# Brew Your Own

September 1998, Vol.4, No.9
Niche Publications Inc.

Special Equipment Issue

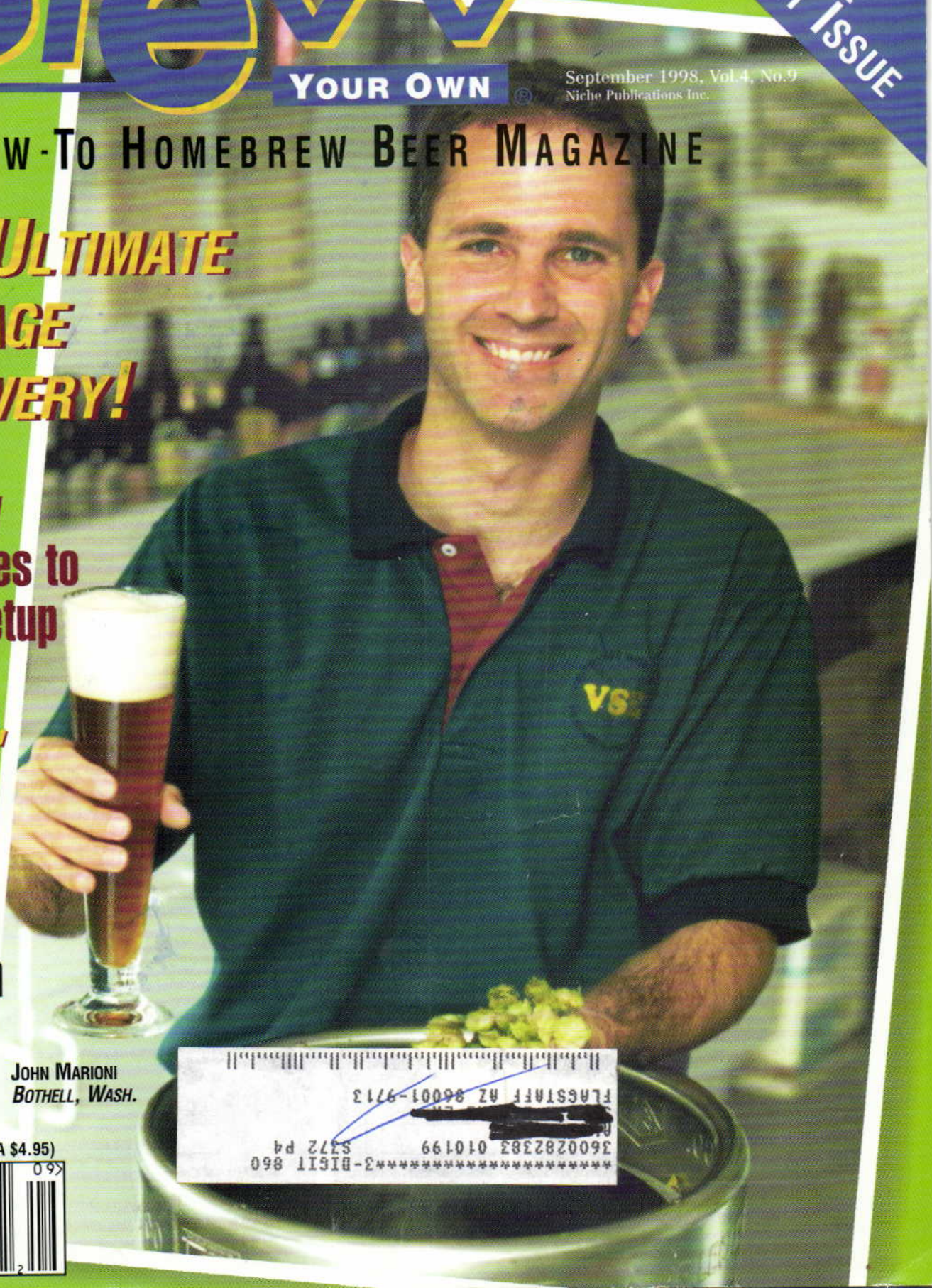
THE HOW-TO HOMEBREW BEER MAGAZINE

## THE ULTIMATE GARAGE BREWERY!

## 12 Easy Upgrades to Your Setup

## Compact, Custom RIMS

## Brew 7-Grain Beer!



JOHN MARIONI
*BOTHELL, WASH.*



U.S. $3.95 (CANADA $4.95)

09
0 74470 87481 2

# AN ALL-GRAIN, FRESH WORT BEER KIT?

# DAMMIT JIM, I'M A BREWER NOT A MAGICIAN!

A bold leap in technology brings you The Brew House beer kit: fresh, all-grain wort without extract or concentrate. Now you can brew all-grain beer in only minutes and make your best recipes even better. Brew House: the next generation of homebrewing.

## RIF Vienna Lager

(Recipe for 5 US gallons*)

1 Brew House Pilsner Kit
1 lb. Munich malt
8 oz. Aromatic malt
8 oz. CaraVienne malt
1 oz. Saaz hops
Wyeast 2124 Bohemian lager yeast

1. Crack your grains and place them in a grain bag.
2. Add grain bag to 2 gallons of cold water in a 3 gallon (or larger) pot. Place over medium heat. Bring temperature to 170°F and hold for 20 minutes.
3. Remove and discard grains and boil for 20 minutes. At the end of the boil, add Saaz hops, remove pot from heat and steep hops for 5 minutes.
4. Cool the liquid and use it to make up the volume of the kit. Top up with water if necessary. Do not forget to add the pH adjustment package.
5. Pitch your yeast culture and ferment at 46-54°F.

Stout
Pilsner
Pale Ale
Wheat Beer
Munich Dark Lager
Extra Special Bitter
American Premium Lager


Your RIF should be ready for bottling in 6 to 8 weeks. With long lagering comes smoothness, rich complexity, and assimilation.

*This recipe is for the 5 US gallon (19 litre) kit. Get in touch and we'll send you the Canadian version. We have other recipes too—just ask.

http://www.thebrewhouse.com info@thebrewhouse.com

**CANADA, WESTERN USA**
Spagnol's Wine and Beer Making Supplies Ltd.
Tel: 1-800-663-0954
Fax: 1-888-557-7557

**EASTERN USA**
Crosby & Baker
1-800-999-2440 (MA)
1-800-666-2440 (GA)

CIRCLE 45 ON READER SERVICE CARD

# Contents



## FEATURES



p. 22

## DEPARTMENTS



## COLUMNS



Cover photo: Karie Hamilton

# Calling All Inventors

I've never been much of a mechanical wizard. Sure, I figured out to empty the drier vent when the clothes started to come out with little burn marks, but that was pure luck.

Like most guys, I love cool machines, gadgets, and nifty inventions. I admire the innovative things that people have done to fine-tune their brewing systems. Often I tell them how much I admire what they've done, hoping they'll volunteer to do the same for me. (Rarely works, though.)

You know how some people can sit down with a wrench, an old keg, a handful of C-clamps, and a welding torch and come out with an exact miniature of the Spaten brewhouse they saw during their trip to Munich last summer? Me, I pull out a screwdriver and my wife is calling to make sure our health insurance is paid up. A hammer and she's got the phone in hand, ready to dial 911. Of course on the other hand, she'll never ask me to put in a new doorbell or repair the drywall.

Anyway, if you're one of those mechanical geniuses just waiting to sketch out your latest brewing invention, I have a couple of suggestions. These are things I could sure use for my brewing setup, and I bet a lot of other people would find them useful, too.

