected all of your wort, hold the hot wort for between 10–20 minutes and then transfer it to your storage container of choice, using your wort

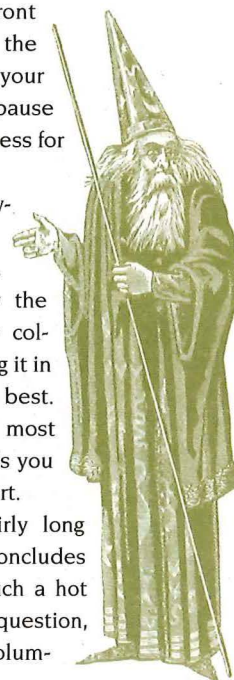
chiller to cool it during transfer. This is a crude form of heat processing and will work to reduce the bacterial population of the wort to delay spoilage. The key is to get the wort as cool as possible. In practice this means chilling to between 70 and 80 °F (21 and 27 °C) with your wort chiller and moving the wort into the refrigerator before use.

So far I have extended the process of wort production by about an hour and I am not done adding time to the brewing process. The next day you wake up and now want to finish the brew. The easiest thing to do at home is to transfer your now cold wort to the brew kettle and kick on the heat. This is going to take some time since the wort is probably around 40 °F. If you could use your wort chiller as a pre-heater you can shave some time off this, but the bottom line is that the heating time is extended. You've probably added another hour to the brewing process.

The other thing about this process is that it requires a lot more energy than your current process because you have added another cooling and heating step as a minimum. And if you heat the wort to somewhere around 190 °F (88 °C) during wort collection, as I suggest, you have added heating on the front end. This is certainly not the most efficient method if your goal is simply to hit the pause button on the brewing process for the night.

Unfortunately the brewing process does not have a convenient pause button. You could try to simplify the method above by simply collecting wort in a pot, stuffing it in the fridge and hope for the best. This probably would work most of the time, but when it fails you will have unsalvageable wort.

I did just write a fairly long essay that pretty much concludes with "maybe this is not such a hot idea." I did answer your question, however, and as a Q&A colum-





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**"Help Me,
Mr. Wizard"**

nist that is what I do. But I am also allowed to ask questions and I have a question for you: does your wife dislike your long brew days because you take over the kitchen, make a mess and prevent her from cooking the simplest meal or does she dislike the long brew days because they take you out of commission for an entire day of the weekend?

If the kitchen is the issue I suggest moving your setup out of the kitchen! You can mash and sparge somewhere else and use the stove top to heat water if you don't have a Cajun cooker-type set up. I know, you still have some pots on the stove but at least some of the clutter is out of the way. If time is the issue you may want to consider overnight mashing. Prepare your mash, chuck into an oven set at ~160 °F (71 °C) and then finish up the next day.

Personally I would try to figure out a way to do everything in one day while simultaneously keeping peace with your wife because in all truth you probably have the best shot of brewing the best beer by sticking with the methods that have emerged as the best brewing methods. Good luck!

Sales setup

I've been homebrewing for a few years now, and the beer tends to turn out wonderfully. And not like, "I'm proud of my beer and I think it's great" wonderful, more that my friends would rather buy my beer than go to the liquor store for a 6-pack of whatever. So I have a few questions for you. What are the federal regulations for selling alcohol (direct to consumer, or to a bar, not through a liquor store)? Where is a good resource for state and local rules (I'm in Denver, Colorado)? What else should I know before letting my homebrew pay for itself?

PJ Hoberman
Denver, Colorado

at one time I taught brewing science classes with Dr. Michael Lewis, now retired professor of brewing science at the UC-Davis, and one of the classes we taught was focused on how to go about opening a brewery. Scott Smith, founder and owner of Coopersmith's Pub & Brewing in Fort Collins, Colorado, and Tom McCormick, who founded McCormick Beverage Company in 1984, the nation's

first wholesale beer distributorship to exclusively sell microbrewed and specialty import beers, were also a key part of our touring group and Tom and Scott covered the business side of brewing.

As it turns out opening a brewery today is not an overly complicated endeavor, as once was the case. Many of the hurdles that microbrewing pioneers faced were due to the fact that new breweries were not at all common in the United States and the government employees working in alcohol control were simply unfamiliar with the requirements of opening a new brewery. They knew all about what existing breweries needed to do to stay legal, but helping someone file the requisite paperwork for a new brewery was alien. Of course other hurdles were present because established breweries really did not want any competition and state and federal laws had been influenced by those with power to advance their agendas.

The most important part of being a legally operated brewery is paying taxes. Remember how the feds nailed Capone? It was tax evasion. And to be legal you must pay both federal and state taxes on the beer produced for sale and local sales tax on beer that you sell. Of course you also must be a licensed brewery so that your tax payment can be tagged to your brewery license.

OK, so I'll give a high-level overview of alcohol beverage law. All breweries in the United States must file paperwork with the Alcohol and Tobacco Tax and Trade Bureau (TTB), formerly the BATF or Bureau of Alcohol, Tobacco and Firearms. The brewery license with the TTB must be renewed annually and with it the license holder is required to file detailed records of brewing operations. The records not only help determine how much tax you owe, but the records are also used by the government to do a sanity check of your brewing operations. Since you must report the usage of malt and hops and beer loss, agents can spot reports that may be fraudulent. Also, when the TTB comes in for an audit they will look at brewing records, raw material invoices and whatever else they wish to examine to determine if your operation is legit. Again, the key here is tax collection.

Breweries also must have the state

and local licenses required for the business. In the state of Missouri (where I live) we have a microbrewery license that allows the license holder to brew beer and to sell the beer on premise at the brewery or through a distributor. We also have local licenses that allow us to operate our business and to sell alcohol at our brewery; the latter is our liquor license. In the state of Missouri breweries cannot sell beer directly to retail outlets, such as

liquor stores, bars or restaurants. Some states, including Colorado, do allow brewers to self distribute and this ability is nice for small producers who want to distribute their own beer and retain control over this part of the business.

You may be familiar with the term "three tiered system." The three tiers of this system are production, distribution and retail sales. The three tiered system was established upon the repeal of

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"Help Me, Mr. Wizard"

Prohibition and the idea was to prevent large companies from dominating the production, distribution and sale of alcohol. In order to separate these three tiers a company could only hold a license to do one of these three activities. When brewpubs came on the scene states had to create laws to permit special exceptions to three-tiered laws since brewpubs produce beer and sell it directly to the consumer. Some states went further and gave brewers the ability to once again do everything. This subject could literally fill an entire text book and interested readers can find all sorts of information on this subject at a local library.

So getting the licenses are really not that difficult these days, especially when dealing with agents who have filed the paperwork before. Colorado is no stranger to craft brewing and you will likely get a lot of assistance to do this by simply contacting the Colorado agency that regulates brewing and expressing your desire. They can help point you to the local TTB office where you can get the required forms for

your federal brewing license. One thing you will need is a designated brewing premise and a bond or surety note guaranteeing that your taxes will be paid.

"The most important
part of being a legally
operated brewery is
paying taxes.

Remember how the
feds got Capone? It
was tax evasion."

Although many maturing craft brewers thought the term "microbrewer" to have a pedantic connotation and intentionally distanced themselves from the classification, some very small brewers have

embraced the term "nanobrewer" to describe their very small and very specialized little breweries. I think what you propose is simply to establish a legal, albeit very small, brewery and to join the world of nanobrewing. Good luck and let us know if you follow through with this! ☺



Brew Your Own Technical Editor Ashton Lewis has been answering homebrew questions as his alter ego Mr. Wizard since 1995. A selection of his Wizard columns have been collected in "The Homebrewer's Answer Book," available online at brewyourownstore.com.

Do you have a homebrewing question for Ashton? Send inquiries to *Brew Your Own*, 5515 Main Street, 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 personally. Sorry!



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Kölsch

The beer of Cologne

by Jamil Zainasheff

my first time wandering the streets of Cologne was a magical moment. In between dramatic cathedrals and luscious chocolate factories, I slipped from one brewery/pub/restaurant to another sampling Kölsch, the beer of Cologne. The waiters (or Köbes as they are called) serve the beer in a tall, narrow 200-mL glass called a Stange. With each additional delivery, they make a mark on your beer coaster, indicating the number of beers you've been served and how much you owe when done. They continue to bring beer and make more marks around the perimeter of the coaster until you put the coaster on top of the glass to indicate you are finished. I sat in the first pub for quite some time, as I enjoyed watching the parade of marks march their way around

the perimeter of the coaster like a formation of skinny ants.

Kölsch, according to the Kölsch Konvention, can only be called Kölsch if it is brewed in the Cologne metropolitan area. The Kölsch Konvention also demands that the beer must be pale in color, be top-fermented, hop-accentuated, highly attenuated and between 11 and 14 °P. Of course, as any good brewer knows, that still leaves considerable wiggle room. While the different breweries do produce beers with a range of character, it is interesting to note how small a range of characteristics they span even though the Konvention technically allows much more.

In today's bold craft beer landscape, Kölsch is a relatively subtle beer. It is very pale gold to light gold color with a light grainy malt character and a soft mouthfeel. A few examples have a slight touch of malt sweetness up front, but all follow through with a crisp enough finish that the beer never really seems sweet. Hop bitterness ranges from medium-low to medium, usually resulting in an even balance. Drier beers may seem a bit more bitter in the balance, and sweeter versions balanced even to very slightly sweet. Hop flavor and aroma are generally low to non-existent, but there are some examples where noble hop character is apparent.

A mistake some brewers make with Kölsch is to take any mention of fruitiness in the BJCP style guide and use that as carte blanche to brew really fruity beers. While there is some fruitiness, in most good examples it is very subtle. In Kölsch, fruitiness should be a character left more to the imagination rather than being outright obvious. When sampling your own Kölsch, if your first thoughts are about the fruity character, then it is way too much. The same can be said for sulfur. During cold fermentation, if activity is slow, the beer will end up retaining unacceptable levels of sulfur. Yes, you might find some sulfur in a few examples of the style, but I would argue that you won't find it in the best examples. Make sure your fermentation procedures minimize the production

Style^e profile

RECIPE

Kölsch

(5 gallons/19 L, extract)

OG = 1.048 (11.9 °P)

FG = 1.009 (2.3 °P)

IBU = 25 SRM = 4 ABV = 5.1%

Ingredients

6.6 lb. (3 kg) Briess Pilsner liquid malt extract (2 °L)

0.25 oz. (113 g) Munich or wheat liquid malt extract (optional)

5 AAU Hallertau pellet hops
(1.25 oz./35 g at 4% alpha acids)
(60 min.)

White Labs WLP029 (German Ale/
Kölsch) or Wyeast 2565 (Kölsch)
yeast

Step by Step

The all-grain version of this recipe uses a small amount of Vienna malt. While you can try steeping 0.5 lb (227 g) of Vienna malt, the problem is that it will add unconverted starch to your beer. It is better to omit it or use extract instead. I don't know of any Vienna malt extracts, so Munich or wheat extract is the best substitute. Many folks have a hard time sourcing 100% wheat or Munich extract (Weyermann makes a 100% Munich malt extract), with most being a blend around 50/50 or 60/40. However, all is not lost. Just count the non-Munich or non-wheat portion of the extract against the base malt. For example, if a recipe called for 1 lb (0.45 kg) of 100% Munich and you had a 50/50 blend instead, increase the amount of Munich extract to 2 lb. (0.9 kg) and lower the base malt amount by 1 lb (0.45 kg).

Mix enough warm, chlorine-free water and the malt extract to make a pre-boil volume of 5.9 gallons (22.3 L) and a gravity of 1.041 (10.2 °P). Stir thoroughly to help dissolve the extract and bring to a boil.

The total wort boil time is 60 minutes. Add the bittering hops once the wort begins to boil. Add Irish moss or



KÖLSCH by the numbers

OG:1.044–1.050 (11–12.4 °P)
FG:1.007–1.011 (1.8–2.8 °P)
SRM:3.5–5
IBU:20–30
ABV:4.4–5.2%

Continued on page 21

RECIPE (continued)

other kettle finings with 15 minutes left. Chill the wort rapidly to 60 °F (16 °C), let the break material settle, rack to the fermenter and aerate thoroughly.

Use 2.5 liquid yeast packages or make a starter with fewer packages. Ferment at 60 °F (16 °C). Allow the beer to lager for at least four weeks before bottling or serving. When finished, carbonate the beer to approximately 2.5 volumes and serve at 50 °F (10 °C).

2565 (Kölsch) yeast

Step by Step

Mill the grains and dough-in targeting a mash of around 1.5 quarts of water to 1 pound of grain (a liquor-to-grist ratio of about 3:1 by weight) and a temperature of 149 °F (65 °C). Hold at 149 °F (65 °C) until enzymatic conversion is complete. Raise the temperature to mash out at 168 °F (76 °C). Sparge slowly with 170 °F (77 °C) water, collecting wort until the pre-boil kettle vol-



Kölsch

(5 gallons/19 L, all-grain)

OG = 1.048 (11.9 °P)

FG = 1.009 (2.3 °P)

IBU = 25 SRM = 4 ABV = 5.1%

Ingredients

9.25 lb. (4.2 kg) Durst continental Pilsner malt (2 °L) or similar

0.5 lb. (227 g) Weyermann Vienna (4 °L)

5 AAU Hallertau pellet hops (1.25 oz./35 g at 4% alpha acids) (60 min.)

White Labs WLP029 (German Ale/Kölsch) or Wyeast

ume is around 6.5 gallons (24.6 L) and the gravity is 1.037 (9.3 °P).

The total wort boil time is 90 minutes, which helps reduce DMS levels in the beer. Add the bittering hops with 60 minutes remaining in the boil. Add Irish moss or other kettle finings with 15 minutes left in the boil. Chill the wort rapidly to 60 °F (16 °C), let the break material settle, rack to the fermenter and aerate thoroughly.

Use 2.5 liquid yeast packages or make a starter with fewer packages. Ferment at 60 °F (16 °C). Lager for at least four weeks before bottling or serving. When finished, carbonate the beer to approximately 2.5 volumes and

serve at 50 °F (10 °C).

Kölsch II

(5 gallons/19 L, all-grain)

OG = 1.049 (12.3 °P)

FG = 1.010 (2.6 °P)

IBU = 28 SRM = 3 ABV = 5.2%

Ingredients

9.5 lb. (4.3 kg) Durst Continental

Pilsner malt (2 °L) or similar

0.5 lb. (227 g) Great Western Wheat Malt (3 °L)

5 AAU Hallertau pellet hops (1.25 oz./35 g at 4% alpha acids) (60 min.)

2 AAU Hallertau pellet hops (0.5 oz./14 g at 4% alpha acids) (15 min.)

White Labs WLP029 (German Ale/Kölsch) or Wyeast 2565 (Kölsch) yeast

Step by Step

Mill the grains and dough-in targeting a mash of around 1.5 quarts of water to 1 pound of grain (a liquor-to-grist ratio of about 3:1 by weight) and a temperature of 149 °F (65 °C). Hold the mash at 149 °F (65 °C) until enzymatic conversion is complete. Raise the temperature to mash out at 168 °F (76 °C). Sparge slowly with 170 °F (77 °C) water, collecting wort until the pre-boil kettle volume is around 6.5 gallons (24.4 L) and the gravity is 1.038 (9.6 °P). The total wort boil time is 90 minutes, which helps reduce DMS levels in the beer. Add the bittering hops with 60 minutes remaining in the boil. Add the Irish moss or other kettle finings and the late hops with 15 minutes left in the boil.

Chill the wort rapidly to 60 °F (16 °C), let the break material settle, rack to the fermenter and aerate thoroughly. Use 2.5 liquid yeast packages or make a starter with fewer packages.

Ferment at 60 °F (16 °C). Allow the beer to lager for at least four weeks before bottling or serving. When finished, carbonate the beer to approximately 2.5 volumes and serve at 50 °F (10 °C).

of fruity esters and sulfur.

I prefer a nice German Pilsner malt for brewing Kölsch. I have used other pale malts with acceptable results, but the light, grainy taste of high quality Pilsner malt is right on target for this style. That is all you need for a great Kölsch. You can enhance the malty flavors with a small addition of Vienna or light Munich malt, but keep the percentage to 5% of the grain bill or less. Using these malts can also make the beer too dark. You don't want to overdo the clean, restrained malt flavors of this beer and you never want to add additions like caramel malts. The sweetness and flavor of caramel malts will quickly overwhelm the intended light character of this style.

In the past, a number of sources suggested that Kölsch-style beers were made with a sizable portion of wheat malt, up to 20%. The current Beer Judge Certification Program style guidelines correctly indicate that this is rare in authentic Kölsch. A small portion of wheat malt is OK; the same as adding Vienna malt. Wheat can add a gentle bready note to the beer and can improve head retention. Overall, try to keep it simple. Limit yourself to no more than one grain in addition to the base malt and keep that to no more than 5% of the grist. A single infusion mash around 149 °F (65 °C) strikes the proper balance between fermentable and non-fermentable sugars.

Extract brewers can use a Pilsner-like malt extract, although in a pinch any light colored extract will suffice. Most light colored extracts will attenuate fairly well, but try to avoid any extract that won't attenuate in the vicinity of 80% apparent attenuation. There are several good Pilsner or Pilsner-type extracts out there, so finding a good extract should not be too difficult for most brewers.

Target a bitterness-to-starting gravity ratio (IBU divided by OG) between 0.4 and 0.6. You're trying to achieve an even or very slightly sweet start to the beer, with a balanced overall character, and a slightly dry finish. Normally, a single addition at 60 minutes is all you need. If you want a beer with some hop character, a moderate later addition, say ½ ounce (14 g) 20 minutes or later is acceptable. Hop choice for bittering and flavor is fairly flexible. Ideally, stick with German noble hops Hallertau, Tettnang, Spalt or Hersbrucker.



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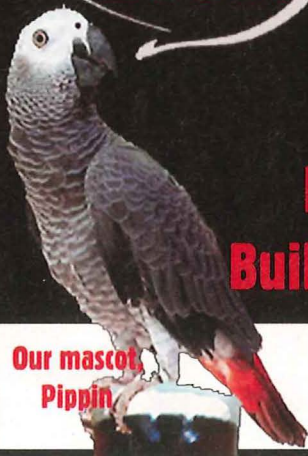
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If you're having trouble sourcing those, any German hop will work as will US versions of traditional German hops. Overall, think German lager hop character, not West Coast pale ale character. Never use citrusy or catty American-type hops.

Yeast selection and fermentation temperature control is very important. It is impossible to get the right flavor and aroma without the right yeast at the right temperature. You want the beer to attenuate enough so that it doesn't have a sweet finish and you want to ferment it cool enough that any esters are restrained and the beer has a fairly clean character. Two great yeasts for this style are White Labs WLP029 German Ale/Kölsch and Wyeast 2565 Kölsch. You can't go wrong with either product. These yeasts provide the right, low-ester profile and proper attenuation for a dry enough finish.

No matter what yeast you choose, however, you'll still need to pitch the proper amount of clean, healthy yeast and keep a close eye on fermentation temperatures to ensure good attenuation and fla-

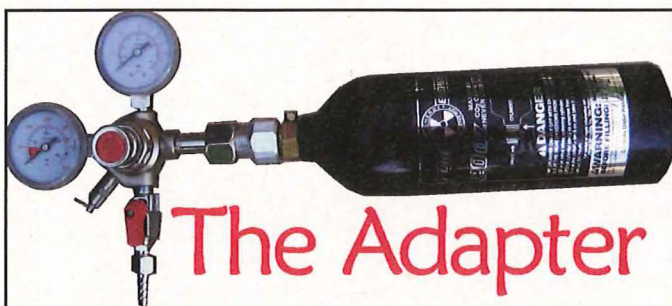
**"It is impossible
to get the right
flavor and aroma
without the right
yeast at the right
temperature."**

vor development. Fermentation temperatures around 58 to 62 °F (14 to 17 °C), depending on strain used, is a good range. One thing to keep in mind about most Kölsch yeasts is that they do not flocculate easily. It can take quite a bit of

time, finings or filtering to clear the beer, and it is important for the style to be brilliantly clear. If you're patient, the easiest way to clear the beer is to lager it near freezing for a month or more.

Kölsch's delicate character won't hide flaws, like oxidation or poor fermentation practices. Pay strict attention to sanitation, yeast health, and treat your beer gently during transfers. After lagering and as soon as the beer reaches its peak of flavor, it is time to start thinking about consuming the beer fairly quickly. Kölsch is best served fresh and around cellar temperature. If you can serve your Kölsch in a tall, narrow, straight-sided glass, it will also make a difference in your perception of the beer. 

Jamil Zainasheff is the author of *"Brewing Classic Styles,"* (Brewers Publications, 2007). He is also the host and co-host of *The Jamil Show* and *Brew Strong* podcasts on *The Brewing Network* (www.thebrewingnetwork.com). He writes "Style Profile" for every issue of *Brew Your Own*. Check out his Web site at www.mrmalty.com.



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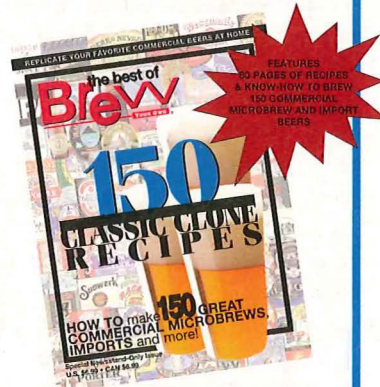
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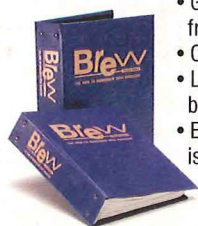
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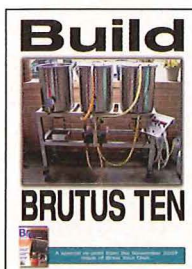
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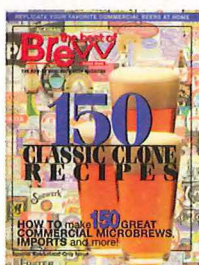
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vienna LAGER

BORN OF INDUSTRIAL
ESPIONAGE, AND
HAILED AS A BREAK-
THROUGH IN
BREWING, VIENNA
LAGER IS A WONDERFULLY
MALTY BREW.



Photos Courtesy Wikipedia

THE VIENNA LAGER did not just happen. It did not evolve like most beer styles. Instead, it was planned — even criminally, one might argue. That's why we know its precise birth year, 1841, and exactly “whodunnit” — an Austrian brewer named Anton Dreher!

Anton Dreher was the son of Franz Anton Dreher, owner of the Schwechat Brewery in Klein-Schwechat near Vienna. And our felonious Tony had an accomplice in his evil deed, his good buddy Gabriel Sedlmayr II, son of Gabriel Sedlmayr I, and owner of the Spaten Brewery in Munich.

Both the Schwechat and the Spaten breweries are still in existence. They are venerable institutions with long traditions. The Schwechat Brewery (now part of the Brau Union Österreich AG conglomerate) was founded in 1632. It was purchased by the Dreher family in 1796. The Spaten

Vienna lager was invented by Anton Dreher, based partially on information purloined from English brewers and maltsters. At a time dominated by dark brews, it was an instant hit.



Vienna lager and Märzen-Oktoberfest were both premiered in 1841. These styles are very similar. In fact, Märzen beer was described as "brewed the Vienna way."

Brewery (now part of the Anheuser-Busch-InBev concern) can trace its origins even further back, all the way to 1397. Sedlmayr the Elder purchased it in 1807. By the time the Vienna lager story begins, in the early 19th Century, Spaten was one of the leading breweries in Munich and the Dreher operation was the leading brewing enterprise in all of the Austro-Hungarian Empire, which, in those days, comprised not just Austria and Hungary proper, but also Bohemia and Moravia (today parts of the Czech Republic), Slovakia, much of the Balkans, as well as the northern part of Italy around the Adriatic port of Trieste.

Vienna lager, though an instant hit in its day, is nowadays rarely brewed, even in Austria. Many beer aficionados consider Negra Modelo from Mexico perhaps its nearest modern descendant. In many respects, Vienna lager resembles the Märzen-Oktoberfest, a close stylistic relative, which was also invented in 1841, in Munich, by Anton's friend Gabriel. The Spaten brewery marketed its Märzen as brewed "the Vienna way." In fact, in a blind taste test, it may be difficult to distinguish between the two brews. The Vienna lager's body is medium and malty; its finish is

slightly, but not cloyingly, sweet. Its hop loading, like that of a Märzen-Oktoberfest, emphasizes aroma more so than bitterness, and its alcohol by volume is usually slightly above 5% — more in line with what Munich brewers call an Export than with a Märzen-Oktoberfest, which tends to have an alcohol by volume level closer to 6%. Finally, the Vienna lager is a touch more reddish in color than the more golden-amber of a typical Märzen-Oktoberfest.

From Stolen Ale Specs Two Lagers Were Born

The creation of the Vienna lager by Anton Dreher (as well as that of the Märzen in Munich by Gabriel Sedlmayr) was based on what can nowadays only be considered a case of industrial espionage. Young Anton and young Gabriel had come to know each other from their visits of each others' breweries during their apprentice years. Both breweries thrived on making the standard dunkel (dark) lagers of their age for their respective markets. But both Anton and Gabriel had also heard of the fabulous pale ales of consistent quality that were made by many brewers in England. This was the era of industrialization and brewers looked to England for technological innovations. Brewers on the Continent, by contrast, seemed to be stuck in a rut.

Because Anton and Gabriel were both progressive and inventive brewing pioneers — as well as foot-loose daredevils — the two buddies decided, in 1833, to see for themselves what the fuss over these English beers was all about. After their arrival in London, they spent five months traveling from one brewery to the next, asking questions and absorbing all they could. Along the way, they saw how British brewers employed steam power to make their processes more efficient. They observed the system-

atic use of the thermometer in the brewery — this was news to them! They also learned about the hydrometer, which allowed brewers to measure a wort's specific gravity and thus to produce brews of consistent strength. That implement, too, was still unknown on the Continent.

The itinerant Continental brewers wanted to know everything: recipes, specifications, brewing techniques and technologies. More often than not, however, their hosts were polite, but evasive, if not cagey about their brewing methods. So whatever knowledge was not rendered voluntarily unto the young lads from the Continent, they would simply steal.

When nobody was looking, they surreptitiously took wort and beer samples right from under the noses of their hosts. As young Sedlmayr revealed in a letter to his father about his "art of stealing," in which he had become "especially masterly." For this purpose, "we always carry small flasks which we fill up furtively and then weigh with our saccharometer [hydrometer] at home ... [and] we are now having walking sticks made of steel, lacquered, with a valve at the lower end. So that, when the stick is dipped, it fills. When taken out, the valve closes at the lower end, and we have the beer in the stick, and in that way we can steal more safely."

The two brewers also learned about a new indirect-fired kiln and roasting drum invented and patented in Britain by Daniel Wheeler in 1817. In contrast to the traditional direct-fired floor malting techniques universally in use in virtually all breweries at the time, the Wheeler kiln allowed brewers to control the drying temperature fairly precisely and thus to make predictable malt of any color from pale to amber to black.

The new kiln also kept any smoky flavors from fuel — usually coal, coke or wood — out of the malt and, therefore, out of the beer made from it. If the clean, lighter-colored malts made possible the evolution of pale ale on the British Isles, Anton and Gabriel concluded, there ought to be no good reason why one could not make paler-colored lagers from them as well.

Upon their return home, the brazen brewers made excellent use of the information gleaned so unethically! At

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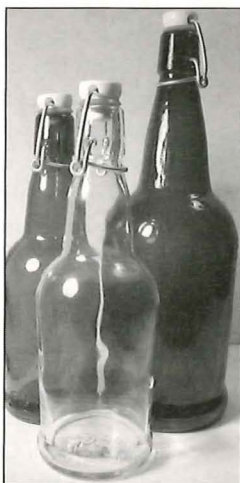


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Vienna Via Extract



Austrian Anton Dreher invented Vienna lager.

Extract brewers have a few options when it comes to brewing a Vienna lager — from all extract to mini-mash.

The Weyermann Malting Company makes a liquid malt extract called Vienna Red. It is produced entirely from a decoction mash of Weyermann Vienna malt, Weyermann Melanoidin malt and Weyermann Pilsner malt. It is red-brown, unhopped and comes in a (8.8-lb.) 4.0-kg canister. This extract produces, according to the manufacturer's specifications, a wort color of 15.6 to 19.3 °Lovibond at an original gravity (OG) of 1.052 (13 °P).

Using this extract for your total grain bill will result in a beer that is slightly darker than the target color of our all-grain recipe, but not totally out of bounds for the style. On the other hand, if you want to go through the trouble, you can replace about one fourth (about 2.2 lbs. or 1 kg) of the Vienna Red with a Pilsner liquid extract, to yield a slightly lighter color. There is no need for steeped grains, as the extract is made from a blend of malts.

Another option would be to perform a partial mash. Based on the all-grain recipe on page 32, you could make a couple different partial mash formulations. The closest interpretation would require you to make a mini mash of 5.75 lbs (2.6 kg) Vienna malt and 6.4 oz. (0.18 kg) of Caramunich® I. For this, you would need a pot with a volume of at least 3.0 gallons (11 L). Place the crushed grains in a large nylon steeping bag. In the pot, heat 2.0 gallons (7.6 L) of water to 163 °F (73 °C), then submerge the grain bag. Open the grain bag and stir thoroughly, to assure all the grains are in contact with water. The temperature should settle close to 151 °F (66 °C). To maintain the mash temperature, you can place the pot in your oven, on its lowest temperature setting, with the door open. Alternately, every 10 minutes or so, you can apply about 30 seconds of heat from your stovetop. Stir the mash when you apply heat, then turn off the burner and check the temperature. Repeat this procedure as needed until your mash temperature is re-established.

Mash the grains for about 45 minutes, then slowly lift the bag out of the liquid. Slide a colander or large strainer under the bag and let the grains drip into the pot. Rinse the grains with about 1.0 gallon (3.8 L) of water, heated to 170–180 °F (77–82 °C). Rinse slowly and try to minimize splashing as much as you reasonably can. You should now have a little less than 3.0 gallons (11 L) of wort from the partial mash. Proceed with the boil and stir in 3.75 lbs. (1.7 kg) of Munich malt extract for the final 15 minutes of the boil. Follow the all-grain directions for hopping and other instructions.

You could also adapt the recipe to follow the countertop partial mashing protocol — a very manageable way to do partial mash beers. (See the October 2006 and October 2007 issues for more on this method of partial mashing.) For your Vienna lager, you would mash 3.6 lbs. (1.6 kg) of Vienna malt and 6.4 oz. (0.18 kg) Caramunich® I in a 2.0-gallon (7.6-L) beverage cooler. You would add 1.0 lb. (0.45 kg) of light dried malt extract to the wort you collect and boil for 90 minutes, again adding 3.75 lbs. (1.7 kg) of Munich malt extract for the final 15 minutes. This beer would have slightly less Vienna character than the all-grain recipe or mini mash adaptation above, but would certainly still qualify as a Vienna lager.

Yet another option — as seen in our recipes — would be to “steep” 2.0 lbs. (0.91 kg) of crushed Vienna malt in 3 qts. (3 L) of water for 45 minutes at 151 °F (66 °C), then combine this “grain tea” with 6.5 lbs. (3.0 kg) Vienna Red malt extract.

VIENNA LAGER by the numbers

OG	 1.050 (12.5 °P), rarely less, often more
FG	 usually 1.012 – 1.014 (3 – 3.5 °P)
SRM	 usually 12 – 14, rarely paler
IBU	 approximately 25
ABV	 usually slightly above 5%, rarely less

Schwechat, Anton experimented with paler grain bills, as did Gabriel at Spaten. Then, in 1841 — one year before Josef Groll brewed the first golden-blond lager, the Pilsner, in Pilsen, Bohemia — the two scoundrels were ready. While Gabriel came out with the first brilliant-amber lager ever to hit the public, Anton introduced the first-ever reddish-amber lager. Gabriel called his brew “Märzen;” Anton's became soon known as “Vienna lager.” Thus had sprung two new central European lager styles from a perfidious case of industrial espionage on the British Isles!

All-Grain Vienna Lager Brewing Techniques

For advice on the grist composition of an authentic Vienna lager, I went straight to the experts at the Weyermann Malting Company in Bamberg, one of the few maltsters that make a specialty Vienna malt. Explained Sabine Weyermann, “We do not know for sure what Anton Dreher's malt was like. However, because Dreher was taking his inspiration from the Wheeler kiln, which was then the latest advance in malting technology, we can be reasonably sure that his malt was fairly well modified for its time. Nowadays, virtually all malts are highly modified, simply for extract reasons. Few modern, economy-minded brewers would accept anything less. Therefore, we are confident that our Vienna malt, though made with the most modern equipment, is actually quite authentic.” Added Thomas Kraus-Weyermann, “The most crucial task for us was to give the malt a flavor profile that comes close to what we believe the 1841 Dreher brew might have tasted like. Our solution was to apply a good amount of high heat at the beginning of the kilning process. This achieved the all-important Vienna color, which Michael Jackson once described as reddish-bronze. But we also had to drive off any moisture as quickly as possible to prevent the formation of glassy kernels. At the same time, we had to be careful not to keep the malt in the kiln too long to keep the barley's enzymes from being denatured.”

To compose a grain bill for an authentic Vienna lager, Sabine recommended “about 50% of the malt, which we named after that beer. With about 3 to 4 °Lovibond, our Vienna malt is darker than our Pilsner malts but still much paler than our Munich malts. It gives the finished beer a light-reddish-amber hue as well as some gentle maltiness. But because we can assume that the Dreher malt was not as uniformly kilned as is possible today with our modern means, I would also add a good dose of our Munich II malt to the grist, perhaps 45%, as well as about 5% of our Caramunich® I. The Munich II has a color rating of roughly 10° Lovibond, the Caramunich® I, of roughly 30 to 40° Lovibond. The Munich II imparts some pronounced malty notes to the brew for a satisfying middle and a lingering finish, while the Caramunich® I is a great background malt, which adds a bit of golden, copper to orange,

depth to the color as well as an aromatic touch to the flavor."

Other Vienna malts available to homebrewers include Briess (3–3.6 °L), Durst (2.5–4.6 °L) and Hugh Baird (3–4 °L). If you try this style of beer and enjoy it, it pays to experiment with different Vienna malts. All are similar in color, but there are subtle differences in their flavor and aroma.

Vienna malts can be used for up to 100% of the grist, although — as in our recipes — Vienna is often paired with Munich malt because their malt characters complement each other well. Brews made from 100% Vienna will be lighter in color and show less malt character compared to a beer with some Munich in the grist.

The use of crystal-type malts, including Caramunich malts, should be restrained. You don't want a distinct caramel flavor in the beer nor to add too much body. Keeping specialty malts to under about 6% of the grain bill will keep the focus on the Vienna malt (or Vienna and Munich malts) and leave an appropriately moderate-bodied to dry brew. Vienna lagers are moderate-strength beers, usually around 12.5 °Plato (SG 1.050) or slightly higher.

Mashing Options

Vienna lager, not surprisingly, has traditionally been brewed by multiple decoction. As with all fully-modified modern malts, however, a single infusion mash will suffice for Vienna malt. Still, I prefer a two-step infusion, starting with a thick dough-in at 122 °F (50 °C) for a 30-minute rest. Then heat the mash up and thin it out with hot water to 151 °F (66 °C) for a 60-minute rest. Finally, use a slow sparge with hot water to raise the temperature for a mash-out at 170 °F (77 °C).

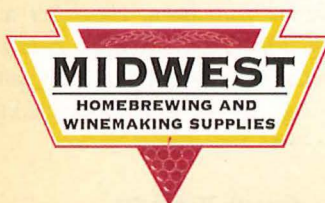
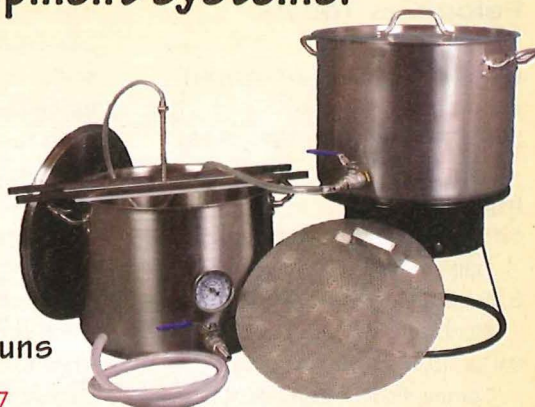
German Hops

In the hop bittering and aroma department, Thomas insisted that "for a beer with that mash composition, you simply cannot trump a classic German noble hop like Hallertauer." German Tettnang, another noble variety, is another good choice. If you don't have access to German hops, the US varieties Mt Hood or Vanguard could also be employed. The level of hop bitterness should nicely balance the malt character of the beer; shooting for around 25 IBUs will achieve this.

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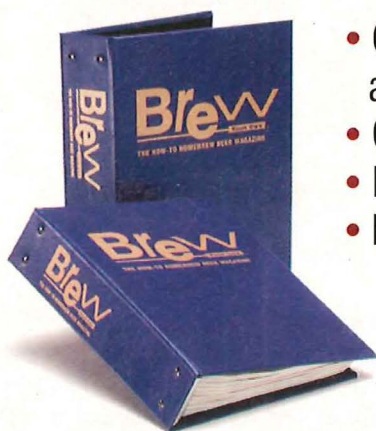
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recipes

Felonious Tony's Vienna Lager

(5 gallons/19 L, all-grain)

OG = 1.052 FG = 1.012

IBU = 25 SRM = 14 ABV = 5.2%

Ingredients

5.75 lbs. (2.6 kg) Weyermann Vienna malt (approx. 3.4°L)
5.25 lbs. (2.4 g) Weyermann Munich II malt (approx. 10°L)
6.4 oz. (0.18 kg) Weyermann Caramunich® I malt (~35°L)
5.56 AAU Hallertauer hops (75 mins) (1.32 oz./37 g) of 4.2% alpha acid
0.5 oz. (14 g) Hallertauer hops (15 mins, for flavor and aroma)
Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager), or White Labs WLP920 (Old Bavarian Lager) yeast
¾ cup corn sugar (for priming)

Step by Step

Dough in with roughly 11 quarts (10 L) of brewing liquor to make a thick mash at approximately 122 °F (50 °C). Let it rest for 30 minutes. Then use a boiling water infusion to raise the temperature to approximately 151 °F (66 °C). Depending on the thermal characteristics of your equipment, this requires at least 1.0 gallon (3.8 L) of liquor. Rest for 60 minutes at this temperature. Then start sparging for a slow run-off of about 90 minutes with hot water of about 180 °F (82 °C) to raise the mash temperature to 170 °F (77 °C), but not higher! If necessary, reduce the sparge water temperature. Discontinue the sparge when the wort in the kettle reaches a specific gravity of roughly 1.048 (12 °P).