Sani-geiger Counter. You know Geiger counters, those things that click when they come near radiation and click faster the more radiation is present? (And by the way, do those really exist, or are they just a product of science fiction movies?)

What I want is a Geiger counter that measures bacteria and other nasties that could contaminate my beer. I stick my Sani-geiger counter in the empty fermenting bucket. Click. Click. I thrust it down to where the bottom and the side meet. Clickclickclickclickclick. Aha! Blast it with bleach! Inundate it with iodophor! This could be the ultimate beer-saving device.

Bonehead Alarm. This would ring any time I'm about to toss in my aroma hops at the beginning of a 60-minute boil or dump a whole pound of black malt into a recipe that calls for three ounces.

I picture this device as something I attach to my temples when I'm starting to brew. It measures my brainwave pattern and when the waves start to go into a perpetual loop, a bell goes off. Then a soothing, prerecorded voice asks, "Are you sure you want to do that?"

This month's issue features two of those great inventor types, John Marioni of Bothell, Wash., and Colin Markham of Philadelphia. John, an aspiring professional brewer, renovated his garage into a workspace a lot nicer than some full-fledged microbreweries. Colin, who works long hours as a nurse at local hospitals, managed to squeeze in the time to build an incredible recirculating infusion mash system (RIMS).

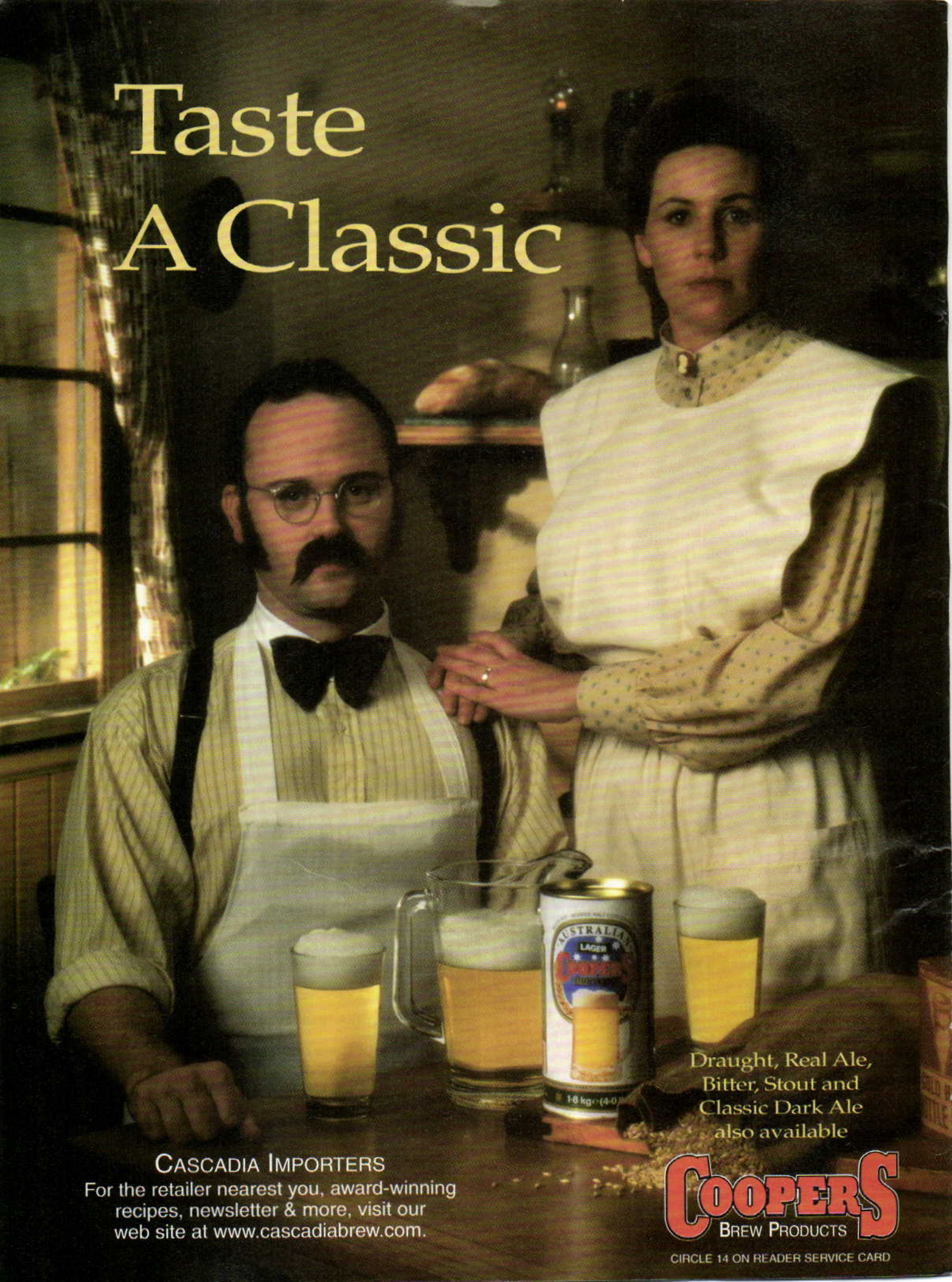
They each share the details of their projects along with some step-by-step plans so you can build key parts for yourself. Check out Garage Vision, page 22, and Killer RIMS, page 32. They may just make you want to get out the C-clamps and the welding torch!

Craig Bystrynski

Brew Your Own
The How-To Homebrew Beer Magazine



***Brew Your Own*** (ISSN 1081-826X) is published monthly for $44.95 per year by Niche Publications, 216 F St., Suite 160, Davis, CA 95616; tel. (530) 758-4596; fax (530) 758-7477. E-mail address: BYO@byo.com. Periodicals postage rate paid at Davis, CA and additional mailing offices. Canada Post International Publications Mail Product Sales Agreement No. 1250469. Canadian Mail Distributor information: Express Messenger International, P.O. Box 25058, London BC, Ontario, Canada N6C6A8. POSTMASTER: Send address changes to ***Brew Your Own***, P.O. Box 1504, Martinez, CA 94553-0504. Customer Service: For subscription orders call 1-800-900-7594. For subscription inquiries or address changes, write ***Brew Your Own***, P.O. Box 1504, Martinez, CA 94553-0504. Tel (510) 372-6002. Fax (510) 372-8582. Foreign and Canadian orders must be payable in U.S. dollars plus postage. The subscription rate to Canada and Mexico is $55; for all other countries the subscription rate is $70.


Taste
A Classic
Draught, Real Ale,
Bitter, Stout and
Classic Dark Ale
also available
CASCADIA IMPORTERS
For the retailer nearest you, award-winning
recipes, newsletter & more, visit our
web site at www.cascadiabrew.com.
COOPERS
BREW PRODUCTS
CIRCLE 14 ON READER SERVICE CARD

# Is This Covered by Your HMO?

**John Zimmerman**
**Brigantine, N.J.**

I have been a chiropractor for 10 years and have been drinking beer even longer. I recently decided it was time to merge my profession with my hobby by making my own chiropractic beer. Dr. Jay's Subluxation Lager was the result. With the help of my local brew store's lager recipe, I brewed a fine-tasting lager with all of the dangerous side effects intact.

For the uninitiated, a subluxation is a condition in the spine in which one or more of the vertebrae are misaligned, placing pressure on the spinal nerves, causing the body not to function properly or be as healthy as it could be. Subluxations are caused by physical (trauma), emotional (stress), or chemical (alcohol, caffeine, drugs) means. Thus the name Subluxation Lager.