Boil for 90 minutes. After evaporation losses during the boil, the kettle gravity should be at 1.052 (13 °P). Add the bittering hops 15 minutes into the boil, the flavor and aroma hops 75 minutes into the boil. After shut-down,

use a spatula to gently stir the wort and create a whirlpool. Let the wort settle for 30 minutes and heat-exchange it to the fermentation temperature of 50 °F (10 °C).

Aerate and add the yeast. Ferment to completion, which should take about two weeks, and rack the beer into a lagering container. If your set-up permits, crash the temperature as close to the freezing point as possible for optimum sedimentation of cold break particulate. Lager for at least four weeks. Rack again before priming and bottling. The brew should be ready to drink after an additional two weeks.

Felonious Tony's Vienna Lager

(5 gallons/19 L, extract only)

OG = 1.052 FG = 1.012

IBU = 25 SRM = 18 ABV = 5.2%

Ingredients

7.75 lbs. (3.5 kg) Weyermann Vienna Red liquid malt extract
5.56 AAU Hallertauer hops (75 mins) (1.32 oz./37 g of 4.2% alpha acid)
0.5 oz. (14 g) Hallertauer hops (15 mins, for flavor and aroma)
Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager), or White Labs WLP920 (Old Bavarian Lager) yeast
¾ cup corn sugar (for priming)

Step by Step

Bring about 3.0 gallons (11 L) of brewing liquor to a boil. Stir in the malt extract and top the kettle off to 5.0 gallons (19 L). Bring to a boil again. Add the bittering hops. Boil for 60 minutes. Add the flavor/aroma hops. Boil for another 15 minutes. After shut-down, adjust your kettle volume for the correct gravity and follow the equivalent all-grain instructions.

Felonious Tony's Vienna Lager

(5 gallons/19 L, extract with grains)

OG = 1.052 FG = 1.012

IBU = 25 SRM = 17 ABV = 5.2%

Ingredients

2.0 lbs. (0.91 kg) Vienna malt
6.5 lbs. (3.0 kg) Weyermann Vienna Red liquid malt extract
5.56 AAU Hallertauer hops (75 mins) (1.32 oz./37 g of 4.2% alpha acid)
0.5 oz. (14 g) Hallertauer hops (15 mins, for flavor and aroma)
Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager), or White Labs WLP920 (Old Bavarian Lager) yeast
¾ cup corn sugar (for priming)

Step by Step

Heat 3 quarts (~3 L) of water to 163 °F (73 °C). Place crushed Vienna malt in a steeping bag. Submerge bag, opening the top and stirring the malt to ensure it mixes with the water. Let the grains "steep," at around 151 °F (66 °C), for 45 minutes. (This is actually a partial mash, so follow the instructions on volume and temperature as closely as you can manage.) While the grains are steeping, begin heating 2.0 gallons (7.6 L) of water in your brewpot. Stir in about 2.5 lbs. (1.1 kg) of the malt extract and slowly bring to a boil as the grains are steeping. Add "grain tea" to brewpot and rinse grains with 1.5 qts. (~1.5 L) of water at 170 °F (77 °C). Boil for 75 minutes, adding hops according to the schedule. Add remaining malt extract for final 15 minutes of boil. Cool wort, rack to fermenter and top up with cold water to make 5 gallons (19 L) at around 50 °F (10 °C). Pitch yeast and follow the remaining all-grain instructions for how to ferment and lager the beer.

Vienna lagers do not have a level of hop flavor or aroma comparable to most American-style amber ales or lagers, so make sure that your late-hop additions don't shift the balance in the aroma to the hop side. There are only two hop additions, one 15 minutes into the boil for bittering and one 15 minutes before shut-down for flavor and aroma.

As is the case with all malt-accented continental lagers, a boiling time of 90 minutes is desirable to produce plenty of melanoidins in the kettle. If need be, adjust your kettle gravity for any evaporation losses by adding extra water.

Lager Yeast

A Vienna lager is best fermented with one of the readily available Bavarian-type lager yeasts, such as Wyeast 2206 (Bavarian Lager), Wyeast 2308 (Munich Lager), White Labs WLP838 (Southern German Lager) or White Labs WLP920 (Old Bavarian Lager). For a 5.0-gallon (19-L) batch, a well-aerated 3- to 4-quart (3-4-L) yeast starter will supply enough yeast for a proper pitching rate. Ferment in the mid-to-low end of the yeast's recommended temperature range.

The finished beer should be only moderately effervescent, so do not overdo the priming. Half to three-quarters of a cup of corn sugar should be plenty for a 5.0-gallon (19-L) batch.

Water

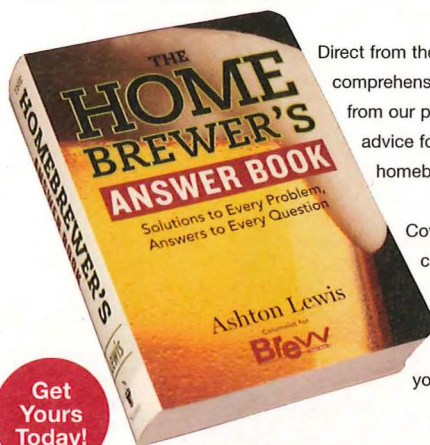
As with most amber-colored beers, you do not need to finely tune your water chemistry to produce a fine beer. However, if you do manipulate your water for every brew, adjust it such that the calcium ion content is around 100 ppm and carbonate ions are in the 125-150 ppm range. However, as long as your mash pH falls in the correct range — 5.2 to 5.6 — your water is likely adequate for this beer.

Anton and Gabriel went to great lengths to covertly gather the information needed to brew their beers. Now, we've "smuggled" this information to you. To best act on this intelligence, employ sound brewing fundamentals and take good notes as you brew.

Horst Dornbusch is a freelance beer writer and *Brew Your Own* magazine's former "Style Profile" columnist.

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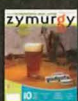
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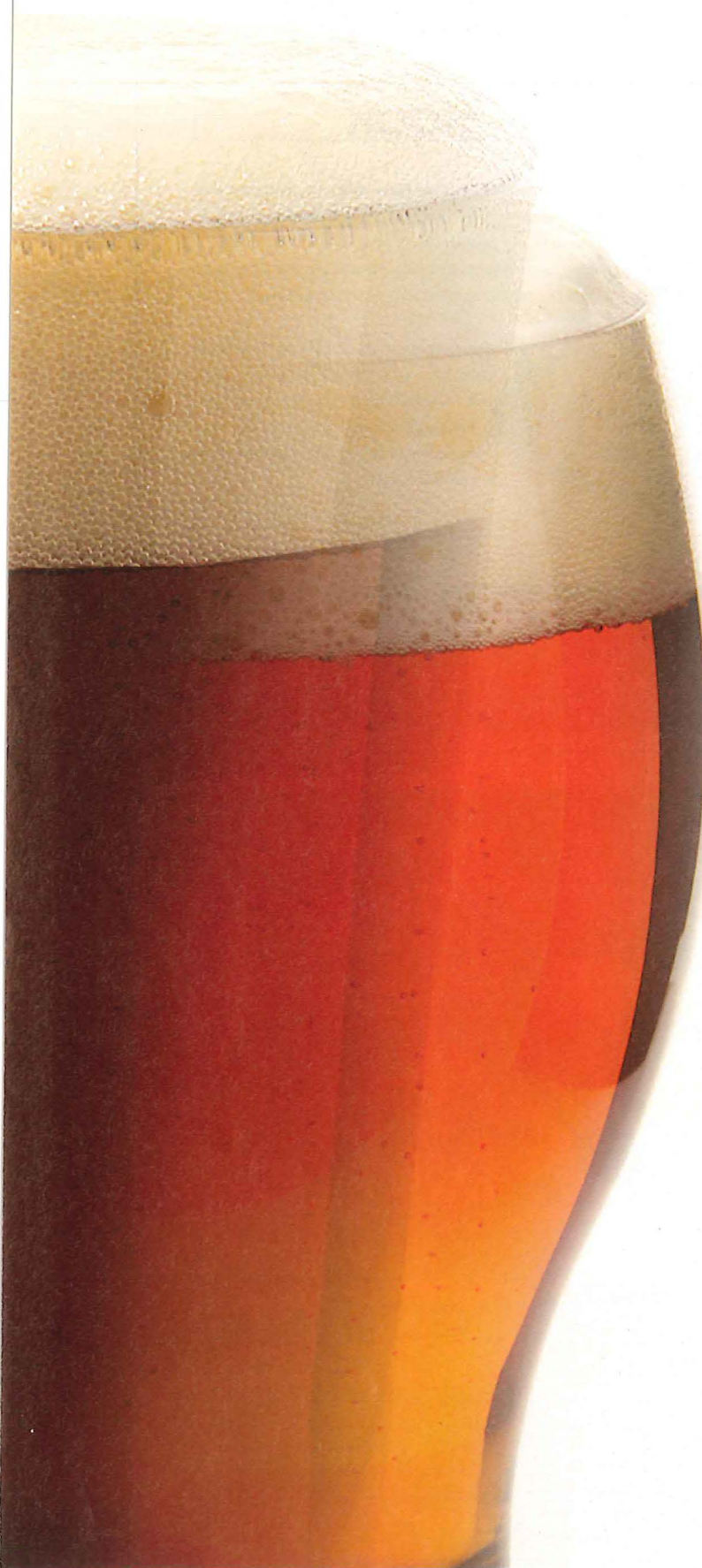
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IF YOU frequently enter your beer in homebrew competitions, you are probably well aware of what's known as "brewing to style." That is, you try to brew your beer so that it falls within the parameters of some style from the Beer Judge Certification Program (BJCP) Style Guidelines. A beer that is a good match for the style guidelines tends to do better in competitions than one that isn't, even if they are both well brewed. However, brewing to style only gets you so far. What do you do for the Specialty Beer category, where the only limitation is your creativity?

Some beers that fall into the Specialty Beer category (BJCP category 23), are fairly straightforward. Some are historical, traditional or minor styles that don't yet have a style description. Some are variations of existing styles, such as creating higher-gravity or "imperial" versions. Others involve unusual techniques, such as steinbier or eisbier, or unusual ingredients (non-barley or wheat fer-

mentables, or adjuncts). Still others are clones of specific commercial beers that aren't examples of any style. Finally, there are the truly oddball beers that might include virtually any ingredient. We aren't going to discuss these cases. We're going to focus on combinations of existing styles, or what I call fusion beers. ("Hybrid beers" would be another good designation for these brews, but the BJCP guidelines already uses that term to refer to something else.)

For purposes of this article, let's define a fusion beer as a beer that is a combination of two or more existing BJCP style categories, or a variation of a single BJCP style category by using ingredients, processes or techniques from other styles. The resulting beer is something that could likely be entered in a homebrew competition as a Category 23 Specialty

beer fusion

FORMULATING **NEW BEERS** BY MIXING STYLES

Beer, or perhaps a Category 16E Belgian Specialty Ale or a Category 21B Christmas Ale (depending on some of the ingredients). We're going to focus more on concept rather than execution, as we discuss how to come up with interesting ideas and how to formulate recipes more than how to actually brew them.

Existentialism

Now would be a good time to ask yourself, "why am I doing this?" Are you coming up with a recipe to brew for yourself or do you intend to enter the beer in a competition? If it's just for yourself and your friends, then you just need to worry about making something drinkable that you will enjoy. However, if it's for a competition, then you also have to worry about pleasing the judges. That can be quite a bit harder. If you're just brewing for yourself, you can skip ahead to the next section.

The first hurdle to overcome for judges is accurately describing your beer. You really need to be able to describe it in a single line, and it needs to be a meaningful concept. For example, "brown IPA" or "cross between brown ale and IPA" would be

understood by judges to be an IPA with a darker color and some chocolate and caramel flavor. The judges would quickly grasp your intent, and then be able to judge the beer without having to think about it too much. Think about descriptions of recipes on menus in restaurants. The best ones will have simple descriptions. The more difficult ones will go into long details about the ingredients, the preparation, and the chef's ego . . . and yup, it will come off the same way with beer judges.

If you supply an overly long explanation of your beer, you'll likely irritate the judges by making them think you're pompous or that you are trying to hide something. You're giving them a description of your beer, not the recipe; remember that.

If you spend too much time explaining your beer, you're also giving the judges more reasons to deduct points. If you mention ingredients, judges will expect to find them. If you give them a general concept, then they will automatically give you more leeway. My best advice is to be specific enough so that they understand you, but general enough so that they give you the benefit of the doubt. I won a gold medal at the last National Homebrew

Conference (NHC) with a specialty beer described as “colonial stock ale with molasses and spruce tips (citrusy taste), 2 years old, 8% ABV.” It didn’t talk about how I handled the spruce tips, or that it had several other unusual ingredients. I mentioned the ones you could taste, and gave some general guidelines to set their mind properly before they tasted it.

I always try to think about the “style space” when formulating a recipe. The style space is the style parameter range a beer occupies — including its alcohol content (ABV), bitterness (IBUs), color (SRM), etc. — and its relationship to other styles. Consider the difference between an American pale ale and an American IPA. They are similar, but occupy different positions within the style space since the IPA has higher ABV and IBUs. Actually, the raw IBUs may be less interesting to us than the overall balance of bittering units to gravity units (BU:GU), what I call the Daniels Ratio after Ray Daniels, who first coined it in his book, “Designing Great Beers” (1996, Brewers Publications).

American pale ale and IPAs are closer in BU:GU than in IBUs, which gives them a more similar balance.

When creating a new recipe, try to avoid hitting the style space occupied by another beer style. Don’t say something is a “darker American pale ale” because that could be an American amber ale or an American brown ale. Come up with something different. Avoid near misses of existing styles as well. Otherwise judges may think you tried to brew a classic style but didn’t get it quite right and then tried to pass it off as a different style. Try to visualize your final product and look for places within the style space with no clear fit. Describe your beer to a judge friend and ask them if they think it matches anything; if not, then you’re clear.

Getting Ideas

It’s a lot easier to clone an existing beer or brew a beer within a well-established style than it is to come up with a new idea. Fortunately, you don’t have to be completely original — you can “borrow” ideas

from other sources if you aren’t getting a flash of inspiration. One thing you can try is to sample commercial examples that don’t fit established styles and see if you get any ideas. You don’t have to try to replicate a commercial beer; you can try one and then decide to take it in another direction. For example, I brew a brown IPA, but it’s not intended as a clone of Dogfish Head’s Indian Brown Ale. All you need is inspiration from one of the commercial examples; you can decide on your own recipe later.

If you’re a BJCP judge, then you can ask to judge specialty beers (or fruit/spice beers) at competitions that get a lot of entries. (And if you’re not a judge yet, c’mon, it’s just a test — take the damn thing already.) If you ask for one of these categories, the organizers will love you since few people request those assignments. In addition, you may get some great ideas. The NHC Second Round is a wonderful place to judge these styles, as all the really bad ideas have been weeded out in the first round.

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You could also think about food and wine concepts. Think of food pairings you like, or food and wine matches that work well. See if you can take the dominant flavorings from some of these examples and apply them to beer. Tasting is tasting, and if a flavor combination works in one realm, it stands a good chance of working in another. For example, if you like spicy and malty flavors together, see if you can work that into a recipe.

If you do have an idea about mixing two commercial styles, here's an easy way to see if you like it. Get two commercial (or homebrewed) beers of the styles you'll be fusing, and blend them. Taste the blend and see if you like the results. You may have to vary the amounts you blend of each beer to get an idea of how well it works. But if you want to know what an IPA with Vienna malt tastes like, try blending an IPA and an Oktoberfest. The blend won't be an exact match with what your recipe will be — in this example, both the bitterness and Vienna malt character will be reduced — but it will allow you to

quickly test if the basic concept is sound. Keep in mind that some pairings that are known to work well. Hoppy, pale beers work well, as do malty beers with low bitterness. Watch out for known clashes. I have a dislike for burnt, deeply roasted grains with citrusy hops. Beers that are spiced or are sour rarely have high levels of bitterness or hoppiness. That's for a reason. Sour and bitter clash; sweetness balances both. It's as true in food as it is in beer. When you use harsh grains and harsh hops, you get an extra-harsh beer. Garrett Oliver's "The Brewmaster's Table" (2003, HarperCollins) is a good reference for understanding the flavor components in beer as well as the interaction between food and beer.

Commercial Examples

Here are a few commercial examples of beers fitting the theme of this article. Try these and see how to fit them into the style guidelines. They don't. Then try to describe them to a judge using multiple styles. It's much easier.

Dogfish Head Indian Brown Ale is a 7.2% ABV, 50 IBU cross between Scotch ale, IPA and American brown ale made with brown sugar.

Surly Bender is a 5.1% ABV, 45 IBU oatmeal brown ale made with Belgian malts and malts from the UK.

Chouffe Houblon Dobbelen IPA Tripel is just that; a 9% Belgian tripel hopped like an American IPA, using Tomahawk, Saaz and Amarillo hops.

On my last trip to Belgium, I visited a very small artisanal brewery, Millervertus. They were very creative in creating beers that blended styles. I tasted a bitter witbier with plum, a beer that tasted like a strong Düsseldorf altbier, a bready tripel (sort of like a cross between a tripel and a Belgian pale ale) and a smoked beer. He used the Orval yeast, so his German-like beers all had a Belgian character. Very interesting indeed.

As you can see, American craft brewers and Belgian artisanal brewers don't care much about hitting styles. They're just trying to be creative and come up with

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**It helps to
understand
what makes
a recipe
fit a certain
style.**

some interesting, tasty beers for their customers to enjoy. That's good advice for any homebrewer.

Recipe Variables

Once you have a concept in mind, it's time to start formulating a recipe. There are two basic models you can follow: you can either make a variation of an existing base

batch against which to judge your experimental fusion beer.

Examine the attributes of the variation style (that which you are fusing with the base style). It helps to understand what makes a recipe fit a certain style. Compare recipes of similar styles to help identify the key differences. For instance, what makes a porter different from a brown ale? Jamil Zainasheff and John Palmer's "Brewing Classic Styles" (2007, Brewers Publications) is a great resource for this exercise. In many cases, it's just a difference in specialty grains. Look at the base grains, the specialty grains, the yeast type, the hop varieties, the bitterness level and the overall strength of the beer.

Identify what you want to vary. Pick the attributes that make the style unique and then think about how you want to fuse them with the base style. In my example of a brown IPA, I took the specialty grains that can make a brown porter (various crystal malts and chocolate malt) and fused them with my base IPA recipe.

Many brewers in the UK are creating new pale ales by using American hops. They leave everything else the same, but just change the hop varieties. It's still not an American pale ale since the grain and yeast are British, but it has a different character. You can create interesting beers by following a similar pattern of changing the country of origin of some of the ingredients. For example, try making an

maple syrup). Don't make too many changes at once; remember you still need an easy-to-describe concept.