An interesting side note is that due to the health benefits and pureness of homebrew, I have not been able to drink enough of my own beer to cause a subluxation. I have had plenty of fun, though.

DR. JAY'S SUBLUXATION LAGER
*"A Subluxation In Every Bottle"*
*Alcohol Content Is Too High To Mention !*

Warning: Imbibing May Lead To Fun And Chemically Induced Subluxations.
Brewed In Brigantine, N.J.

*This chiropractor likes adjusting his beer as much as his patients.*

---

**Sharon Partain and Traci Tutor**
**Pangburn, Ark.**

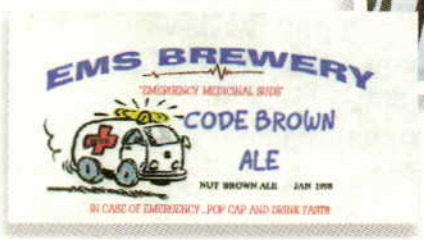
Officially we are Emergency Medical Technicians (EMT) — that's ambulance drivers to you lay people — in the field of Emergency Medical Services (EMS). That's the branch of emergency services that employs big white ice cream trucks with red lights on top.

Unofficially we are Emergency Medicinal Tasters (that's beer guzzlers) for EMS (Emergency Medicinal Suds) Brewery, our two person, five-gallon-a-week beer producing team.

As you can see, we bring our careers into our labels.

**Medical Translation:**
**Tachy Turtle Wheat:** Refers to a fast heart rate. (So "fast" and "turtle" don't go together, but the beer's damn good.)

**Code Brown Ale:** Code Brown is the pile of smelly presents our patients leave on our gurney from time to time.


*These homebrewing EMTs have a quick response time for making beer at EMS Brewery.*

*Photo Opportunity: Kenneth Clucas of Overland Park, Kan., gets help in his homebrewery from his trusty pet cockatoo, Kitt-man. The bird's favorite task is opening the bottles (or at least chewing the caps).*

### Tom Centurion
### Areguá, Paraguay

I live in Areguá, Paraguay, a beautiful place around the romantic "Ypacaraí Lake," 20 miles away from Asunción, the main city and capital of Paraguay. My wife Whitney, an American, and I have been fanatic homebrewers since 1994, brewing great real beer (according to our friend and family fans).

As you see in the picture, sometimes we get some help from our cute pets, Beethoven (left) and Fluffy (right). They love licking drops of beer on the counter or floor. We are subscribers to BYO, and that helps us a lot to improve our brewing.

Currently, I'm a musician and my wife runs her English school in Paraguay. We are planning to move soon to Davis, Calif., to study brewing, then come back to Paraguay and open a microbrewery and/or brewpub.

Our specialty is a great pale ale, "Lady of the Lake." We add some local hops (still a secret), but next time I'll send our exclusive recipe to all readers. A huge hello to all the BYO worldwide family from Areguá, Paraguay.

*Beethoven and Fluffy help create "Lady of the Lake" in Paraguay.*

## How To Reach

BrewYour Own

**Editorial and Advertising Office:**
Brew Your Own
216 F Street, Suite 160
Davis, CA 95616

Tel: (530) 758-4596
Fax: (530) 758-7477
E-Mail: BYO@byo.com

**Advertising Contact:**
Evan Shipman, Ad Manager
ad@byo.com

**Editorial Contact:**
Craig Bystrynski, Editor
edit@byo.com

**Subscriptions Only:**
Brew Your Own
PO Box 1504
Martinez, CA 94553

Tel: 1-800-900-7594
M-F 8:30-5:00 PST
Fax: (510) 372-8582

**Special Subscription Offer:**
12 issues for $29.95

**Web Site:**
www.byo.com


## All Hands Starboard

Dear BYO,

In the July '98 issue (Mail) Steven Guyot makes a great point regarding the content of your magazine. As an avid homebrewer, I was very interested to begin a subscription to your magazine. After several issues I realized that a few of your pages were devoted to the folly of winemaking. My first thought was that, yes, some homebrewers fade to the "port side" occasionally. But then common sense kicked in and I realized that a true homebrewer may stray but must always return to where the wort is pure (pure malt, that is!).

Imagine what would happen to BYO (The How-To Homebrew "Beer" Magazine) if all of your devoted subscribers became wine (ughhh) makers. Your subscriptions would fall and we would all be reading "Whine & More!"

I hope you rethink the winemaking section before I am drawn to the evils that lurk in wine! If you need content, print more letters!

*Tom Rueckl*
*The Bomb Brewery*
*Luxemburg, Wis.*

Dear BYO,

In the July issue there is a person who is whining about your magazine having too much winemaking stuff. Well, I (disagree). There are a lot of us out here who like to make wine also, not just beer.

*Bernie Gonzales*
*Las Vegas, Nev.*

Dear BYO,

In reference to the letter in the July issue I, too, subscribe to a "brew your own" magazine not a "wine your own" one. At this time I do not feel I will renew the subscription when the time comes.

*Allen Dangerfield*
*via e-mail*

Dear BYO,

I recently started brewing and have been frequently buying your magazine (the last six issues). I have considered getting a subscription but am dissatisfied by your wine coverage ("Adding Oak to your Wine," July '98). If I want to read about winemaking, I will seek out a periodical specializing in wine. My needs are to learn about beer making and improve on my brewing style. I enjoy the format you present, but if you want me as a reader, please concentrate on beer.

In reference to the oak article, I am hoping you will concentrate a future article on beer and oak. I have read very little on the subject. I am also in the middle of a test batch of some oak chips and Scottish ale. I need more information on contact time, amount of chips, sanitization of chips, how to roast and the effects of different levels of roasting, and varieties of beer that would be enhanced by oak aging.

*David Russell*
*Ann Arbor Brewer's Guild*
*Plymouth, Mich.*

*Thanks for the suggestion. We're preparing an article on oak that will appear in a future issue of BYO.*

## Changes Brewing

Dear BYO,

I am a subscriber from the beginning. I have passed the word of your magazine along to many of my brewing friends. But now that I have renewed for the fourth year, I am not happy with the "new focus" of the magazine.

I have always felt that although much of the direction of the magazine was toward the extract brewer, you always attempted to get people to try all-grain brewing and reap the benefits. But now the tables have turned and my favorite section of the magazine has vanished. Style of the Month is no more. What happened to it and will it return? Over the years I have brewed many beers from these recipes and look forward to each

month to see what I might be brewing next. What is happening?

I would like to cast my vote for the return of Style of the Month.

*Darren and Laurie Procsal*
*via e-mail*

*The votes have been counted and Style of the Month will return. Look for it in the January issue in a new and improved format.*

### Frozen Grains

Dear BYO,

I'm sometimes overzealous when purchasing my brew supplies and thus always buy more than I really need. I guess I think that I will brew every day, but that doesn't happen. When I purchase grains and seldom use all that I purchase, I freeze them, sometimes for a month or two. What effect will this have on my brew? Will the grains be as fresh as they were when I purchased them? Is there a time when I should discard them?

*Don Spurrier*
*Moorpark, Calif.*

*Unless you live in a very humid climate, storing unmilled malt dry in an air-tight container at room temperature should be fine. Freezing may create moisture, altering brewing calculations and flavors. There is also the possibility of it staling faster when frozen. In addition grain will not mill as well when wet.*

*If you are buying premilled grain, we recommend buying only the necessary quantity.*

### It Just Didn't Seem Right

I have already brewed two of your clone recipes from the July issue ("Extract Clones"), the Anchor Steam, and the Celis White. The problem arose with the wit beer.