When merging two styles, look for the common elements between them. It's helpful to use two recipes representing the styles, and then analyze the similarities and differences. Do they use the same base malt or the same yeast? Are they the same gravity or bitterness level? Pick out all the things that are the same between them and put that in your fusion recipe. Then start taking a look at the differences. You'll want to borrow enough from each recipe so that your fusion beer reminds the taster of both styles, but not so much that all the flavors become muddled. It might help to consider base malts, specialty grains, adjuncts, bitterness level, strength, late hops, yeast, and fermentation technique separately. Fill each of those attributes with one element from either of your parent styles, and see if the combination is appealing to you. The process will take some trial-and-error, as well as some imagination.

Putting it into Practice

So now you have a basic recipe. Time to brew it, right? Not so fast. You need to take a moment and think about what you're going to brew. Does it make sense? Does it sound good? Remember that just because you can combine two styles, doesn't mean that you should. Some concepts are simply bad ideas that could taste horrible. There is an old episode of the TV show *Friends* in which Rachel is cooking an English Christmas dinner. Two pages of her recipe book stuck together and she wound up making a dish that was half English trifle and half shepherd's pie. One comment was that it "tastes like feet." Don't let your beer wind up that way! Run through a mental "sanity check" before brewing your beer.

A good fusion beer needs to succeed in both concept and execution. We've discussed the conceptual side, but not as much about execution. Here are some common pitfalls in making these type of beers, and how best to avoid them. The keys to a great specialty beer are balance, flavor and drinkability. Whatever you do, your beer needs to be enjoyable to drink. The flavor profile should be clean, and any special ingredients should be well

**"Remember that just because you
can combine two styles, doesn't
mean that you should."**

style by adding elements from another style, or you can attempt to combine attributes of two or more separate styles to create something completely different. We'll talk about the variation option first, since it's easier.

This might be an obvious step, but it bears repeating. Make sure you have a good recipe for your (unmodified) base beer style. Adding more ingredients isn't going to make it better, so please be sure you're happy with your original beer. You can even use the original as a control

Oktoberfest or Dunkelweizen but use a Belgian Trappist yeast, for instance. That would be sort of like merging the German beers with a dubbel.

In addition to the country of origin (US, UK, German, Belgium) of the ingredients, you can also vary the strength of the beer and the use of adjuncts. If you fuse styles of different strengths, you can decide how strong to make the result. You can add distinctive grains (e.g., rye, spelt, buckwheat, oats) or fermentables (e.g., honey, molasses, brown sugar, sorghum,

balanced. When in doubt, err on the side of restraint. Many good concepts are ruined because brewers over-emphasize the special nature of the ingredients at the expense of overall drinkability.

One way to improve drinkability is to understand common clashes in flavor, as well as how flavors balance and complement each other. While there are many examples I could cite, the ones that I think matter the most for fusion beers are:

Phenolics and harshness Avoid using harsh hops or grains with phenolic yeast, or in using multiple sources of phenolics or harshness in a beer. Highly sulfate water can make hops harsh, and water with a high pH can extract harshness from grains. Certain hop varieties can be harsh, as can using lots of hops in long boils. Combine any of this harshness with a Trappist or weizen yeast, and the result will be amplified.

Dark malts and citrusy/piney hops Sometimes found in stronger stouts, I'm not a fan of this flavor combination. The acidity clashes and the citrus flavors make

the dark malts seem like stale, bad coffee.

Yeast, spice or fruit and bitterness or late hop character Ever notice how most beers with a lot of yeast character tend to have low bitterness? Think weizens, witbiers, and lambics. Same with fruit and spice. If you add too much bitterness or too many late hops, the hops can step on the yeast, spice or fruit. Worse, you might still get both, but they could clash. Unless you have found a combination you know works, it's best to avoid trying to overhop these types of beers.

Fruit and spice I think merging fruit and spice beers is a classic fusion. However, keep in mind the combinations need to work just like they do in food. For example, plums might work with cinnamon, but not with rosemary.

Sour and bitter Sour beers aren't usually bitter. Those two flavors are not naturally appealing to the palate, so combining them makes for a difficult flavor combination. Acidity and sourness can come from unlikely sources, so be sure to account for the use of any fruit, large amount of dark

grains and citrusy hops.

If you try to avoid these known clashes and start experimenting with ideas that are known to work, such as blending fruits and spices, making darker variations of normally pale beers, making Belgian versions of American, English or German beers, using German base malts in American beers, brewing ales as lagers and vice versa, making pale beers hoppy and bitter, while making dark beers malty and with lower bitterness, then you will have a better chance of success.

Remember to apply your recipe tweaks sparingly, and to keep good notes. Don't change too many variables at once, and keep experimenting. Finally, if you brew a combination you don't like, let it age for awhile. Some flavors take awhile to meld, and many beers improve with time. I look forward to judging some of your creations in competitions. ☺

Gordon Strong is President of the Beer Judge Certification Program (BJCP). Read his guest "Style Profile" column in BYO Jan-Feb 2009.

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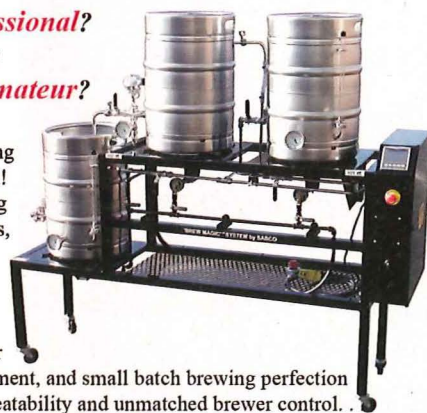
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FUSION BEER RECIPES

I've included two recipes to give you an idea of how to put these concepts into practice. The first one is a brown IPA, which is my normal IPA recipe with the addition of some darker malts and using brown sugar instead of honey. It uses late hopping for bitterness and adds the darker malts during the sparge, both of which should cut down on the clash of malt/hops that can happen in hoppy darker beers. The second one is a black witbier, which is my normal witbier recipe with darker malts and a slight tweak in spicing. Darker malts were used, but again only during the sparge. I changed the usual coriander and orange peel to star anise and tangerine, since I thought those spices would match better with a darker grain bill. I was actually thinking about a Chinese red braised beef dish for the flavorings, and wondered how they would fit. Check it out and let me know, or drop me a line with whatever original combinations you came up with on your own.

Cherokee Nation (American Indian Brown Ale)

(5 gallons/19 L, all-grain)

OG = 1.070 FG = 1.014

IBU = 66 SRM = 37 ABV = 7.4%

Ingredients

9 lb. 10 oz. (4.4 kg) Maris Otter malt
7.0 oz. (0.20 kg) Munich malt
7.0 oz. (0.20 kg) wheat malt
14 oz. (0.40 kg) CaraVienne malt
14 oz. (0.40 kg) crystal malt (40 °L)
7.0 oz. (0.20 kg) chocolate malt
3.5 oz. (0.10 kg) Special B malt
14 oz. (0.40 kg) Turbinado sugar

10.5 AAU Centennial hops (FWH)
(1.0 oz./28 g of 10.5% alpha acids)
32 AAU Tomahawk hops (20 mins)
(2.0 oz./57 g of 16% alpha acids)
2 oz. (57 g) Cascade hops (0 mins)
2 oz. (57 g) Centennial hops (dry hop)
Wyeast 1272 (American Ale II) yeast

Step by Step

Mash base grains at 152 °F (67 °C). Add crystal malts and dark grains during recirculation and sparging. Run off 8 gallons (30 L). Add sugar to the boil. Use a 90-minute boil, hopping according to schedule. (Note: FWH means first wort hops, hops added to kettle prior to boiling, while you are collecting wort.) You'll probably lose some volume to the hops soaking them up. Ferment at 68 °F (20 °C).

Cherokee Nation (American Indian Brown Ale)

(5 gallons/19 L,

extract with grains)

OG = 1.070 FG = 1.014

IBU = 66 SRM = 33 ABV = 7.4%

Ingredients

5.75 lbs. (2.6 kg) light dried
malt extract
14 oz. (0.40 kg) CaraVienne malt
14 oz. (0.40 kg) crystal malt (40 °L)
7.0 oz. (0.20 kg) chocolate malt
3.5 oz. (0.10 kg) Special B malt
14 oz. (0.40 kg) Turbinado sugar
10.5 AAU Centennial hops (20 mins)
(1.0 oz./28 g of 10.5% alpha acids)
32 AAU Tomahawk hops (20 mins)
(2.0 oz./57 g of 16% alpha acids)
2 oz. (57 g) Cascade hops (0 mins)
2 oz. (57 g) Centennial hops (dry hop)
Wyeast 1272 (American Ale II) yeast

Step by Step

Steep grains in 3 qts. (~3 L) of water at 152 °F (67 °C) for 30 minutes. While grains are steeping, begin heating 5.0 gallons (19 L) of water in your brewpot to a boil. (Note: you need to perform a full-wort boil to get the proper hop utilization in this hoppy beer.) Combine "grain tea" and boiling water, then stir in dried malt extract (DME). (Shut heat off and stir DME in carefully to avoid excessive foaming.) Top kettle up to 6.5 gallons (25 L) and boil for 90 minutes, adding hops at times indicated. Add sugar to

the boil. You'll probably lose some volume to the hops soaking them up. Ferment at 68 °F (20 °C).

The Other Michael Jackson (Black Witbier)
(5 gallons/19 L, all-grain)
OG = 1.052 FG = 1.012
IBU = 15 SRM = 24 ABV = 5.3%

Ingredients

5.5 lbs. (2.5 kg) Belgian Pilsner malt
4.0 lbs. (1.8 kg) flaked wheat
0.5 lbs. (0.23 kg) flaked oats
0.25 lbs. (0.11 kg) Carafo® Special II
0.25 lbs. (0.11 kg) Pale Chocolate malt
0.25 lbs. (0.11 kg) CaraVienne malt
3 AAU Hallertauer hops (90 mins)
(0.75 oz./21 g at 4% alpha acids)
0.25 tsp. dried chamomile flowers
zest of 2 tangerines
1 whole star anise, crushed
Wyeast 3944 (Belgian White Beer) yeast

Step by Step

Step mash Pils malt, wheat and oats starting with a 122 °F (50 °C) rest for 10 minutes followed by 148 °F (64 °C) for

60 minutes. Add dark grains during recirculation and sparge. Collect 6.5 gallons (25 L). Use a 90 minute boil. Add spices at knockout and steep for 5 minutes. Ferment at 68 °F (20 °C).

The Other Michael Jackson (Black Witbier)
(5 gallons/19 L, extract with grains)
OG = 1.052 FG = 1.012
IBU = 15 SRM = 25 ABV = 5.3%

Ingredients

1.5 lb. (0.68 kg) Pilsner dried malt extract
2.0 lbs. (0.91 kg) wheat liquid malt extract
0.25 lbs. (0.11 kg) Carafo® Special II
0.25 lbs. (0.11 kg) Pale Chocolate malt
0.25 lbs. (0.11 kg) CaraVienne malt
3 AAU Hallertauer hops (90 mins)
(0.75 oz./21 g at 4% alpha acids)
0.25 tsp. dried chamomile flowers
zest of 2 tangerines
1 whole star anise, crushed
Wyeast 3944 (Belgian White Beer) yeast

Step by Step

Steep specialty grains at 148 °F (64 °C) for 30 minutes. While grains steep, begin heating 2.5 gallons (9.5 L) of water to a boil in your brewpot. Combine water in brewpot, "grain tea" from steep and dried malt extract and bring to a boil. Boil for 90 minutes, adding hops at beginning of boil. Don't let wort volume drop below 2.5 gallons (9.5 L) during the boil. (Add water, if so.) Stir in liquid malt extract during the final 10 minutes. Add spices when boil is finished and let them steep for 5 minutes prior to cooling wort. Cool wort, transfer to fermenter and top up to 5 gallons (19 L). See all-grain recipe for remaining instructions.

Ingredient notes: Get chamomile flowers at a spice store, health food shop, tea shop or craft store. Google "buy dried chamomile flowers" to find online sources. Chamomile tea is usually pure chamomile flowers (check the ingredient list). Use only the orange zest of the tangerines. Do not use the white pith. Using broken pieces of star anise is cheaper; use the equivalent of one whole star.

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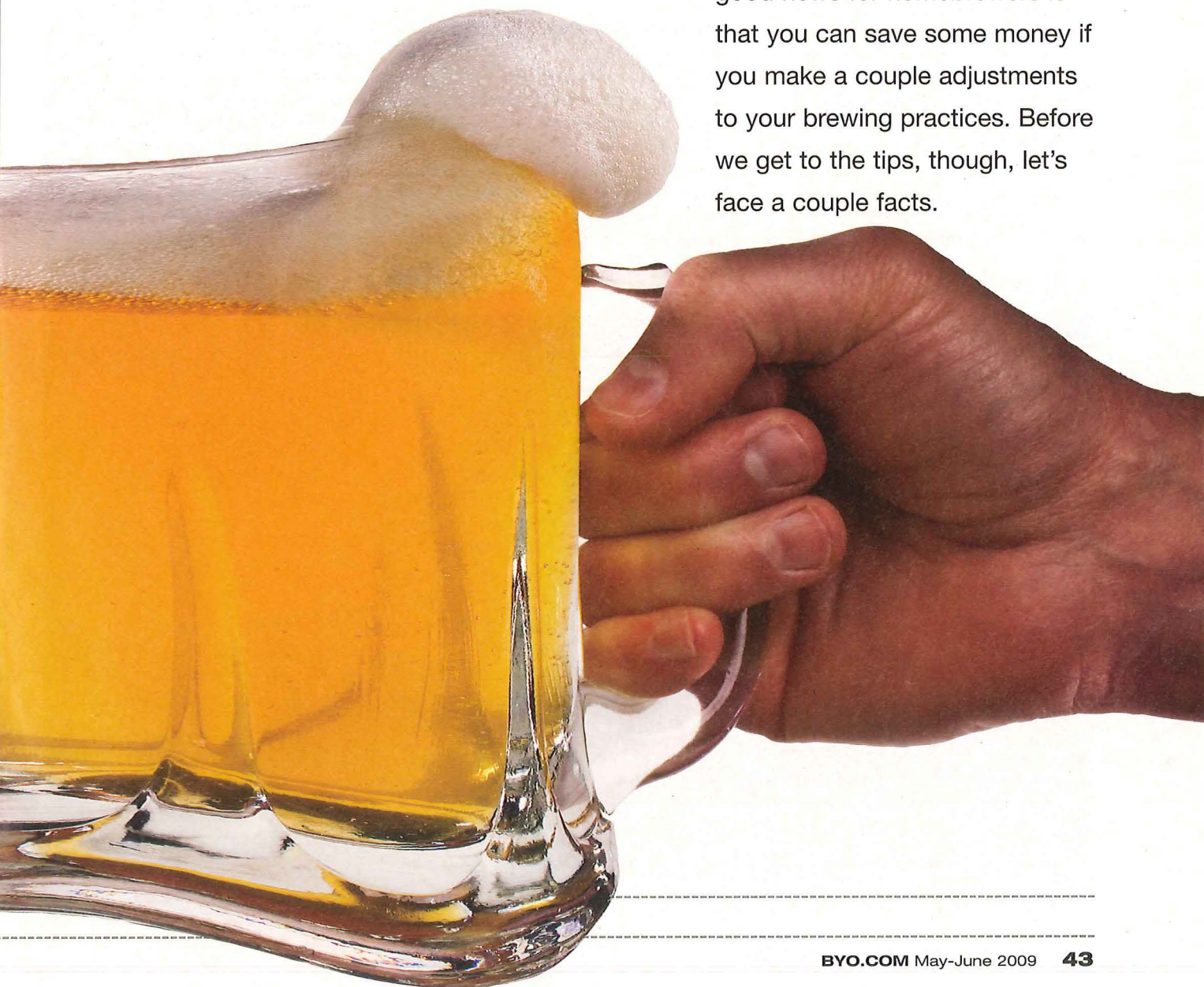
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BOY, THE NEWS SURE IS CHEERFUL THESE DAYS, HUH?

Stocks are down.

Unemployment is up. As a consequence, everybody — even those who still have a job and didn't invest everything they had with Bernie Madoff — is looking for ways to live more frugally. The good news for homebrewers is that you can save some money if you make a couple adjustments to your brewing practices. Before we get to the tips, though, let's face a couple facts.

Fact 1: Homebrewing is Economical

As hobbies go, homebrewing is inexpensive. You can make it costly, but the basics can be done very economically. Once you have the needed equipment, the cost of ingredients and expendibles for a moderate gravity 5.0-gallon (19-L) batch of beer is generally only 30 to 40 dollars. Compare this expense to buying a new bass boat or fixing up that old muscle car.

Fact 2: Brewing Serves Two Purposes

For the homebrewer, brewing serves two purposes. Brewing, of course, supplies the homebrewer with beer and this is less costly than buying commercial beer. And, let's face it, no matter how bad the economy gets, you're not going to quit drinking beer. Secondly, brewing is entertainment. With the wide variety of great craft beers available today, nobody has to brew to have access to great beer. We brew because we love brewing.

Viewed as both supplying a commodity and entertainment, homebrewing is very inexpensive. Compare a day of brewing with going to see a major league sporting event, or even a minor league sporting event . . . or, for that matter, even dinner and a movie.

However, even though brewing is already affordable, there are ways to

stretch your brewing dollar even further. In addition to my ideas, I also gathered money-saving tips from homebrew retailers. See their comments at the bottom of the pages in this article.

Money Saving Tip 1: Brew More

Generally, saving money involves buying fewer things. So how can brewing more — which would involve buying more brewing stuff — save you money? First, brewing results in beer that costs less than store-bought beer. Second, brewing fills entertainment time, during which you might be doing something far more costly. So, if you're looking to save money this year, consider how a few extra batches of homebrew would save you on your overall beer expenses. And also, be honest, if you weren't brewing on those Saturdays, what would you be doing in place of brewing and how much would *that* cost?

Money Saving Tip 2: Buy in Bulk

If you have a fairly good idea of what you are going to brew in the coming months, buying your ingredients in bulk can save you some money. If, for example, you know you're going to be brewing several English-style ales soon, buying a whole sack of pale ale malt can save you 10 or more bucks versus buying it by the pound

for each batch. Likewise, if you use a particular variety of hop frequently, buying it by the pound is cheaper than by the ounce. (Given the current hop situation, some shops don't currently sell hops by the pound. This will likely change next year.) Other expendibles, such as bottle caps, are also generally cheaper when bought in quantity.

Of course, buying in bulk only saves you money if you end up using all the ingredients. And, keep in mind that brewing ingredients have a shelf life. Buying in bulk works best when you plan your brewing for several months in advance.

Money Saving Tip 3: Brew Appropriately-Sized Batches

Most homebrew recipes are for 5.0 gallons (19 L) of beer. However, brewing smaller or larger-sized batches may make more economic sense, in different situations.

Sometimes, you might find a recipe you are interested in brewing, but you might not want 5 gallons (19 L) of the beer. It may be a beer style you're not familiar with. It may require a ton of malt or hops, use some unusual and costly ingredient, or simply be something you like in small amounts. In those cases, save some money and brew a smaller batch.