After steeping the oats as directed, I added one quart of water to compensate for the absorbed water (I was going on instinct). I then added the extract and candi sugar. Six pounds of extract created almost three-quarters gallon of additional volume, to which I added another quart to bring up to two gallons, as directed. Here is the problem: 1.75 gallons of water is not enough for six pounds of wheat extract, which is extremely heavy. I thought that the instructions should have specified to bring the *water* volume to two gallons, as opposed to the wort volume, which became very thick. But I followed the instructions and proceeded. Some of the extract settled during the boil and scorched on the bottom, giving my finished brew a somewhat carmelized color and a very faint burnt aroma. I don't think this is characteristic of Belgian wits, and I would hate to have someone else make this mistake.

Please clarify this step for future brewers. As for me, I will not second guess my instincts in the future.

*Andy Lynch,*
*Roanoke, Va.*

# Some Well-Bread History

*by Scott R. Russell*

To explain this month's recipe, I have to delve back into the past and explain one of the great myths of modern history. Bear with me; it will all make sense in the end. And it's a true story. I swear!

In 1804 Napoleon Bonaparte, emperor of France, was on his way to a battle. He and his troops stopped in some obscure Austrian or Bavarian village to find food. One of his aides came back with what the villagers called bread — it was dark brown, dense, full of whole grains and seeds, warm and aromatic. Napoleon, being a bit of an aristocrat (taste-wise, at least) and not liking to be reminded of his less-than-upper-class roots (the ruling classes in France ate nothing but pure white bread), took a look at the bread, then looked at his horse, Nicole. She seemed genuinely interested in the bread, so he gave her some. She ate it greedily. He smiled and turned back to his aide and said, *"Voilà, c'est bon pour Nicole.* (That will take care of Nicole.) Now find *me* something to eat." A villager standing nearby heard *"bon pour Nicole,"* but of course, when he repeated the insult to his friends, pronounced it *"pon por Nikul,"* which of course became "Pumpernickel" — a dark brown, multi-grain rye and wheat bread.

Since Napoleon was emperor, any associated beer must be an imperial stout. This recipe is a tribute to Napoleon, to his lack of good taste in bread. I think he would have liked the beer, though. It is rich and dark but not black like an Irish stout. Sweeter than most stouts but with the unmistakable double tang of rye and caraway.

## "Bon pour Nicole" Stout
**(5 gallons, partial mash)**

### Ingredients:
- 3 lbs. English pale malt
- 0.5 lb. dark crystal malt (90° to 120° Lovibond)
- 1 lb. malted rye
- 1 lb. malted wheat
- 0.5 lb. roasted barley
- 1 lb. flaked maize
- 3 lbs. unhopped dark dry malt extract
- 1 cup molasses
- 1 oz. Fuggle hops (4% alpha acid) for 60 min.
- 1 oz. Northern Brewer hops (8% alpha acid) for 15 min.
- 1 Tbsp. caraway seeds (slightly crushed but not powdered)
- 1 qt. English or Irish ale yeast slurry (Wyeast 1098 or 1084)
- 2/3 cup corn sugar to prime

### Step by Step:
Heat 2.5 gal. of water to 164° F. Crush grains and mix in, settling mash at about 152° F. Hold at this temperature for 75 min. Begin run-off and sparge with 2.5 gal. water at 168° F.

To the run-off add dry malt and molasses. Total boil is 60 min. Bring to a boil, add Fuggle hops, and boil 45 min. Add Northern Brewer, boil 15 min. more. Remove from heat and add caraway. Steep 30 min. then begin cooling. Top off in fermenter with enough cold, pre-boiled water to make 5.25 gal. Chill to 68° F and pitch yeast slurry.

Ferment at 65° F for 10 days. Rack to secondary, age cool (50° F) for three weeks. Prime with corn sugar, bottle, and age four to six weeks.

### Variations:
**All-grain recipe:** Increase mash water to 4 gal., sparge water to 5 gal. Increase pale malt to 6 lbs.; crystal and roasted barley to 1 lb. each. Omit dry malt extract, but the rest of the procedure is the same.

**All-extract recipe:** Steep rye, wheat, crystal, and roasted barley in 3 gal. of water, raising heat gradually to 179° F. Remove grains, and add 3 lbs. dark dry malt extract and 4 lbs. amber dry malt extract. The rest of the procedure is the same.

## Reader Recipes

### Wild Dog ESB
**(5.5 gallons, partial mash)**

This beer is a little too rich, malty, complex, and dark to be a true ESB, but it's exactly what I was after, a "house" style ale that's good anytime. Add two cups (0.5 lb.) chocolate malt to the grains and

you've got a fantastic porter!

*Mark Garland*
*Syracuse, N.Y.*

**Ingredients:**

- 6.6 lbs. Yellow Dog amber extract
- 1 lb. light dry malt
- 1 lb. two-row pale malt
- 1 lb. Munich malt
- 4 oz. victory or biscuit malt
- 4 oz. cara-pils malt
- 1 lb. crystal malt, 60° Lovibond
- 2 tsp. gypsum
- 1 tsp. Irish moss
- 1 oz. Northern Brewer hops (8% alpha acid) for 60 min.
- 1 oz. Cascade hops (5% alpha acid): 0.5 oz. for 45 min., 0.5 oz. for 15 min.
- 1 oz. Fuggle hops (5% alpha acid): 0.5 oz. for 30 min. (1 full oz. optional), 0.5 oz. end of boil
- Wyeast 1056 (American ale)
- 3/4 cup corn sugar for priming

**Step by Step:**

Mash malts in large grain bags in 1.5 gal. of water at 150° to 155° F for 60 min. Remove and sparge with 2 gal. of 170° F water.

Add extracts and return to boil. Total boil is 60 min. Add Northern Brewer at start of boil. Boil 15 min. and add 0.5 oz. Cascade hops. Boil 15 min. more and add 0.5 oz. Fuggle hops. Boil 15 min. more and add remaining Cascade hops. Boil 15 min. more. At the end of boil add remaining Fuggle. Steep for 5 min. Transfer to fermenter and top up to 5.5 gal. Pitch yeast at 70° to 75° F.

Ferment seven to nine days at 65° F. Rack to secondary and ferment for seven to nine days. Bottle with corn sugar. Age four weeks.

## Sweet Stout

**(5 gallons, partial mash)**

My favorite stout.

*Kathy Jackson*
*Oakland, Calif.*

**Ingredients:**

- 7 lbs. dark extract
- 1 lb. dark brown sugar
- 0.25 lb. black patent malt
- 0.25 lb. roasted barley
- 0.75 lb. crystal malt, 70° Lovibond
- 3 oz. Northern Brewer hops (8% alpha acid): 1 oz. for 60 min., 1 oz. for 45 min., 1 oz. for 15 min.
- 1 pack liquid Irish ale yeast
- 2/3 cup corn sugar for priming

**Step by Step:**

Steep grains in 1.5 gal. of 150° F water for 10 min. Remove from heat and rinse grains with 1.5 gal. of 150° F water.

Add extract and brown sugar. Bring to boil. Total boil is 60 min. Add 1 oz. hops and boil 15 min. Add 1 oz. hops and boil 30 min. more. Add last ounce of hops and boil 15 min. more. Remove from heat, rack into primary, and top up to 5 gal. Chill to 70° F. Pitch yeast.

Ferment near 65° F for 10 days. Bottle or keg as usual.

OG = 1.065
FG = 1.012 ■

# Predicting the Right Yield

Mr. Wizard

**I am looking for a formula and instructions for calculating extract efficiency in all-grain brewing. How important is it to calculate this number? I hear other brewers claim they got 75, 80, even 90 percent extract efficiency from their all-grain brews. How do you calculate extract efficiency?**

*Tony Bell*
*via e-mail*

Professional brewers strive to brew the same wort day after day to achieve the most consistent beer possible. At least that's the plan. One of the many things required to brew a consistent beer is knowledge about extract efficiency or extract yield. Malts change from lot to lot and brewhouse efficiency may change with time, so commercial brewers naturally want to account for these natural variations.

Almost every batch of malt produced in a commercial malt house is analyzed for the maximum amount of solids that can be extracted from the malt in a laboratory mash. The number produced from this analysis is called the laboratory yield. When brewers produce wort using the same batch of malt as a lab they almost always get less extract from the malt. This is because brewers use a coarser malt grind than the lab method and they collect less of the weak "last runnings" from the grain bed. The relationship between the brewery yield and the laboratory yield is a reflection of brewery efficiency and is referred to as brewhouse yield. To calculate brewhouse yield you only need to know three numbers: wort volume after boiling, wort gravity after boiling, and the laboratory yield.

This really is easy to calculate if you have a hydrometer and a way to measure wort volume. Suppose you produce five gallons of a 1.040 OG wort. If you multiply five gallons by 40 gravity points (the number following the decimal in the OG reading), you can determine the number of gallon-points in the wort. In this example there are 200 gallon-points. Although this is a strange unit, it works well.

Next, compare the gallon-points actually produced with the number theoretically possible. Suppose you used seven pounds of malt that had a laboratory yield of 36 gallon-points per pound. Theoretically you could produce 252 gallon-points of extract (7 x 36). Comparing the 200 gallon-points produced with the 252 gallon-points theoretically possible gives a brewhouse yield of 79 percent.

This calculation is easy on paper. However, calculating it at home is another story because very few malts purchased at homebrew supply stores state their theoretical yield. Even if the malt comes with a laboratory yield number, the number can't always be trusted. Malts settle and small samples may not have the same properties as the whole batch, bags get mixed, old data sheets hang around longer than the malt bag they came with, and many malt suppliers give "typical" lab results to homebrew suppliers. Falling short of analyzing the malt yourself, you probably won't know the laboratory yield of the malt you are using.

Most homebrewers (and many pub brewers) make educated guesses at the theoretical yield of different malts. This works reasonably well because the modern maltster is pretty good at being consistent; after all, we brewers demand it! Pale malt usually has a lab yield of about 78 percent, crystal is about 72 percent, rice is around 98 percent, and black malt is near 65 percent. Malt labs typically report yield as a percentage, and these numbers can be converted to gallon-points per pound by multiplying by 0.46.

The great thing about knowing your brewery efficiency and your malt yield is that they help you become consistent and are very helpful when trying to hit a target original gravity with grains you have never used. Those are really the only brewing issues related to efficiency unless you brew commercially.

If you make as much beer as Anheuser-Busch, the difference between 95 percent and 90 percent efficiency is about $15 million per year if the price of malt is only 15 cents per pound. For homebrewers making the legal limit of 200 gallons per year, the difference is a whopping $11.06 if our price of malt is a $1.50 per pound — not a big deal considering a couple rounds of good beer cost more than $11.06.

The other hobbyist aspect of efficiency is machismo. I mean, what good is 95 percent efficiency if you can't brag? Kind of like the guy with the imported sports car that goes from zero to 60 in 4.9 seconds. All of his friends surely know his car's prowess, but has he needed that acceleration lately, let alone

used it?

Give me a system that is reliable, predictable and, most important, makes great beer!

## Mr. Wizard

**I buy bottled drinking water for brewing. The label indicates the water was purified by reverse osmosis and then "ozonated." Adding ozone disinfects, decolorizes, and deodorizes, but does the extra oxygen add any risks, especially since I've always read to "siphon quietly" to avoid oxygenation? Or is the term "ozonated" just a buzz word?**

*Jon Bakehouse*
*via e-mail*

Water purified using reverse osmosis (RO) has been stripped of any chemical preservatives, such as chlorine and chloramines, that are added to municipal water. Thus, RO-purified water must be stabilized before it is sold. Although water exiting an RO purification usually harbors no microorganisms, the storage tanks and interconnecting pipework following the purification unit may. This is why bottled waters must be treated before packaging.

Two common methods used to kill microbes in water before packaging are ultraviolet light systems and ozonation. UV systems work by passing the water through a clear pipe that has a UV lamp shining on it. The UV light energy kills contaminants and imparts nothing to the water.

The other common method is ozonation. Ozonation works by bubbling ozone ($O_3$) through the water. Ozone is a potent oxidizing agent and oxidizes anything and everything that it contacts. That's why ozonation kills, decolorizes, and deodorizes — pretty nifty stuff! The only thing left in the water by the ozone is oxygen. However, any bottle of non-ozonated water allowed to sit around for a day or two after bottling will become saturated with oxygen from the atmosphere because plastic water bottles are oxygen permeable. This means that all bottled waters contain about the same oxygen concentration, roughly 10 parts per million, regardless of how they were treated before packaging.

## Mr. Wizard

**How do you safely extend the use of packaged liquid yeast? I seem to remember an article a few years ago that talked about getting six batches of beer out of one packet of Wyeast. I don't want to get into yeast slants or propagation; those methods are too complicated. I just want to learn how to get more than one clean and uncontaminated use per packet.**

*Sidney L. Patin*
*Colorado Springs, Colo.*

All breweries recycle their yeast to some extent, and the key to yeast reuse begins with cleanliness. Any bacteria picked up from wort coolers, fermenters, or beer hose will start to grow during beer fermentation and will eventually become a prominent part of the yeast population. This is when re-using yeast becomes the brewer's worst enemy. If you want to get six uses out of one packet of liquid yeast, cleanliness is a must.

The easiest and perhaps most reliable method of harvesting and re-using yeast is to brew frequently. Yeast is healthiest when it is used soon after harvest. Most ale strains can be harvested by skimming the yeast from the top of the fermenter about four days after fermentation has begun. Lager strains do form a thin yeast head on top of the ferment, but the cell density is too low to give a very good yeast harvest.

If skimming the fermenter is not an option, most ales strains and all lager strains will eventually settle to the bottom of the fermenter where yeast can be harvested. Cooling the fermentation after the diacetyl rest usually helps get the yeast to the bottom of the fermenter. After the yeast has settled, rack the beer into another fermenter and collect the yeast by carefully pouring it into a clean and sanitized storage container. Whether top cropping or harvesting from the bottom, it is best to use the yeast as soon as possible.

When yeast is fresh it will start fermentation quickly and will suppress the growth of bacteria that are most likely somewhere in the wort. This effect is due to the yeast lowering the pH of the wort during the early stages of fermentation and due to their rapid uptake of nutrients when fermentations start to rock and roll. Microbiologists call this competition — competition is good!

One of the problems with yeast reuse is that taking everything from the bottom of the fermenter is not very exact. In the process of harvesting yeast, a lot of trub and dead yeast are likely to be brought along for the ride. Since trub and dead yeast tend to settle quickly from the wort, their concentration will grow with successive uses if precautions are not taken.