On the other hand, for brews you enjoy and make frequently, scaling up

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JOIN THE CLUB

One of the best ways for homebrewers who brew all-grain to be cost-effective with this hobby would be to either join a local homebrewing club or get together with other homebrewers in the area and order grain and hops in bulk from their local homebrewing supply shop. Homebrewers can easily shave off 40% or more in savings if they order in bulk and then break it down into individual orders once the shipment arrives. Brewing all-grain beer is also more cost-effective than brewing extract, too.

*Ben Knoerdel
Ben's Homebrew
Tarentum, Pennsylvania*

REPITCH YEAST AND UNDERSTAND HOPS

I'd have to point out the obvious. Repitch your yeast. Maybe start a yeast bank with the club. Ask members, "What's brewing? When are you racking?" Understanding hop utilization is another opportunity to save money. Know where and why you should be using hops . . . at \$3-4 per oz, this will save plenty!

*Jason Smith
Adventures in Homebrewing
Taylor, Michigan*

KEG IT!

Kegging your homebrew is a wise investment. Purchase used corny kegs and reduce your bottle needs and cleaning costs.

*Elizabeth Erschens
HomebrewUSA
Norfolk, Virginia*

BREW BIG

Brew larger batches, the incremental cost is less for heat. Get together with other brewers and split batches!

*Erik Schmid
The Brewmeister
Folsom, California*

may make more sense. The cost of malt and hops will increase proportionally with batch size. However, the cost of yeast, propane, cleaning solutions and other things — such as the cost of running the refrigerator to cool your kegs — stays the same or about the same. If there's a style of beer you really enjoy, brewing larger batches is a smart move.

Money Saving Tip 4: **Substitute Malt** **for Malt Extract**

Brewing with malt extract is very convenient, but extract is also expensive compared to malt. One way to retain most of the convenience of extract brewing, but save a little money on fermentables, is to make partial mash beers. There are many ways to do partial mashes. One method we have featured a few times in the past few years is my countertop partial mash protocol. With that, the brewer mashes 4.0 lbs. (1.8 kg) of grains to supply some of the wort. The rest is made from malt extract. You can think of this small mash as replacing approximately the amount of liquid malt extract found in a 3.3 lb. (1.5 kg) can. Swapping 4.0 lbs. (1.8 kg) of grain for 3.3 lbs. (1.5 kg) of liquid malt extract will save you at least a couple bucks.

To perform a countertop partial mash, all you need in terms of new equipment is a 2-gallon (7.6-L) beverage cooler, which

sells for around \$20 at most sporting goods or camping supply stores.

Switching to all-grain brewing will also save you money, although you will need a mash tun, a kettle large enough to boil the full volume of your wort and a wort chiller. For most average-strength beers, switching to all-grain can save you around 10 dollars per batch.

Money Saving Tip 5: **Hops**

Hop prices shot up two years ago and haven't fallen all the way back down yet. You can save money on hops if you're willing to do some substitution in certain recipes. If you have a recipe that is bit-tered by adding a large amount of low-alpha hops, substitute high-alpha hops for low-alpha hops.

Recently, a new method of late hopping beers has arisen in the homebrewing community — adding hops via a French press extract. The idea is simple: Put some hops in a French press coffee maker, pour some boiling wort on them and let them steep briefly. Then, pour this hop extract — that contains loads of hop flavor and aroma — into your beer when you rack to secondary. Using this method, you can get the same amount of late hop character in your beer using $\frac{1}{3}$ to $\frac{1}{2}$ as many hops. With the French press method, you also lower the amount of wort lost to the

absorption of the hops in your kettle, so your yield goes up slightly, especially when brewing very hoppy beers. This method, and other ways to maximize your hoppiness, can be found in the September 2008 issue of *Brew Your Own*.

Most brewers have one form of hop — pellet, plug or whole — they prefer. However, being flexible on the type of hop you choose can sometimes save you money. If your shop carries a variety you use in both whole and pellet form, watch the prices and alpha acid ratings each year. Sometimes the whole and pellet hops will come from different sources and one can have a substantially higher alpha rating than the other. If you divide the cost by the alpha acid rating of both, you can directly compare the “bang for your buck” both deliver. Keep in mind, though, that you get approximately 10% less utilization from whole hops.

Money Saving Tip 6: Yeast

Yeast is one of the major ingredient costs, but yeast differs from other beer ingredients in one key respect — you can reuse your yeast. If you plan to brew beer two weekends in a row, you can use the yeast from the first batch to pitch the second batch. Most commercial breweries repitch yeast several times before starting a new culture. A few repitch continually. Your success in repitching is going to rely main-

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KIT BEERS

We have found that we are having an increased number of sales on the Brewer's Best and True Brew ingredient kits that include malt, yeast, hops, hop/grain bags, bottle caps, some grain, recipes, etc. I am finding that the increase of sales is due to the simple fact that separate ingredients, especially liquid or dry malt and hops have increased so tremendously over the last year and a half. I understand that some brewers prefer making their own recipe, but the kits can offer more beer for your buck.

*Christy Sewell
Wine & Cake Hobbies, Inc
Norfolk, Virginia*

SESSION BEERS

Making full-bodied, full-flavored homebrews under 4.5% alcohol saves money. All those big beers are expensive. Focusing on good everyday “session” beers is always a good strategy.

Summer, when lots of brewers are too busy to brew beer, is a perfect time to make a wine kit. The carboy can sit all summer full of wine, not empty. By the time a brewer needs the carboy back for beer, she has 5 or 6 gallons of wine at a substantial savings over store bought wine. A busy, productive carboy and an appreciative significant other is a win-win situation.

*Anne Whyte
Vermont Homebrew Supply
Winooski, Vermont*

MAKE BREWDAY FAMILY DAY

Brewing with a friend also saves money on outside entertainment expenses. We are seeing our customers getting together for weekend brews followed by parties with friends and family that showcase their homebrews. Guests bring homebrewed beer, munchies and soda for the kids! Soda is so easy to make with fresh ingredients or extracts. You can make small batches and reuse 2 liter soda bottles. It is a great way to get your children involved in a hobby. Kids love to be involved in activities and can't wait to squeeze the bottles to see if they are ready to be chilled!

*Elizabeth Erschens
HomebrewUSA
Norfolk, Virginia*

ly on your cleaning and sanitation. If you repitch yeast from a batch with a small amount of contamination, the resulting batch will show a lot of contamination. Repitching once halves your yeast cost ...and if you keep the ball rolling, your yeast cost can drop to almost nothing.

If you make the same beer over and over, obviously, repitching is a valid option. However, most homebrewers don't do this. Still, if you brew similar styles of beer, it is feasible. In the recipe section on page 49, I give an example of a beer combination that can be used for repitching. In general, if there is a low-gravity style of beer you enjoy and a higher gravity style that can be brewed with the same strain, they will make a good pair. You can raise the yeast for the higher-gravity beer by brewing a batch of the lower-gravity beer. (Low gravity fermentations put less stress on brewers yeast.) For example, if you like both Scottish 60/ ales and Scottish 80/ ales or wee heavies, you could brew both of these from the same yeast. Other possible combinations include an English bitter followed by an ESB, English-style IPA or barleywine. A Belgian blonde ale could be used to raise yeast for a dubbel or tripel and a helles could be used to raise yeast for an Octoberfest or a bock.

To get the yeast in the best possible health for repitching, be sure to aerate

your wort thoroughly and add a small dose of yeast nutrients. The gravity of a session beer is higher than the gravity of most yeast starters, so be as kind to your yeast as possible.

You can also repitch from any average-strength beer to another beer of similar strength. Commercial brewers do this all the time. Just be sure to aerate your wort well and, again, adding a little bit of yeast nutrient is a good idea.

You *can* repitch from high-gravity fermentations, but the yeast tends to be less viable. Aerating well and ensuring yeast nutrition become more important when using "tired" yeast. In general, though, you'll get better, more consistent results from using yeast that has fermented low-to-moderate gravity beers.

You can also make multiple yeast starters from a single vial or smack pack of yeast. Wyeast and White Labs packages contain around 100 billion cells. This is easily enough to pitch to 2.5 gallons (9.5 L) of low gravity wort. So, if you are an ale brewer who typically makes 5-gallon (19-L) batches of average-strength ales, and have some extra growlers on hand, you can make five 2-quart (~2 L) yeast starters and pitch them from a single pack of liquid yeast. On brewing day, pick the one that was fermenting the best to pitch to your batch. Refrigerate the rest once they finish. (Watch that the liquid in your fer-

mentation lock doesn't get sucked into the starter when you cool it. If you use the common "S"-shaped lock, leave only a small amount of liquid in the lock and it won't get sucked in. Do not store these starters sealed.) If you are a lager brewer, you can make three starters of slightly less than 1.0 gallon (3.8 L).

Money Saving Tip 7: Brew with a Friend

Having a brewing partner can have multiple benefits. For starters, if you combine your yearly brewing plans, you will likely have more opportunities to buy ingredients in bulk.

In addition, the combined elements of your individual breweries may make a better hybrid brewery. For example, let's say your buddy has a nice counterflow chiller and you have a pH meter. Together, you have a better setup than either of you have alone. Having a brewing partner also allows you to gradually purchase equipment towards assembling a "stand-alone" brewery. For example, let's say you're an extract brewer who has decided to go all-grain. You have an extract setup, but your brewing partner is all-grain. You could buy a new brewpot one month, a wort chiller later and the mash/lauter tun still later. This would allow you to switch to full wort boils, then to all-grain — all while brewing and learning the ropes with your all-grain

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BREW BIG, BREW FRIENDLY

Brewing more is definitely the way to go. Brew double or triple batches! Not only do you save time brewing more, but you save money on cleaning supplies, yeast if you do a starter, water, and electricity or gas! For those that want more variety, brew with a friend and split the beer or have your friend brew something different and share your beers! If you brew with a friend, take turns on hosting the brew event. This way no one person has to shoulder the cost of munchies.

*Elizabeth Erschens
HomebrewUSA
Norfolk, Virginia*

TRY NEW HOP VARIETIES

Experiment by using hop varieties that may be priced lower than your "go to" hops, and see if you like the results.

*John "JB" Brack
Austin Homebrew Supply
Austin, Texas*

SAVE YOUR SANITIZER

Some sanitizers can be reused for months. Go beyond the spray bottle. Star San, for one, can be stored in a plastic bucket or glass carboy for months and reused as long as the pH stays below 3.

*Elizabeth Erschens
HomebrewUSA
Norfolk, Virginia*

REUSE YOUR EXTRACT CONTAINERS

If you purchase malt extract from a local homebrew store, ask if you can reuse your containers. We give a discount off kits when customers bring their container back for reuse. If that is not an option, save them and reuse them for storage. They are food grade so work well for leftovers as well as storing dry goods. I have customers tell me they haven't purchased a single food storage container since they started brewing. They also work great for storing small toys and items in the garage.

*Elizabeth Erschens
HomebrewUSA
Norfolk, Virginia*

brewing buddy.

In addition, sometimes just splitting the cost of a batch can be a help. Even if you end up spending the same amount on brewing ingredients over the year, spreading out the expenditures may help.

Money Saving Tip 8: **Grow Your Own**

Money doesn't grow on trees. But, hops grow at the end of long vines (technically called bines). Growing your own hops can be a rewarding activity as well as a cost-saving measure. Hops can be grown almost anywhere in the continental US and each plant can yield several ounces of dried hop cones.

Some beer recipes call for small amounts of raw (unmalted) wheat and you can easily grow this in your garden, too. Likewise, if you frequently brew Belgian-style ales, you can grow your own cilantro plants to supply the coriander. Growing your own barley would certainly save you money, but you'd have to malt it yourself.

Money Saving Tip 9: **Use Energy Wisely**

One hidden cost to brewing is the cost of electricity to run multiple brewing fridges and fermentation chambers (which are usually a fridge or chest freezer with an external thermostat). If you have multiple fridges, see if you can consolidate your

fridge contents and unplug unused fridges. Likewise, continually opening fridge doors costs electricity. If possible, keep all of your most-used items in a single fridge. This way, you can grab multiple items every time you open the door. And, you can keep the door of other fridges closed for long periods of time.

If one of your brewing fridges is very old, it pays to consider buying a new one. This is obviously a large up-front cost. However, your savings in terms of electricity use can justify the cost in a fairly short amount of time.

Money Saving Tip 10: **Make Smart Equipment Purchases**

Every advanced homebrewer has at least one gadget they bought years ago, thinking that it was the solution to one of their problems or at least something that would be really handy. Now that gadget sits unused. To avoid buying equipment that is destined to gather dust, there are a couple things you should do.

If you see a gadget or a piece of equipment in your local homebrew shop that catches your eye, think about whether it will really fit into your existing brewery. It also helps to think about what you want your brewery to consist of in the future. The new 7-gallon (26-L) conical fermenter in the window might look cool, but what if

you only brew 10-gallon (38 L) batches, or plan to start doing so once the brewing rig you're building is finished? Planning an upgrade path also forces you to think about what pieces of equipment would benefit you the most. The conical might be sweet, but you might benefit most from bringing in a chest freezer to use as a fermentation chamber.

For expensive purchases, do some research and find out if other brewers who own the product are satisfied. For example, many new homebrewers wonder if a new kegging system is worth the money, but I've never heard from a "kegger" that regretted that purchase.

Note that some equipment purchases will eventually pay for themselves. As mentioned before, buying the equipment to go all-grain will lead to lower per-batch costs. Likewise, if you buy a grain mill, you can save on crushing charges and take advantage of buying unmilled grain by the sack. (You can buy milled grain by the sack, but you need to use it within a few weeks.) And of course, if you upgrade to a larger brewery, you can save money by brewing larger batches. (Plus, if you sell off your old brewery pieces, you can recoup some of the money immediately.)

Money Saving Tip 11: **Think Green and Lean**

In the October 2008 issue of *Brew Your Own*,

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SAVE ON SHIPPING

Homebrewers that purchase their supplies online may want to consider purchasing two or three batches of beer at once instead of separately in order to save on shipping. For example, if a kit costs \$10 to ship and 3 kits cost \$20, the savings is obvious. Brewers can store the extra kits in the fridge and they will keep for several months until they are ready to be brewed.

*Desiree Knott
High Gravity Homebrewing &
Winemaking Supplies
Tulsa, Oklahoma*

TRY DRIED

We suggest purchasing dry yeast when there is a good equivalent. Our experience with Safale's US-05 has been excellent and we suggest customers give it a try when recipes call for American ale yeast. Brewers generally save between \$2 and \$3 per batch by using dry instead of liquid yeast when appropriate.

*Desiree Knott
High Gravity Homebrewing &
Winemaking Supplies
Tulsa, Oklahoma*

WATER WATER EVERYWHERE

Don't buy your water if you don't have to. You may have a friend that has a great water source and will be willing to give you your water in exchange for a few brews.

*Francie Lengerich
The Brewers Art Supply
Fort Wayne, Indiana*

BUY BIG

Most shops will give price breaks for bulk buys of extract, grain and hops.

*Erik Schmid
The Brewmeister
Folsom, California*

we covered "green" brewing. The principles of reducing, reusing and recycling can not only potentially help the environment, they can help save your green. Two specific things homebrewers can do is to reuse the plastic containers that some shops use to hold liquid malt extract and reuse your sanitizing solutions. Clean the extract bucket and bring it to the store the next time you buy extract. Most shops will charge you less to refill a bucket than to give you a new one.

Sanitizing solutions can be effectively used more than once. If your iodophor solution still has the correct yellow color, and you are planning on sanitizing some more items in a few days, save it in a carboy and reuse it. Likewise, Star San remains effective as long as the pH is around 3.

Going Further

Try keeping a brewing diary. Record every beer you brew, save all your brewing receipts and add up what it is really costing you. However, also add up what it is really saving you. If you didn't brew that last IPA, how much would you have spent on beer at the liquor store, bar or brewpub? On weekend days that you don't brew, what do you do? And how much does that cost? Although most homebrewers probably won't want to go to this extreme, it can be informative.

How Not to Save Money

Using the tips mentioned in the article — or any supplied by the retailers — can help out your bottom line. There are, however, some bad ideas when it comes to saving money.

One of the worst ways to try to save money is to do things that increase the risk of making bad beer. For example, skimping on cleaning or sanitation solutions is not a wise move. Reusing solutions within a reasonable amount of time is a good idea. However, using a sanitizer that you expect is past its prime or mixing it at a lower than recommended concentration is a very bad idea. You may save a few cents on the chemical, but you risk contaminating your beer.

Another way of being "penny wise but pound foolish" is to continue to use tubing, rubber stoppers or similar items made of soft materials when they get too grungy. Don't let a contaminated batch of beer be the only thing that forces you consider replacing these inexpensive items. You can still use old buckets to hold cleaning and sanitizing solutions, or simply as a container for miscellaneous equipment.

Likewise, using ingredients that are past their prime just wastes your time. You can't brew good beer from stale malt, stale malt extract or cheesy hops. And pitching your wort with a package of expired yeast may result in a sluggish fermentation, if

the fermentation starts at all. (You can frequently revive old yeast if you make a very small, very low gravity yeast starter. Use this mini-starter to pitch to a normal-sized yeast starter once you see signs of fermentation.)

Old ingredients, especially old grain, can be dumped on your compost pile or just worked into your garden soil. Some homebrewers use old malt extract to make yeast starters. If you do this, you'll obviously only want to pitch the yeast sediment, not the whole starter. Old hops can be saved and used in lambics.

The absolute worst way to save money as a homebrewer is to brew beer that you don't like. Brewing a barleywine can be expensive. But, brewing an English-style bitter — which requires far less malt — is not a good substitute if what you really like is barleywine.

Likewise, don't let economic concerns diminish the joy of brewing. If you don't feel like repitching the same yeast or making multiple yeast starters from a single package of yeast, don't do it. This is your hobby. You should be having fun with it. The fact that you are brewing at all is saving you some money . . . and that's good news. ☺

Chris Colby is Editor of Brew Your Own. See his blog at www.byo.com — it's free (and worth every penny).

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PLAN YOUR WORK, WORK YOUR PLAN

Plan to brew! Many homebrewers do not plan ahead and don't have that Irish stout ready in March, the Oktoberfest in September and the winter warmer in December so they end up buying multiple six packs. Decide what kinds of beer you want to have ready to drink each month, and then back up your brewing calendar the appropriate number of weeks to get it done. If you plan to brew 6 batches of beer next year, and have it on your calendar, chances are you will make it happen.

*Steve Bader
Bader Beer and Wine Supply
Vancouver, Washington*

SWAP LME FOR DME

I've been encouraging my customers to convert DME to to less expensive LME whenever possible without affecting the recipe. I convert liquid at the rate of 1.2 times that of dry malt.

*Bob Bacolas
Grains Beans & Things
Medford, Oregon*

AIM HIGH (ALPHA)

Use high alpha hops for bittering when possible, as they are often the same price per ounce. Instead of 2 ounces of 8% N. Brewer, try 1 ounce of some Warrior, Columbus or Nugget.

*Erik Schmid
The Brewmeister
Folsom, California*

GOOD PAIRS

To stretch your dollar, plan your brews in order to reuse the yeast cake from the primary fermentation of the previous batch. A couple of good solid choices for multiple styles are the California/American ale yeast (White Labs WLP001/Wyeast 1056/Safale US-05) or English/ESB yeasts (White Labs WLP002/Wyeast 1968/Safale S-04).

*Steve Headstream,
Kevin DeLange,
Jason Wiedman
The Brew Hut
Aurora, Colorado*

Budget Brewing Combo (Two Brews from One Yeast)

Here's a simple twist on repitching yeast from one batch to the next that makes the process quick and easy. It's based on the idea that both Wyeast Activator packs and White Labs tubes contain roughly 100 billion cells — enough to pitch around 2.5 gallons (9.5 L) of moderately-low gravity beer at the optimal rate. The basic idea is, instead of making a yeast starter, then two full batches of beer, make 2.5 gallons (9.5 L) of a session beer as the yeast starter. Then use this yeast to pitch to either 5 or 10 gallons (19 or 38 L) of a higher gravity beer. You skip making a yeast starter, but still have plenty of fresh, healthy yeast for both of your batches. In addition, there are several convenient options to get the smaller first batch packaged quickly.

Walk in the Park Ale (Golden Ale)

(2.5 gallons/9.5 L,
mini-mash)

OG = 1.043 FG = 1.009
IBU = 22 SRM = 6 ABV = 4.4%

Ingredients

3 lb. 13 oz. (1.7 kg) 2-row pale malt
3.0 oz. (85 g) crystal malt (30 °L)
4.0 oz. (0.11 kg) light dried
malt extract
3 AAU Columbus hops (60 mins)
(0.25 oz./7.1 g of
12% alpha acids)
0.25 oz. (7.1 g) Cascade hops
(10 mins)
½ tsp. Irish moss (15 mins)
¼ tsp. yeast nutrients (20 mins)
Wyeast 1056 (American Ale), White
Labs WLP001 (California Ale) or
Fermentis US-05 dried yeast
(no yeast starter required)

Step by Step

Place crushed grains in a large steeping bag. Heat 5.5 qts. (5.2 L) of water to 164 °F (73 °C) and pour into a 2.0-gallon (7.6-L) beverage cooler (which will serve as your mash/lauter vessel). Submerge grain bag, then open bag and stir grains. Put the lid on the cooler and let the grains mash for 45 minutes, starting at around 152 °F (67 °C). Begin heating 1.0 gallon (3.8 L) of water to a boil in your brewpot. Also heat 5 qts. (~5L) of water to 180 °F (82 °C) in a sepa-

rate pot. After mash, draw off several pints of wort, one at a time, and return to top of mash. After this recirculation, draw off roughly a pint of wort and add it to the boiling water in your brew pot. Take a pint of 180 °F (82 °C) water and pour it gently on top of the grain bed. Repeat this until you have 3.0 gallons (11 L) of wort in your brewpot. Add dried malt extract and boil wort for 60 minutes, adding hops, Irish moss and yeast nutrients at times indicated. Cool wort and transfer to a bucket fermenter. (Use a bucket so you can harvest the yeast easily.) Top up to 2.5 gallons (9.5 L), if needed. Aerate and pitch yeast. Ferment at 67 °F (19 °C). Let the fermentation run to completion, then let the beer sit for about 3 days, to let most of the yeast settle out.

On the IPA brew day, rack the golden ale to bottle or kegs. An easy packaging option is to rack the beer into five 2-L soda bottles or 2-qt. growlers, each with 0.5 oz (14 g) of corn sugar added. These bottles, made from PET plastic, are not good for long-term beer storage. However, they are filled with a low-gravity session beer — so you shouldn't be expecting to keep them for long. Other good options include small (2.5 or 3 gallon/9.5 or 11 L) Cornelius kegs, a Party Pig, two Tap-A-Draft bottles or any kind of mini kegging system.

Edison's IPA (American IPA) (5 gallons/19 L, countertop partial mash)

OG = 1.060 FG = 1.012
IBU = 60 SRM = 8 ABV = 6.1%

Ingredients

3 lb. 10 oz. (1.6 kg) pale malt
6.0 oz. (0.17 kg) crystal malt (20 °L)
1.5 lb. (0.68 kg) light dried
malt extract
4.0 lbs. (1.8 kg) light liquid
malt extract
16 AAU Summit hops (60 mins)
(1.0 oz./28 g of 16% alpha acids)
0.75 oz. (21 g) Cascade whole hops
0.5 oz. (14 g) Centennial whole
hops
0.5 oz. (14 g) Amarillo whole hops
2 tbsp. light dried malt extract

(for hop extract)
1 tsp. Irish moss (15 mins)
¼ tsp. yeast nutrients (20 mins)
yeast from previous batch

Step by Step

Mash the crushed grains as described in the golden ale recipe, but have 1.5 gallons (5.7 L) of water in your brewpot, so you have 3.5 gallons (13 L) of wort when the boil starts. Boil for 60 minutes, adding Summit hops at beginning of boil and Irish moss and yeast nutrients late in the boil. Rack golden ale to keg or bottles during boil. Cool wort, transfer to fermenter and top up to 5 gallons (19 L). Aerate wort and pitch yeast from the golden ale yeast cake. To do this, take a sanitized brewing spoon and scoop a little over a cup of yeast from the bottom of the bucket. Try to get as much of the creamy, light-beige colored yeast from the middle layers of sediment. Ferment at 68 °F (20 °C). Add whole hops to bottling bucket or keg using the French press method. Add the hops to a 1-L French press, pour in boiling wort (made from DME). Let sit for 15 minutes, then pour in bottling bucket or keg.

Edison's IPA (American IPA) (10 gallons/38 L, all-grain)

OG = 1.060 FG = 1.012
IBU = 60 SRM = 8 ABV = 6.1%

Ingredients

24 lbs. (11 kg) pale malt
12 oz. (0.34 kg) crystal malt (20 °L)
32 AAU Summit hops (60 mins)
(2.0 oz./28 g of 16% alpha acids)
1.5 oz. (43 g) Cascade whole hops
1.0 oz. (28 g) Centennial whole hops
1.0 oz. (28 g) Amarillo whole hops
4 tbsp. light dried malt extract
(for hop extract)
1 tsp. Irish moss (15 mins)
¼ tsp. yeast nutrients (20 mins)
yeast from previous batch

Step by Step

Mash grains at 152 °F (67 °C) for 60 minutes. Boil wort for 90 minutes. Ferment at 68 °F (20 °C), then add late hops using the French press method (described above).



BUILD YOUR OWN GLYCOL FERMENTER





PROFESSIONAL BREWERS CONTROL THE TEMPERATURES OF EACH OF THEIR INDIVIDUAL FERMENTATION VESSELS. TO ACCOMPLISH THIS, HOMEBREWERS ARE TYPICALLY STUCK USING MULTIPLE CHEST FREEZERS OR REFRIGERATORS TO CONTROL FERMENTATION TEMPERATURES. I WANTED TO HAVE TEMPERATURE CONTROL OVER EACH OF MY FERMENTERS, LIKE THE PROS, STORE THEM WITHIN THE CONFINED SPACE OF MY GARAGE AND STILL USE MY GARAGE FOR ITS INTENDED USE . . . TO PARK CARS. SO WITH A LITTLE RESEARCH, WELDING, DESIGN AND PATIENCE, I BUILT THE ULTIMATE TEMPERATURE CONTROLLED FERMENTER.

THIS PROJECT DOES NOT REQUIRE A LOT OF SPACE TO BUILD OR STORE. I BUILT IT IN MY GARAGE AND STORE IT ALONG ONE SIDE NEXT TO MY BREWING SYSTEM. ALL OF THE MATERIALS CAN BE EASILY OBTAINED AND THE WHOLE THING CAN BE BUILT FOR ABOUT \$2,000. YOU CAN FERMENT A LAGER IN ONE VESSEL AND AN ALE IN THE OTHER; RAISE THE TEMPERATURE FOR A DIACETYL REST AND EVEN CRASH COOL TO NEAR FREEZING BEFORE KEGGING TO HELP CLEAR YOUR BEER. IT WORKS GREAT!

I CALL IT THE ULTIMATE CHILLER AND, IF YOU'LL PARDON THE PUN, IT IS "REALLY COOL." YOU CAN BUILD ONE, TOO. HERE'S HOW:



Planning

I am a makeshift welder, but I did not have any experience welding aluminum. As a brewer, I've always wanted to learn how to weld stainless and aluminum. My solution was to take a TIG (tungsten and inert gas) welding course at the local vocational school. This is where I actually came up with the idea of a jacketing system for my Sabco fermenters. You may choose to do this as well or, armed with a six-pack of your favorite homebrew, you can find an experienced welder that will weld this part of the project for you. With a good understanding of how the chiller is going to work and look, this project will come together in a snap.

Design

Professional brewers use glycol chillers and jacketed fermenters

for temperature control. On the homebrew level, this can get very expensive. The cost of a small glycol chiller alone can run over \$1,500 easily. The solution — build one!

I used a 5,000 BTU window air conditioner and a standard size ice chest for the chiller unit. The air conditioner's evaporator coil is immersed in a glycol bath to cool the glycol. A small fountain pump is used to constantly circulate the glycol solution inside the cooler. Two slightly larger fountain pumps are used to circulate glycol through copper tubing that is wrapped around each fermenter underneath an insulated jacket. These larger pumps are switched on and off by a temperature switch that is monitoring the temperature inside each fermenter.

The Ultimate Chiller provides great temperature control. I set the glycol temperature to 30 °F (-1 °C) during primary fermenta-

material list

Description	Part Number	Vender	Quantity	Unit Cost	Total
Fermenters	PR731	Sabco	2	\$570.00	\$1140.00
Aluminum Strap	8975K17	McMaster-Carr	5	\$8.77	\$43.85
Aluminum Channel	4592T11	McMaster-Carr	2	\$10.80	\$21.60
Aluminum Roll	112540	Lowe's	1	\$10.80	\$10.80
Copper Tubing	3/8" x 60'	Lowe's	2	\$39.00	\$78.00
Copper Wire	12-ga. ground wire	Lowe's	130	\$0.19	\$24.70
Armaflex Insulation	1/2" x 48" x 48"	Allied Insulation	2	\$28.00	\$56.00
Shelving	18" x 48" x 38"	Garage sale	1	\$20.00	\$20.00
Temperature Control	TS-13010	Cole-Palmer	3	\$49.00	\$147.00
AC Unit	68868	Lowe's	1	\$96.00	\$96.00
Fountain Pump	FT-160	fountainmountain.com	2	\$19.95	\$39.90
Fountain Pump	FT-70-0	fountainmountain.com	1	\$14.95	\$14.95
PVC Tubing	60702	usplastic.com	10	\$0.41	\$4.10
Tubing Insulation	21374	Lowe's	4	\$4.87	\$19.48
Gylcol	60703	micromatic.com	2	\$37.50	\$75.00
Cooler	6 1/2 gallon	Garage sale	1	\$10.00	\$10.00
Misc. Shipping					\$40.00
				TOTAL	\$1841.38



tion. This allows adequate cooling so I can set the fermentation vessels at either lager or ale temperatures. After primary fermentation is complete, you can raise the temperature for a diacetyl rest then lower to near freezing to help settle the yeast and clarify the beer before racking.

Cooling Jacket

I used 60' (18 m) of 3/8" copper tubing for the cooling loop on each fermenter. I used a 12-gauge copper wire in between the copper tubing loops as they wrap around. This wire has two functions. First, it will increase the surface area contact between the copper tubing and the stainless vessel. This helps to transfer the temperature of the cold glycol to the fermenting beer. Secondly, the copper wire also provides a way to pull the copper tubing tight and hold it in place on the fermenter.

Each fermenter uses 60' (18 m) of copper tubing and 65' (20 m) of 12-gauge copper wire. Roll out the tubing and the wire in a straight line. With some help from a friend, and a lot of patience, wrap the cop-

per tubing and the wire around the vessel at the same time. Use a tubing bender to bend the end of the tubing so it faces outward from the vessel. I used a ratchet strap hooked on the bent part of the tubing to hold the first wrap in place until I got all of the tubing and wire wrapped around. Slowly work your way around until all of the tubing and wire are wrapped around and in place. I used some stainless steel picture hanging wire to keep the copper tubing pulled together with the copper wire in between and hold it in place. At the top, bend the tubing out again and use another ratchet strap to pull the copper tubing tight. With everything in place you can use the same 12-gauge wire to attach the ends of the tubing and pull them tight. Just wrap the wire around the end at the top, wrap it all the way around one time and attach the other end to the tubing at the bottom and twist the wire tight. The wrapped tubing can be seen in photos 3, 4 and 5.

The top tubing is the glycol inlet and the bottom is the outlet back to the ice chest. Now we can insulate this thing.

Insulated Jacket

The aluminum bands that I built in my welding class are used to house the insulation and provide something rigid to attach the outside aluminum jacket to. Start by rolling the 1" x 3/8" (2.5 X 0.32 cm) aluminum strap around a bucket or empty keg to make a circle that is about 18" (470 cm) in diameter. Cut the first strap about 55" (1.4 m) long; this is a rough length, but when you finish the first strap you can use it for a pattern to build the others.

For the standoffs, cut a 1/2" x 1/2" (1.3 x 1.3 cm) aluminum channel into 1" (2.5 cm) pieces. You will need a total of $(2 \times 9 \times 6 =)$ 108 pieces for the six bands. The standoffs are made by welding two pieces of the 1/2" (1.3 cm) aluminum channel together. It takes nine of these for each of the six bands. Weld each of the standoffs in place, evenly spaced along the inside circumference of the strap. Before welding the last standoff to the end, check the length of the strap by putting it on the vessel and marking the correct length, about 1" (2.5 cm) shorter. All of the other straps can be cut to this same length.

My straps are 54 3/4" (139 cm) long. This allows for a 1" (2.5 cm) space between the two end standoffs. Drill a 3/16" hole in both of the two end standoffs. Use a #10 x 2 1/2" machine screw and nut through the 3/16" holes to draw the bands tight and hold them in place on the vessel, as seen in photos 1 and 2 on page 50.

Before installing the standoff bands, cut the Armaflex insulation to fit around the vessel on top of the copper tubing. The insulation can be held in place and firm using nylon string. With the insulation in place, install each standoff ring securely in place. Just slice a small opening in the insulation at each place the standoffs need to contact the vessel. Also, and this is important, cut small pieces of insulation to stuff in the openings formed by the aluminum channel on each standoff. The outside of the fermenter will sweat any place that is not properly insulated!

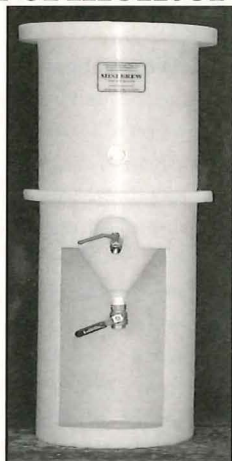
Now attach the aluminum sheet metal to the outside of the bands using 1/8" x 3/16" pop rivets. Rough cut the sheet metal about

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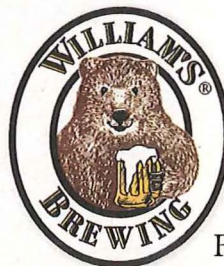
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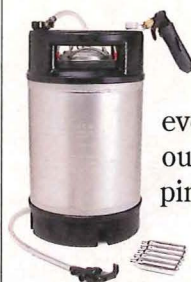


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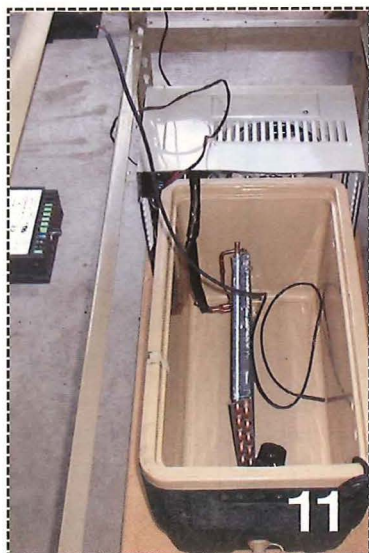
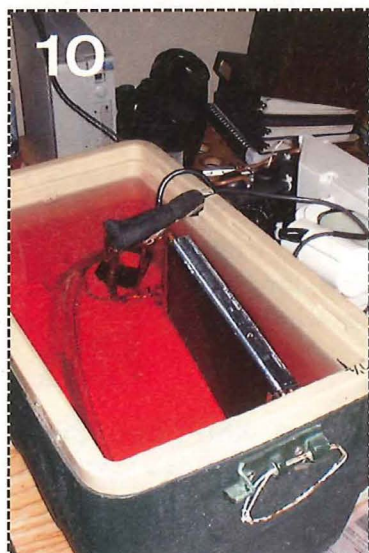
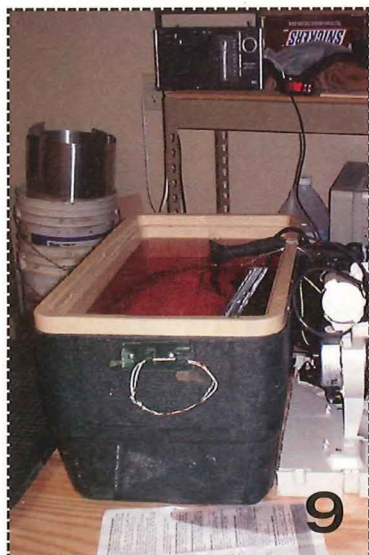
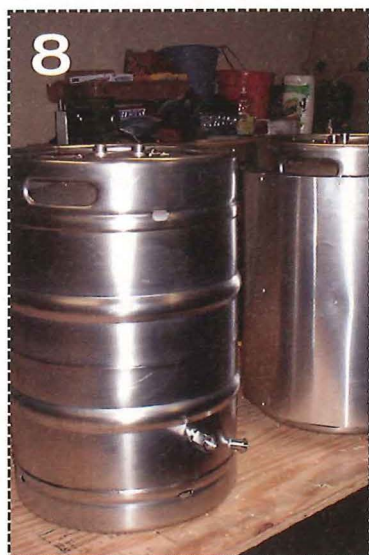
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1" (2.5 cm) longer than the actual outside circumference of the bands. Attach one end at the inlet and outlet of the copper tubing and work your way around. You can make the final cut at the end to fit perfectly using a good pair of scissors or tin snips. I just lined the bottom up evenly as I attached the sheet metal then trimmed the top to fit along the top band after all of the riveting was finished. These made a nice, even-looking finish around the top and bottom, as shown in photos 6, 7 and 8.

I went to the local sheet metal shop and had them build four aluminum rings that snap on the top and bottom standoff rings to protect the insulation. They charged me \$85.00 for the four rings, I think you could do the same thing with some aluminum tape; you just need something to protect the insulation.

And now you have two very nice jacketed fermenters that will last a lifetime. The next step is to build the glycol chiller.

Glycol Chiller

The glycol chiller is made using a 5,000 BTU window air conditioner and a 6.5 gallon (25 L) ice chest. Take the outside housing off the AC unit and remove any screws holding the evaporator coil. The evaporator coil should have enough freon tubing so it can be bent to position the coil inside of the ice chest. Be careful not to kink the tubing as you position the coil. Using a jig-saw, cut a notch at the top of the cooler for the freon lines to go through. The fan that blows air across the evaporator coil is no longer needed. Remove the fan blade and cut the motor shaft off with a hacksaw. Now trim the outside housing with tin snips and reinstall it.