One of the best methods to limit dead yeast and trub carry-over is to remove them as soon as the living yeast wakes up and disperses in the wort. The easiest way to do this at home is to rack the beer before rapid fermentation takes off but after the good yeast starts to produce some carbon dioxide. This is usually about 12 hours after pitching. In commercial breweries "flotation" (purging air through pitched wort to drive the dead yeast and trub to the wort surface) and cone blowing or purging the unwanted schmoo from the tank bottom are two common methods used to deal with the same problem. Unfortunately, most homebrewers don't have the tools required for

cone blowing or flotation.

Once yeast is harvested it should be stored in a clean and sterile container at cold temperatures (32° to 38° F) until use. To prevent possible explosions, do not seal the yeast container. Covering with aluminum foil or plastic wrap works fine. As long as the yeast is used within two weeks it will be okay. If you want the healthiest yeast, use it immediately. The drawback with immediate reuse is that you will be brewing every seven to 10 days and producing enough beer to satisfy more thirsty friends than you want hanging out at your home.

One technique I like is to form a brewing circle. The only requirement to the brewing circle technique is that all members of the circle have to be reliable. The idea is simple. When the yeast is harvested and ready to ferment another five gallons of wort, one of your brewing buddies is prepared to use it. When his batch is complete, he harvests the yeast and passes it to the next anxious brewer in the circle. I have successfully used this method and can guarantee success if the circle works as a team. This means that the first brewer doesn't brew an imperial stout if the second brewer is planning a light ale.

If you don't have a brew circle, try propagation. Propagation is just a smaller-scale fermentation. Start with one packet of liquid yeast and grow it up in a quart of wort. When it's time to brew use about 90 percent of the starter for the brew and transfer the remainder to a clean and sterile quart jar. At the end of your brew day, fill up the quart jar with fresh wort and store it in a cool place. After about two days transfer the starter to the refrigerator until you are ready to brew again. On brew day take the starter from the refrigerator and allow the yeast to wake up. Repeat the process in the same manner as before and you will find success.

Whatever method is used, pay attention. If the fermentations take longer to start, if the beer tastes funky, or if the yeast starts to lose its flocculation (settling) properties, start over. As long as things are clean and the yeast is reasonably fresh, six brews from one yeast packet is an attainable goal! ■



## Mr. Wizard's Address

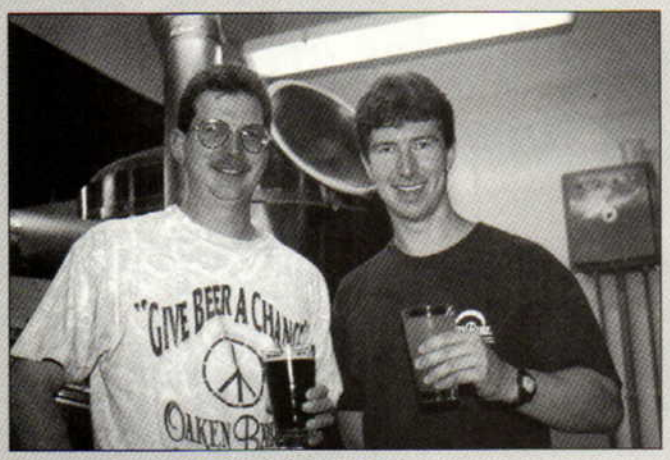
Do you have a question for Mr. Wizard? Write to him c/o *Brew Your Own*, 216 F St., #160, Davis, CA 95616. Or send e-mail to wiz@byo.com.

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

# Leading the Pack in Indy

*by Stan Hieronymus and Daria Labinsky*

## Oaken Barrel Brewing Co.




**Brewer: Brook Belli with Bill Fulton**

**Brewer:** Brook Belli
**Brewery:** Oaken Barrel Brewing Co.
**Years of experience:** Pro for four years and homebrewer for four years
**Education:** Civil Engineering Degree at Virginia Tech, Siebel Institute Degree
**House Beers:** Meridian Street Lager, Big Red, Leroy Brown, Razz Wheat, Snake, Snakepit Porter

What happens when your brewery grows faster than planned, when you take a giant step from running a seven-barrel pub system to running a 50-barrel microbrewery?

Although the owners of the Oaken Barrel Brewing Co., in the Indianapolis suburb of Greenwood, eventually hoped to expand, it wasn't something they had in their short-range plans. But when the Indianapolis Brewing Co. went on the block last year, Oaken Barrel owners Bill Fulton, Brook Belli, and Kwang Casey decided buying it was an opportunity they couldn't pass up.

Besides, the pub's brewing system was practically maxed out, and storage space was at a premium, so they knew Oaken Barrel would have to expand eventually. They raised money privately and became the owners of IBC's brewing equipment and bottling line late last year, taking possession on Jan. 1 of the warehouse space where those are located.

With the demise of the Evansville Brewing Co., Oaken Barrel is now Indiana's largest brewery. The new purchase added 9,000 square feet of space to the 650-square-foot pub brewery and expanded capacity from 2,000 to 10,000 barrels.

Rather than dive right into the new equipment, Belli, the director of brewing operations, decided to test the brewing waters. "We're not afraid to take our time," he says of the one-day-a-week summer brewing schedule. "Until we're able to be there two to three days a week, it's hard to get used to everything. You go in and it's like, 'Where'd I leave off?'

"We need to make a lot of money before we can make a lot of changes there. We don't want to overextend ourselves." Still, he adds, "I'm looking forward to the time when we can make that the focus more than the pub."

Buying Indianapolis Brewing isn't the first step Oaken Barrel has taken sooner than planned, and the owners have approached each new step with the same kind of caution. Not long after opening in July 1994, the brewpub became a distributing microbrewery thanks to the popularity of a beer called Razz Wheat.

Although Belli never made a raspberry beer as a homebrewer, he did so at the request of Fulton's wife, Patty, who had tried several in the Northwest. "I think it was the only fruit beer in the state," Belli says. "We didn't plan to sell it off-premise, but more people came in and tried it. It was the one beer they focused on, like nothing they ever had before."

Within two months of the pub's opening, bar owners were coming in wanting to buy it. "We didn't try

to solicit accounts," Belli says. "They came to us and said that's what they wanted."

Adds Fulton, "We tried to take it off tap, and we couldn't." Off-premise, they found, "it wasn't the sales that were important, it was the fact that it was a drawing card. Bud Ice isn't going to draw somebody into their place, but Razz Wheat will."

Boosted by that initial success and by winning a silver medal for Razz Wheat at the 1995 Great American Beer Festival, Oaken Barrel targeted likely accounts. "The places we picked were horrible," Belli says with a laugh. "So we pulled back and let them come to us." Today, the beer and several other Oaken Barrel brews are sold off-premise through Hoosier Micro Distributors.

Three brewers run Oaken Barrel's brewery: Belli, Brewing Coordinator Jerry Sutherland, and Brewer Tony Diggs. They do two seven-barrel brews on brew day and transfer them into a 14-barrel tank. Belli says he and brewer Gus Chalfant, who died last year, "rebuilt the whole thing" over the past few years. By adding five 14-barrel conditioning tanks, the brewery doubled its capacity relatively cheaply.

In addition to Razz Wheat, the most popular beers at Oaken Barrel are Meridian Street Premium Lager and Snake Pit Porter. Meridian Street Lager is a medium-bodied, straw-colored lager in the helles style. It's hopped with American hops, including Cascades, which Belli describes as his "workhorse bittering hops," with Liberty and Crystal added late in the boil. Meridian Lager took a silver in the Munchener Helles and Export category at last year's Great American Beer Festival.

Snake Pit Porter is a coffeeish porter made with chocolate, crystal, and black malt. Other popular beers include Leroy Brown, an English-style brown ale made with honey, and Big Red, a red ale. Despite the fact that Razz Wheat, Snake Pit Porter, and Meridian Lager account for two-thirds of the pub brewery's output, Oaken Barrel has been able to make about 15 beers each year. "Brook likes to keep eight beers on tap," Fulton says. Popular seasonals include Plum Stout, which is available in the winter, and a German-style unfiltered wheat beer called King Rudi, sold during the summer.

Eventually, the eastside brewery will take over production of the porter, lager, and Razz, hopefully freeing up the pub system somewhat. The IBC equipment includes a 25-barrel brew kettle, two 50-barrel fermenters, and five 50-barrel conditioning tanks and a bright tank.

But it will take months to get it on track. For one thing, Belli is concerned about how the lager will translate to the bigger system. "The lager's always been tricky with yeast management," he says. "I'm hoping

to get a new mill installed before we lager over there. The water's a little different, the mill's a little different." The fact that Diggs formerly worked at Indianapolis Brewing will help. "It's nice to have him familiar with all the equipment," Belli says.

Even when the eastside brewery is fully operational, Oaken Barrel doesn't plan to sell much beer outside central Indiana. The brewpub produced more than 1,000 barrels in 1997 and has at times been on a 1,300-to-1,500-barrel pace this year. "May was tough for us" with the Indianapolis 500 and the NBA Pacers in the conference finals, Belli says. "We were out of lager, brown, red; we were down to four beers at one point."

Fulton, who's from Indiana, and Belli were working as engineers in Atlanta when they began talking about opening a brewery-restaurant. At that time, the early 1990s, brewpubs weren't legal in Georgia. "Microbreweries were legal, but starting a micro was a struggle," Belli says. "A restaurant is a built-in market for your beer."

Neither man had restaurant experience, but through a friend they found Casey, a restaurant veteran who was looking for a new opportunity. They contributed their own money and raised additional money privately. Casey serves as director of restaurant operations for the brewery, while Fulton is director of business operations.

**The Tips**

- **When making a fruit beer, use a neutral yeast.**
- **Try using a fruit puree.**
- **Add fruit to taste throughout the process.**

Oaken Barrel had expanded twice before buying Indianapolis Brewing, first opening a beer garden in 1995, then adding the Brewhouse Bar to its original bar area in 1997. Late in 1996 the brewery bought a small bottling line from Kalamazoo Brewing Co.

Razz Wheat, Meridian Street Lager and Snake Pit Porter are now available in 12-ounce bottles, and the pub's pale ale may be in bottles by the time you read this. The brewers bottle about 50 cases at a time, so they can control product freshness.

Oaken Barrel Brewing Co. is open Monday through Saturday for lunch and dinner. The Brewhouse Bar is open on Sundays as well.

Oaken Barrel Brewing Co., 50 N. Airport Parkway, Suite L, Greenwood, Ind. 46143. (317) 887-2287. Web site: www.oakenbarrel.com

## Tips

With the success of the Razz Wheat, Belli has had a lot of practice making fruit beers.

"You don't want to overpower the fruit flavor with something else, like hops or yeast," Belli says. A Belgian or German yeast can add flavors you may not want. Instead he recommends using a neutral yeast.

So what's the best form for your fruit? For homebrewers, using fresh or frozen fruit isn't too much of a problem, according to Belli. "I suggest steeping the fruit in hot water, about 180° F, for 15 minutes to pasteurize it. Whole fruit with skin should be crushed before adding to your fermenter. I choose not to boil fruit to keep more of the fruit aroma intact. If you do boil the fruit you will set the pectin, which will result in a hazy finished beer. To break down the pectin try adding the enzyme pectinase at the end of fermentation.

For simplicity's sake, Belli suggests using a puree instead of fresh fruit. "I have used fresh fruit, and it was a lot of work," he says, recalling a time when he was colored red up to his elbows from crushing blueberries.

He warns that purees will vary from lot to lot, just as fresh fruit varies from crop to crop, and their flavors fade over time. A recent batch of Razz Wheat tasted quite different from the usual brew, because the puree wasn't as fresh as it normally is.

That beer was made at the eastside brewery. "It seemed lighter; it didn't seem as raspberry as we expected," he says, but he attributed that to the new brewing system. "Then we made a batch at the pub and it went like wildfire."

But the next batch was made at the pub with the same puree as the first one, and they discovered the puree was responsible for the difference.

"I didn't realize it until it was out of the fermenter," he says. "Then, you're kind of stuck."

Add fruit to taste as you go along. "I add it to the fermenter and let it ferment out, pull a sample, and taste it," he says. "If you keep (the fruit) clean, and it's pasteurized, you can just dump it in and the beer takes off again right away. As long as it's still warm, the fruit sugar will allow fermentation to continue.

"If you do get a stuck fermentation, don't be afraid to keep adding yeast after you've added the fruit," he says.

Once you find a fruit that works, don't stop there, Belli advises. "Don't be afraid to experiment with different fruit beers. Based on the success of Razz Wheat, I tried a cherry beer. Customers who didn't normally drink Razz Wheat like the cherry beer because the flavor was more subdued." When the cherry was gone customers were clamoring for the next fruit beer.

"Over the past four years I have tried raspberry, peach, apple, blueberry, and even plums in beer," he says. "Some brewers scoff at the fruit beer style, but when customers are making requests it's hard to say no."

That's the joy of brewing at a brewpub and later going to a micro, Belli says. "You can experiment at the pub and get customer feedback. If a beer is well received it can be brewed on a larger scale at the micro." ■