The temperature control thermostat on the AC unit can be removed and the two wires to it twisted together with a wire nut. This will cause the unit to run any time it has power. The glycol temperature will be controlled using one of the Love temperature switches by monitoring the temperature of the glycol bath. I made a thermal well out of a piece of $\frac{3}{8}$ " copper tubing to support the Love switch temperature probe in the side of the cooler. This setup is shown in photos 9, 10 and 11.

I drilled a $\frac{3}{8}$ " hole in the side of the AC unit housing and reinstalled the high/low switch there. The power to the AC unit will be switched on and off with temperature

switch. As the glycol warms up, the AC unit will come on, when the glycol cools to your set temperature, the AC unit will kick off. That is cool! (Be sure to keep pets and children away from the glycol; it tastes sweet, but is toxic.)

Temperature Control

The Love digital temperature switch comes complete with a temperature probe and is pretty much ready to use right out of the box. If you have never used this type of control, you may spend a little time learning the basics, but the instructions provided with the controller have all of the information you need.

I mounted the three temperature controllers across the front panel of my shelving unit. The center control has its temperature probe in a homemade thermal well inside of the ice chest. The other two controllers turn the large fountain pumps on and off, as each of the two fermenters requires cooling. Their temperature probes are mounted inside the thermal well on the Sabco fermenters. I had to drill the factory thermal well out slightly on the Sabco fermenters so the probe would fit inside. Use a $\frac{1}{8}$ " bit and be very careful, stainless steel can be very hard to drill.

Pumps

Three fountain pumps control fluid movement through the system. The smaller pump has a short hose connected to the outlet and simply circulates glycol around the coil inside the ice chest. This smaller pump runs continuously.

The other two pumps are larger. These pumps have their outlet connected to a section of $\frac{3}{8}$ " PVC hose. The other end of the pump outlet hose is connected to the top copper tubing on the fermenter. The bottom copper tubing on the fermenter is connected to another $\frac{3}{8}$ " hose that dumps the glycol back into the ice chest. I drilled $\frac{3}{8}$ " holes in the side of the ice chest, above the liquid level, for the lines to go through. Use plastic wire ties to hold the lines securely in place.

The Love temperature switch provides power for the large pumps. The probe for the temperature control monitors the temperature inside the fermentation vessel. If the vessel needs cooling, the pump comes on and circulates glycol around the vessel until the set temperature is reached then the pump kicks off and waits for its next signal to come on. It's just that simple . . . technology is great! So how do you wire this thing up?

Wiring

The wiring for the fermenters is fairly simple. However, if you are not used to working with electricity, you should get a professional electrician to help you. I used the Ground Fault Interrupter (GFI) plug that came with the air conditioning unit to power everything. The GFI has a 20 amp circuit breaker built in. I used the Test and Reset buttons to switch everything off and on manually when I am not using the system. There are no other manual switches.

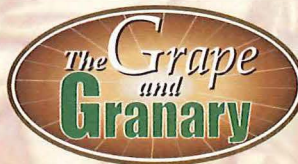
Each of the larger fountain pumps is controlled off and on by their own Love temperature switch. The temperature switch's



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internal relay is connected to the hot wire controlling the pump. The probe for this switch is inserted into the thermal well on the fermenter. As the fermenter requires cooling, the temperature probe will signal the switch to turn on the pump. When the fermenter temperature reaches the set point on the Love switch, the pump turns off.

The air conditioning unit is connected to its own Love temperature switch. The probe for this switch is in a thermal well inside the ice chest. As the glycol heats up, from being circulated around the fermenters, the switch tells the AC unit to come on. When the glycol in the ice chest reaches the set point on the Love switch, the AC unit turns off.

Test Run

When everything is connected and in place, it is time for a test run. I strongly recommend using water in the cooler for testing. Glycol is very expensive and if things don't work just right on the first run, all you need to do is drain the water rather than recover every precious drop of glycol.

With water in the ice chest, you won't want to set the temperature to go below about 35 °F (2 °C) or everything will freeze solid. With glycol, I run my chiller at 30 °F (-1 °C) during primary fermentation, then I lower it to 20 °F (-7 °C) to crash cool before racking. This provides sufficient cooling and keeps the AC unit from running so often.

After everything tests out, replace the water with a glycol mix-

ture. I use a 40/60 mixture of pure propylene glycol and water. This mixture will provide a freeze protection to about -10°F (-23 °C). You will need this much protection because the actual temperature of the fluid directly in contact with the cooling coil in the ice chest is most likely well below freezing temperatures. If you don't run enough glycol in solution, you risk the mixture becoming thick and slushy at lower temperatures.

Summary

Temperature control over fermentations is one technique professional breweries use to make a consistent brew time and again. I have fermented about 25 batches on this system and have experienced no problems.

The Ultimate Chiller can be used for cold storage also. After primary fermentation, just transfer the beer from one fermenter to the other using a little CO2 pressure. Set the temperature to about 35 °F (2 °C) and cellar away. If you don't brew very often, you can serve beer out of the kegs as well. Just pull the yeast and sediment off the bottom, carbonate the beer and then serve bright beer right out of the tank, just like a pub.

I hope this gives you enough information to build your own version of The Ultimate Chiller. Many of the ideas I used came from the web (www.flickr.com/photos/billjohnn) and I thank Wild Bill for posting photos of his work for us all to enjoy.

This is Marty Cornelius's first article for Brew Your Own.

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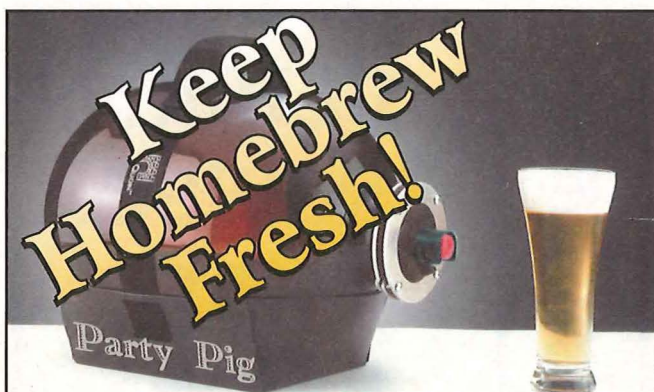
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High Gravity Beers *Techniques*

How to ferment the big boys

by Jon Stika

fermenting a batch of high-gravity beer can be a challenge for homebrewers because it can also be a challenge for yeast. Yeast in a high-gravity brew not only has a lot of work to do, but the work is not easy. To successfully brew a high gravity beer, brewers must set the stage for the yeast to have the best chance of getting the job done. This installment of "Techniques" examines what it takes to brew big beers that begin between 15 and 20 °Plato (specific gravity of 1.061–1.083). We'll also look at some special considerations for brewing beers of more than 20 °Plato (specific gravity > 1.083), big beers with high percentages of adjuncts and what to do if fermentation slows down or stops before a big beer is finished.

Big beer basics

To increase your chance of success when fermenting a big beer it is important to choose the right yeast for the job, pitch an ample amount of yeast, provide the yeast with adequate aeration and nutrition, control fermentation temperatures and don't

let the yeast quit until the job is done!

Not just any yeast is suitable to ferment a high gravity beer. It is important to select a strain of yeast that not only produces the desired flavor profile and degree of attenuation, but can also tolerate the level of alcohol expected in the finished beer. Information on specific yeast strains is available on the Web at (www.byo.com/resources/yeast), at White Labs at (www.whitelabs.com) and Wyeast at (www.wyeastlab.com).

Once you choose the strain (or combination of strains) of yeast to ferment your high gravity wort, it is critical to send in a large enough workforce of cells to tackle the task at hand. According to the suggested pitching rates shown in; "Pitching Rates for Fresh Yeast" Table 2 "Pitching Rates from a Fresh Starter" at <http://www.byo.com/resources/pitching>, an example wort with an original specific gravity of 1.080 calls for 440 billion yeast cells. A large pack or vial of yeast may contain around 100 billion cells. Thus to pitch an adequate amount of yeast would require three times that amount at a minimum. In this case, building a big starter culture is the best way to go.

Preparing yeast starters is not a difficult task. In the "Techniques" column of the July/August 2007 issue of BYO, I covered this topic in "Make a Yeast Starter."

However a big beer needs a big starter . . . of about a gallon (3.7 L) in size rather than the typical a one-quart (0.9 L) measure of yeast used for most brews. Wyeast and White Labs liquid cultures typically contain approximately 100 billion cells, which is adequate to pitch into a full gallon (3.7 L) of at least 10 °Plato (specific gravity 1.040) starter. Be sure the wort used for your starter is well aerated. A good way to assure good aeration is to continuously aerate the starter (using filtered air supplied by an aquarium pump) as the yeast grow. A typical starter culture usually ferments in a day or two. After fermentation is nearly complete, turn off the aeration (and magnetic stirrer if you're using one) and the yeast should settle to

the bottom of the vessel. This way, most of the liquid can be decanted off and the remaining yeast slurry pitched into the high gravity main batch of wort.

The next critical element to a successful high gravity fermentation is supplying oxygen and nutrients in the wort that the yeast cells need for growth early in life while making sterols and unsaturated fatty acids crucial for building cell walls. Wort aeration can be accomplished by bubbling either air or pure oxygen through the wort cooled to fermentation temperature. For wort of 15 °Plato (specific gravity of 1.061) fifteen minutes of air or two minutes of oxygen should be sufficient. The nutrients contained in all-malt wort along with the nutrients included in a smack pack of liquid yeast should be sufficient for beers up to 20 °Plato (specific gravity of 1.083).

Once fermentation has begun, temperature control is the next important consideration. If your batch of brew gets too warm, you may end up with more estery (fruit) or phenolic (clove) flavors than desired . . . too cool and your fermentation may slow or even stop. Typical temperatures recommended by Wyeast for their high-gravity yeasts are 65–80 °F (18–27 °C) and those from White Labs are in the 65–75 °F (18–24 °C) range. In the March-April 2009 issue of BYO, I covered ways to control fermentation temperature in the "Techniques" column titled, "Taking Control: How to maintain fermentation temperatures." So, make note of the fermentation temperature range recommended for your chosen yeast and take measures to assure your big brew stays in that range.

With all the work yeast is required to perform in a high-gravity beer, sometimes the yeast may fall dormant before the job is done despite our best efforts as brewers. Should this occur, you can use the time-honored trick of, "taking the yeast for a walk" where barrels of fermenting beer were rolled about the brewery to rouse the yeast back into suspension and wake them up for a final phase of activity to finish the job. While many of us do not fer-



Fermenting high gravity beers, including many Belgian styles, can be challenging.

Techniques

ment our beer in barrels that can be rolled around, a sanitized spoon or racking cane can be used to stir up the beer and get the yeast back in suspension and in contact with any unfermented sugars that might remain in the beer.

Tactics for really big beers

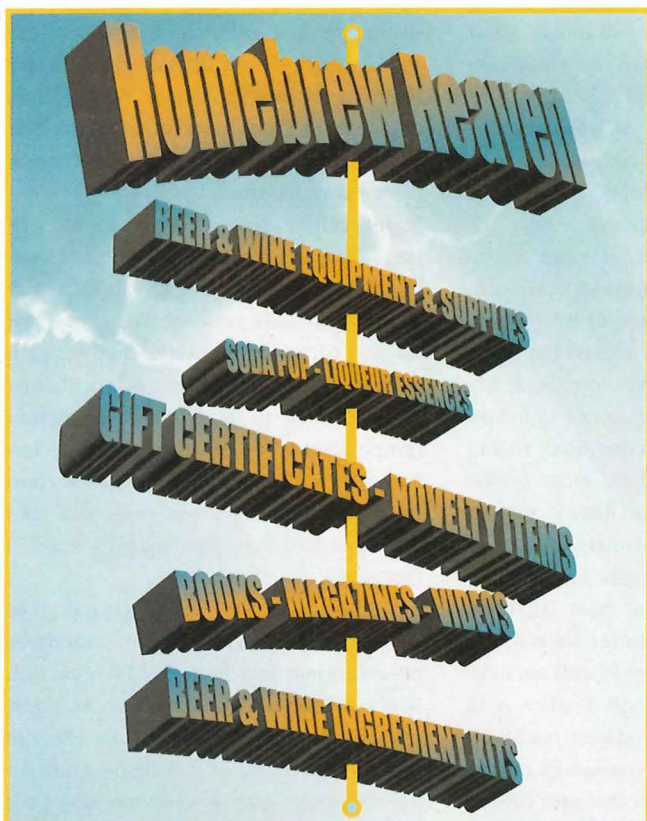
For a really big beer or barley wine with a starting gravity of 20 °Plato (specific gravity > 1.083) or more, consider pitching multiple strains of yeast together at the start to assure complete fermentation and achieve a more complex flavor profile. While it is essential to have a strain of yeast in the mix that can tolerate higher levels of alcohol, a less alcohol-tolerant strain can contribute its own flavors up until the alcohol content of the beer exceeds its limit. At that point, one or more alcohol-tolerant strains can carry on until the desired level of attenuation and alcohol production is achieved. Do not be tempted to use a wine or champagne yeast to finish out fermentation, such

**"If your batch
of brew gets too
warm, you may
end up with
more estery
(fruit) or phenolic
(clove) flavors
than desired . . ."**

yeast could finish too dry, leaving your beer without the desired flavors available from beer yeast. If you need a strain to serve as a "closer," consider one of the Trappist high gravity, Belgian strong ale or Abbey ale strains that can tolerate 12–15% alcohol by volume while not straying from

the desired flavor profile.

As the concentration of the wort increases, so should oxygenation. For wort of 20 °Plato (specific gravity 1.083) or more, aerate up to an hour with air, or ten minutes with oxygen to be sure oxygen is not lacking for the yeast to grow. While additional aeration after the start of fermentation is often discouraged in brewing as it may result in off flavors, it may be useful to supply additional oxygen to your wort up to the point of high kräusen (peak of fermentation activity). This can be accomplished by simply inserting a sanitized aeration apparatus into the fermenting wort and briefly bubbling in oxygen or filtered air. By briefly, I mean less than two minutes using oxygen or less than ten minutes with air. This can give the yeast a boost without running the risk of developing off-flavors associated with late aeration (cardboard or sherry-like flavors). Additional aeration during fermentation should typically not be necessary if a sufficient quantity of yeast was pitched at the start of fermentation.



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Tactics for big beers with adjuncts

In addition to the information mentioned earlier for really big beers, there are some additional considerations when brewing a big beer that includes a significant amount of starchy adjuncts in the mash or additional sugars added to the boil. Though oxygen is essential to yeast reproduction, proper nutrition is also important to yeast health. Yeast requires a certain amount of nitrogen in the form of amino acids and fatty acids to multiply and grow. While yeast get most of these compounds from the barley malt used to make wort, other sugar added to take the place of barley malt often do not include nitrogen and other essential yeast nutrients. Therefore, the addition of yeast-specific nutrients becomes necessary to assure that nutrition will not be lacking.

There are four types of yeast nutrient typically sold for use in home brewing; Diammonium Phosphate, yeast hulls, yeast nutrient and Servomyces. Yeast nutrient and Servomyces include vitamins, miner-

als and other compounds that provide the most complete yeast nutrition of the products listed. To borrow an approach used by vintners, some of the yeast nutrients may be added during fermentation to help the yeast along. A portion (half) of the yeast nutrients might be added to the

boil and the remainder added after the commencement of fermentation. Yeast nutrients should not be added once the beer has achieved about two-thirds of the total expected attenuation. Use the amount of yeast nutrient recommended by the supplier (this is usually shown on

An aeration system like this one is helpful for fermenting high gravity beers.



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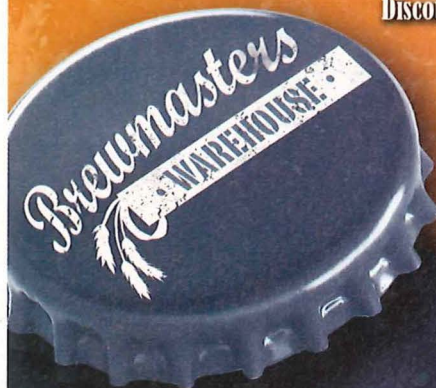
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the package). Another potential yeast nutrient is yeast itself. I sometimes have dry yeast that has past its expiration date. Instead of throwing it out, I will add the old yeast to the boil as a yeast nutrient because it contains the nutrients living yeast need to grow and ferment wort.

Tactics to help get big beers to the finish line

There are times when high gravity fermentation may slow down or stop before reaching the desired terminal gravity. In such circumstances the brewer may have to provide a boost to get things going again. One approach to kick starting a sluggish fermentation is to make a small batch of similar strength wort, aerate it, pitch a "closer" strain of yeast into it and get it to a high state of fermentation (kräusen) before adding it to the main batch. This technique can recharge a slowly fermenting beer and get it back into gear to help it reach the final desired level of attenuation. If you plan to add this type of boost, or supplement other fermenta-

"There is no doubt that fermenting a high-gravity beer requires more work for both the brewer and the yeast."

bles during the primary or secondary stages of fermentation, be sure to allow space in your vessel for the added volume, plus headspace for any foam produced during the renewed activity.

There is no doubt that fermenting a

high-gravity beer requires more work for both the brewer and the yeast. The challenge for the brewer is to create an environment for the yeast to have the best chance of success. Careful planning is necessary to choose the right strain(s) of yeast, and then provide proper aeration, nutrition and temperature for the yeast to reproduce and grow. The brewer must be committed to monitoring and managing fermentation through the possible addition of oxygen, nutrients or fermentables . . . and rousing the yeast if necessary to reach the goal of superb beer. Despite the extra effort it takes to ferment a high-gravity beer, your efforts will be well rewarded with a product that is in a class by itself. 

Web extra:

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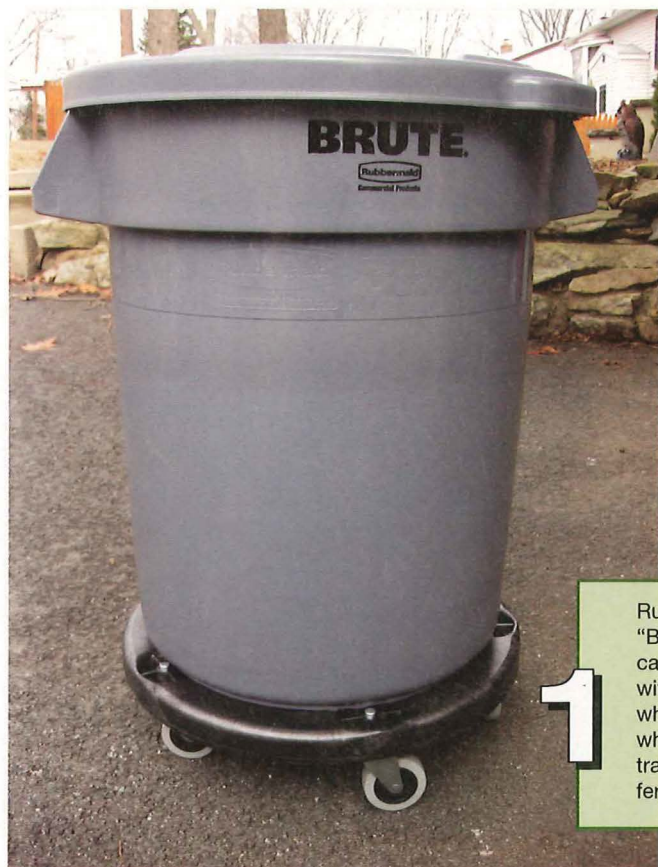
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Big on a Budget

Convert a "Brute" into a fermenter

Projects

Story and photos by Forrest Whitesides



Rubbermaid "Brute" trash cans can be modified with an optional wheeled dolly, which makes transporting a full fermenter easier.

The normal line of thinking is to get a bigger kettle and split the batch over multiple 5- or 6-gallon (19- or 23-L) carboys. If you've priced a large-enough kettle to do 10-gallon (38-L) batches, you no doubt already know that they aren't cheap. So instead of doubling up on the kettle size, we're going to increase the size of the fermenter. With a smaller kettle and a larger fermenter, you may spend an extra hour on a second boil, but you save time sanitizing only one carboy and then later on racking and primary fermentation cleanup of just one carboy. It ends up pretty much breaking even time-wise, and you still end up with double the beer of a 5-gallon (19-L) batch with only a little more time and effort than you would've put in for the smaller batch. And hey, if you already have a huge kettle, then you'll save even more time!

Another big advantage to having a large fermenter is that batch size begins to become less of a consideration. There's no rule saying you have to standardize your brewing on 5 gallons (19 L) or 10 gallons (38-L) or any other round number. If your budget

has room for larger batches, but maybe not as big as 10 gallons (38-L), you could easily do 7 or 7.5 or 9 gallons (26, 28 or 34 L) instead. And with a big enough fermenter, you can even do 12- or 15-gallon (45- or 57-L) batches as well.

To cover all the bases, I suggest using a Rubbermaid Brute container. Yes, technically these are trash cans, and they are not impermeable to gas transfer and therefore not recom-

mended for aging, but they are also rated to NSF/ANSI Standard

With the appalling state of the US economy and its trickle-down pressure on all of us average Joes (plumbers or otherwise), we as homebrewers are in a great position to maximize the frugal aspects of our hobby. But there is always room to tighten down the budget and get a little more homebrew for the dollar. You can reuse yeast multiple times, go in on a group purchase with other local brewers for hops or grain, or even consider lowering the target starting gravity on your recipes. With a little modification work and about \$25, you can have a high-volume fermenter for increased batch sizes, reduced time requirements and even lower costs in some cases.

One of the biggest limiting factors for anyone who brews as a hobby is time and attention needed to do things right. Setup and cleanup on brewday can take a considerable chunk of time, especially for all-grain brewing (which can be cheaper per batch than using extract — after the extra equipment costs have been amortized over a few batches). One of the best ways to brew more beer but keep the time requirements the same is to increase the batch size. Setup and cleanup for a 10-gallon (38-L) batch is only slightly more effort than a 5-gallon (19-L) batch, but you end up with twice the amount of beer.

PARTS LIST

Essential Parts

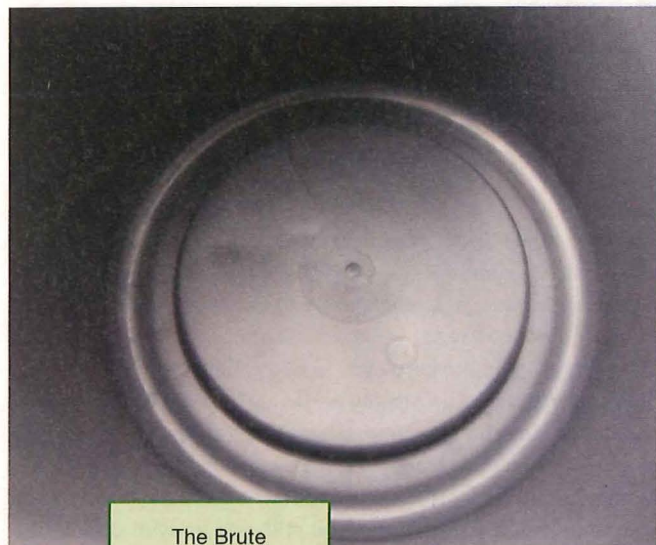
- (1) 10, 20 or 32-gallon (38, 76 or 121-L) Rubbermaid Brute container
- (1) lid to fit the Brute container
- (1) ½-inch rubber grommet
- (1) airlock
- (1) stick-on or floating thermometer
- food grade lubricant
- (4-6) wood clamps

Optional Parts

- (1) Rubbermaid Brute wheeled dolly

Tools

- power drill fitted with a ½-inch drill bit



2

The Brute features a deeply recessed ring at the bottom.

2 for food storage and also are USDA Meat & Poultry Equipment Group Listed (ie: they are food grade and safe for brewing) and are very popular in the food service industry.

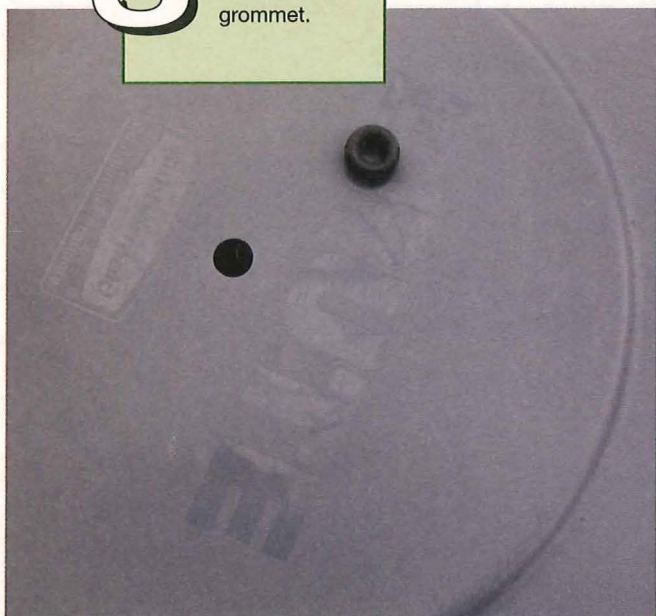
Additionally, they are extremely sturdy, have reinforced handles, and can hold a considerable amount of weight without deforming (that is, they can be moved when full of beer without changing shape or buckling). The lids are also sturdy and lock down securely.

Brutes are priced similarly to other plastic containers, but the build quality is among the best available to consumers. My local big-box hardware store had Brutes available in both 20-gallon (76-L) and 32-gallon (121-L) sizes, for \$20 and \$30, respectively.

Rubbermaid also makes a 10-gallon (38-L) Brute,

3

To convert the lid, drill a 1/2-inch hole and insert a rubber grommet.



which would be a good size for 5- to 8-gallon (19- to 30-L) batches. Additionally, there is a dolly available that locks into the bottom of the container to make it easy to move your new fermenter without any lifting (Figure 1). The dolly costs as much as the container, but I think it's a worthwhile investment as it fits all Brute containers from 10 gallons (38 L) up to 44 gallons (167 L).

One other thing I like about the Brute containers is that they have a deeply recessed ring at the bottom, which makes a fantastic trub and flocculated yeast receptacle. This aids in clean racking, as well as facilitates yeast harvesting (Figure 2). It's almost as though the good folks at Rubbermaid anticipated brewing applications.

Making the Brute brew-ready

So, now our high-grade rubbish-bin-turned-fermenter just needs a few small modifications to make it ready for production. The first step is to add a hole and grommet for an airlock. Drill a 1/2-inch



4

Once the grommet is attached to the lid, insert the airlock and the Brute is ready to ferment.

hole in the center of the lid (Figure 3) and work a rubber grommet into place in the hole. You can get the grommet from an existing brewing bucket lid or purchase one from your local homebrew shop (you can also order online). Most hardware stores also carry the right type of grommet. Attach an airlock and the lid is ready for action (Figure 4).

Like most plastic containers — including the typical brew bucket — your Brute fermenter will never be 100% airtight. This isn't a big deal as far as I'm concerned, as I've had 3- and 4-week primary ferments in buckets with no oxidation whatsoever. But there are steps we can take to make the Brute fermenter a bit more airtight than a stock unit.

The easiest way to improve the seal of the lid is to apply a medium coat of food-grade lubricant (ie: "keg lube") to the rim of the fermenter itself. Couple this with some wood clamps to hold the lid down tighter, and you can get a pretty darn tight seal (Figure 5). A set of belt clamps can also be used to tighten down the lid. A lot of homebrewers will already have at least a few types of clamps in their tool set, but those that do not could use this opportunity to stock up the tool chest. Clamps are handy for a myriad of uses and are a key component in many home-improvement and repair projects, so if you need to buy them for this pro-

ject, they'll pay for themselves in no time.

Another thing you'll likely want to do is apply a stick-on thermometer to the exterior of the fermenter. The type generally used for glass carboys or plastic buckets will work just fine on the Brute fermenter. These types of thermometers are available from almost all homebrew suppliers for just a couple dollars each. You could also use the thermometers designed for aquarium use, but my experience is that only a few models

With a few wood clamps and some food-grade lubricant your fermenter is close to airtight.

5



are available that adequately cover the range used in brewing. But if you shop around, you can find one that will work.

One thing to note is that given the extremely thick and sturdy construction of the Brute, stick-on type exterior thermometers will change readings more slowly than glass or standard brew buckets. However, given the wide opening of the fermenter, it's actually quite trivial to remove the lid and drop in a floating thermometer or a floating hydrometer-thermometer combo. It's also easy to take samples in this same way.

Now that you have it assembled, take your Brute and get to brewing some big-ole batches of tasty, high-quality and economical homebrew! 🍷

Forrest Whitesides is a regular writer for Brew Your Own and frequently writes the "Projects" column. He is an avid homebrewer who brewed his first batch of homebrew in 1995 — an English brown ale. He is a graduate of North Carolina State University and lives in Hopatcong, New Jersey with his wife.



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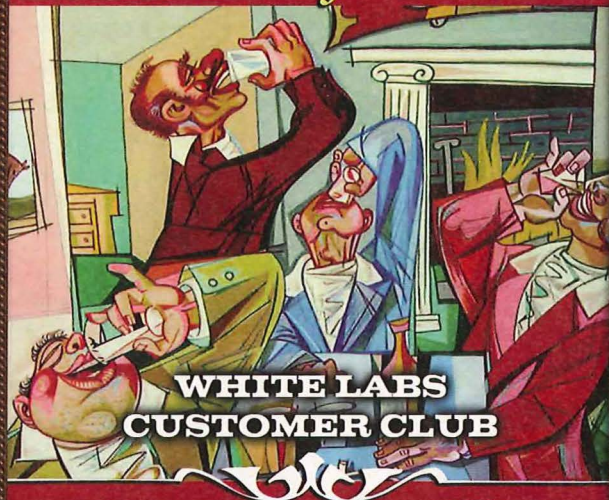
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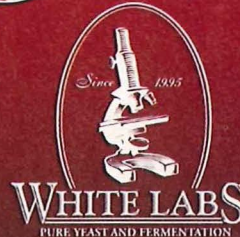
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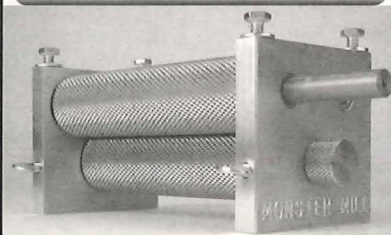
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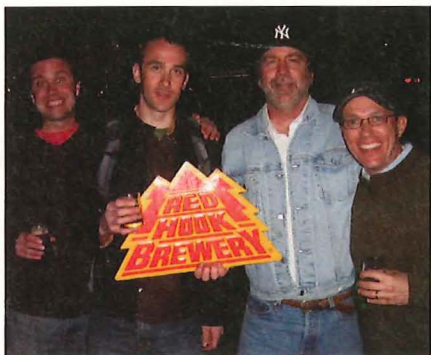
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Block Party

Meet the Grant Street Brewing Club

Chris McClanahan • Bellingham, Washington



The Grant Street Guys Brewing Club all started when I moved from the Midwest to the Great Northwest in 2001 and my brewing equipment went directly into the attic storage of my home. Perhaps it was because there were too many fantastic beers to sample in my new geography that I forgot my old beer equipment even made the trip west.

However, upon moving into our new home on the 2500 block of Grant Street in Bellingham I discovered three other neighbors who also shared a great fondness for quality beer. In December of 2008, I sent out an invitation to join me in the formation of the Grant Street Guys Brewing Club. Everyone quickly accepted and the first brewing session took place in January of 2008. It was time to resurrect the equipment and get the dead insects washed out of the carboys!

Having procured and sampled too many of our favorite northwest regional brews while brewing our first beer together, suffice to say that our initial brewing session was very "spirited." It is not often that taxi cabs are considered to take people home who live only four houses apart . . . at 3 p.m. With phrases such as, "oops, was that supposed to go in there?" and "you have to re-sanitize AFTER going to the bathroom" being bantered around the kitchen, this had brewing disaster written all over it. To this day, as the inaugural brewmaster for the club, headquartered in Bellingham, I am still not sure how the first batch turned out good.

The four basic cornerstones of the Grant Street Guys Brewing Club are to:

1. Meet quarterly to select and brew a different world style of beer.
2. Test our bounds of brew knowledge and be willing to experiment.
3. Discover the joy of creating a quality beer that we can attempt to duplicate repeatedly.
4. Enjoy the "fruits" of our labor and share it with family and friends.

With each batch, a different member is designated the "Grant Street Brewmaster." This individual is in control of the batch from start to finish, selects the beer style, formulates the recipe, gets to name the beer and designs the label. It is up to the other guys (brewing apprentices for that quarter) to find quotes at ChuckNorrisFacts.com and sample new beers from around the world. Tough gig! Here are some of our favorite quotes:

"Chuck Norris can drink our entire 5-gallon (19-L) batch in 37 seconds and not even feel the effects," says Brian B.

"Well, that's because Chuck Norris can drink beer with his mouth closed," shouts out David.

"Yea, Chuck Norris doesn't throw up if he drinks too much, he throws DOWN!," yells Brian C.

The inspiration for batch #1, Bitchy Cat ESB, is a neighborhood inside story. Every neighborhood has the token crazy person — you know, the house that no child wants to visit on Halloween night. We have an individual on our block who is a cat hoarder. At one time, before the city stepped in and stopped her makeshift shelter, she had 76 cats in her tiny house. She is very bitter with everyone she comes in contact, thus Bitchy Cat ESB was born. "Not very special...but TRULY bitter" became the catch phrase for the beer.

Since the excitement of the first batch, we have brewed Cascadia Pale Ale, Scout Stout, Cheval Blanche and recently brewed Coal 525 Porter. Presently, we are still in the intermediate phase of brewing, sticking to partial mash extract brewing. Eventually we may transition to all-grain and we will definitely transition from bottles to kegs. Our other goal is to get tem-



perature control set up so that we can begin brewing some European lagers in the future.

While the names Chris, David, Brian and Brian don't exactly evoke memories of the Fab Four, we are currently producing some of the finest beers ever produced on Grant Street. We now consider ourselves to be the preeminent brewing club on the 2500 block of Grant Street in Bellingham. All right, so we are the ONLY brewing club on Grant Street!

Our advice for anyone wanting to start a club in their neighborhood?

- Get to know your local brewing store owners. They are invaluable. For example, our local store, North Corner Brewing Supply in Bellingham, will even take one of your homebrews home, review it and fill out an analysis sheet. This is a great way to improve your future brews.
- Develop a procedure for brewing that will ensure success every time you brew. A great sanitation process should be part of that procedure.
- Share your beer with family and friends, especially those who think Milwaukee's Best is a premium beer.
- Never ever carry a bottle tree loaded up with sanitized bottles up a flight of stairs on bottling day! It is truly is a disaster waiting to happen as we found out.
- Have fun! Trust me, if our first batch turned out OK, yours will also.

Even after the eventful first brew, I am very happy to this day that I resurrected a hobby out of my attic and I am able to share it with friends on my street. There is nothing better than sitting down with some Copper River salmon coupled with a bottle of Cheval Blanche — our Belgian white beer. If you ever find yourself in Bellingham, Washington stop over to the 2500 block and ask for one of the Grant Street Guys Brewing Club members and enjoy a beer with us. Cheers! ☺



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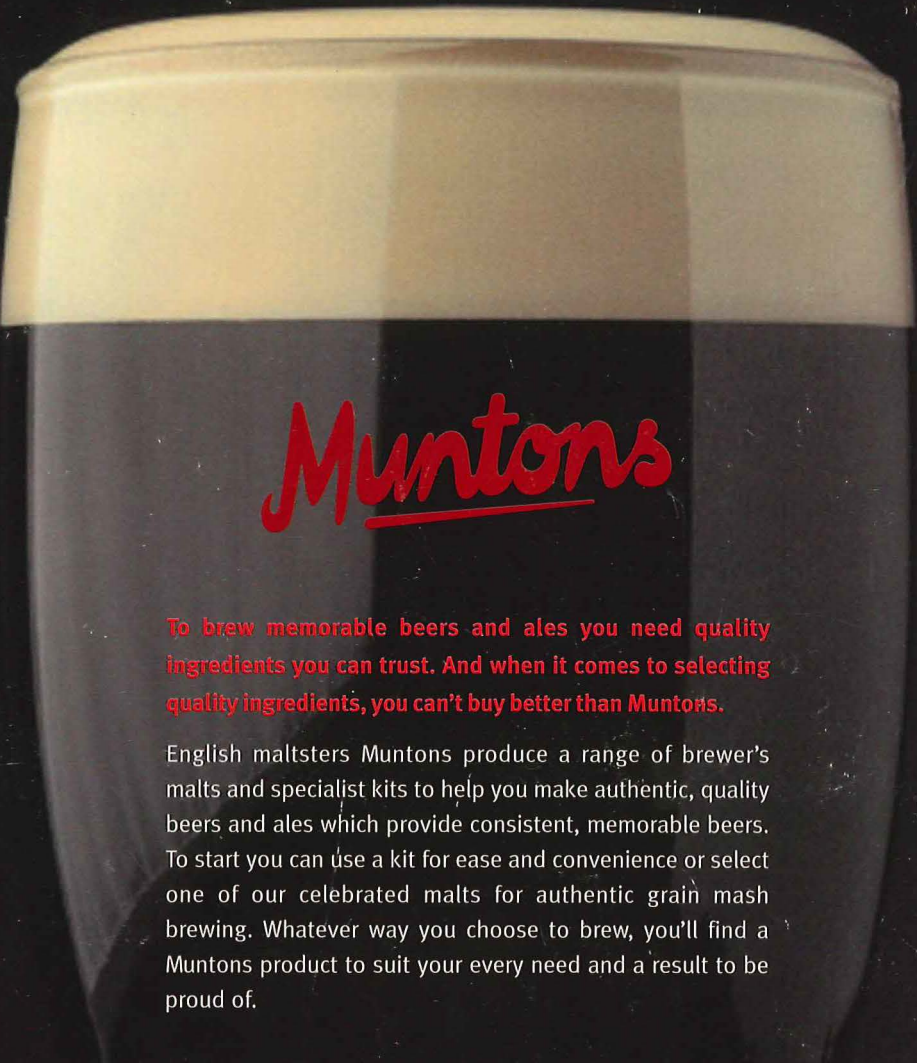
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