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

# COOL EQUIPMENT

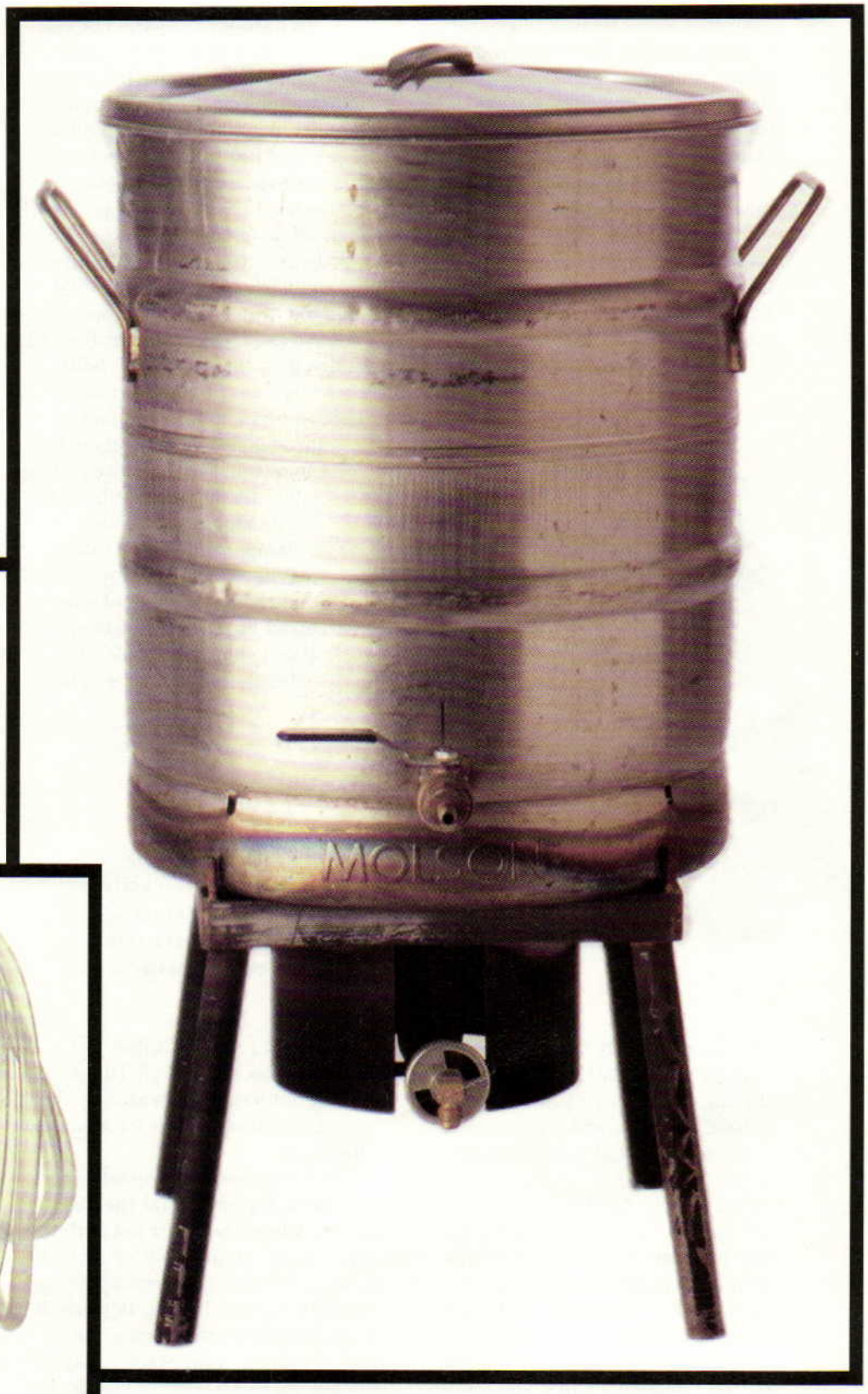
## 12 Easy Ways to Improve Your Brewery

You know how you caught a few fish by using worms off the dock before you worked your way up to fishing from that beautiful boat with twin outboards, depth finder, fighting chair, and trolling motor? And you know how it would seem a bit strange if somebody bought the ski clothing and top-flight skis, reserved the condo in Colorado, and bought a season pass before they'd ever been on the slopes?

Well, homebrewing is progressive like most hobbies. Brewers usually start by helping a friend or getting a minimal starter kit, then adding to it bit by bit. Sometimes the items come along by luck (like the 30-quart canning pot that your father-in-law was using to wash his truck and was willing to trade for a pickle bucket) and other means to fill a homebrewer's specific needs.

At most brew supply stores, however, folks don't walk in and start with the complete top-of-the-line, stainless steel, three-vessel system. Assuming you have already

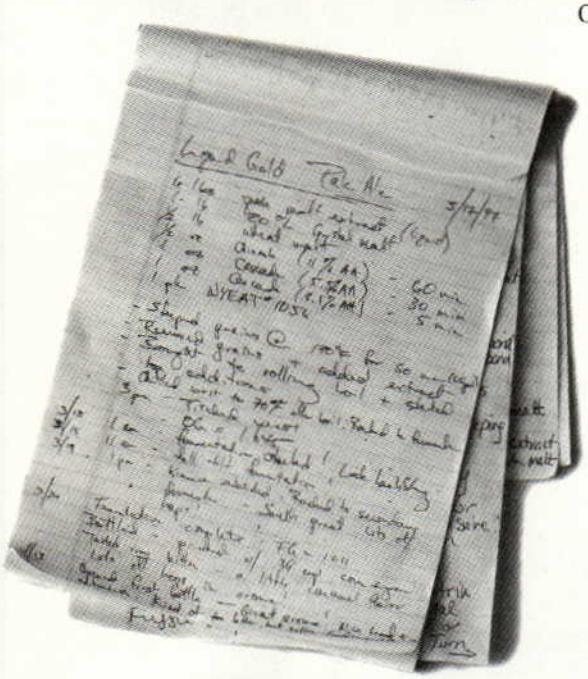
by Craig Hartinger




TODD HAMMOND PHOTOS

brewed a batch or two, here are some items that save time, reduce stress, and allow more control over the process. These items all have the significant benefit of good old-fashioned value as well.

**1. A brewing journal.** What made that beer so great? What went wrong? How could it be improved? If you write down everything, you'll brew better beer. Period. Put down ingredients, techniques, any detail that could have any influence. ("I was up late last night and am extremely tired" could explain a beer that didn't come out the way it did when you brewed it before.) Go back and add tasting notes as the batch conditions and ages.



A simple journal will help you recreate your best beers, discover the cause of subtle flavor differences, and pass your wisdom on to posterity.

**2. A large kettle.** Full-wort boils will improve your break and your hop utilization, and will allow you to feed huge numbers of people corn on the cob or spaghetti. (Estimated number of good-sized Dungeness crabs that fit into a 7.5-gallon kettle: 16.) Remember that you'll need about seven to eight gallons of capacity to yield five gallons of wort. You'll need room for an active boil, and there is a significant volume loss due to the length of the boil.

**3. An outdoor propane cooker.** Another item that not only minimizes odors in the house (there are rumors of non-brewing roommates or family members who do not like the smell of brewing) but also saves time due to increased heat output. It's also useful for the huge pot of spaghetti noodles, corn on the cob, or crabs that you may wish to prepare outdoors in your large kettle when you aren't using it to brew.

**4. An immersion chiller.** Easy to sanitize (just throw it in the boil), easy to use, easy to buy or make. Consisting of 25 or more feet of three-eighths-inch copper tubing wound into a loose coil that fits in your kettle, some vinyl tubing, two hose clamps, and a hose fitting, this device will save you time and reduce the risk of oxidized flavors in your beer. (Wort should be cooled to pitching temperature before it is aerated.) A benefit that you may not have thought of: The water coming out has been heated by the wort and you can use it for cleanup. Efficiency!

**5. A yeast-starter vessel with a stick-on liquid crystal thermometer.** A large bottle or jug with the appropriate stopper and an airlock is pretty much a requirement for stepping up liquid yeast. Because it has a relatively small mass, the temperature of your starter may be fluctuating more than you think. Put a thermometer on there, and by moving the vessel to warmer or cooler spots you can keep your yeast in a temperature range where it is happiest.

**6. A large primary fermenter.** A 6.8-gallon carboy may be one thing that will lend a spring to your step and extra volume to your beer inventory. It can aid aeration (by leaving airspace when you stir or shake), it will add to your yield by reducing volume loss due to blowoff, and the brewer who racks to secondary in a five-gallon carboy can fill the five right to the top, leaving the sediment back in the 6.8. Put volume markings on the 6.8 with stickers or a permanent marker before you use it and put volume notes in your journal. Soon you'll know exactly how to customize your recipes with additional fermentables and how much wort to add to your 6.8. Typically, 5.25 to 5.5 gallons will allow plenty of headspace for kraeusen yet still allow you to yield five full gallons in secondary.

**7. A beer thief.** This large-diameter tube (glass is preferred for ease of sanitation) will allow you to pull samples from your fermenter to check gravity and evaluate flavor. Works just like the straw you used to put in your milk as a kid; you lower the sanitized thief into your fermenting or lagering beer, put your thumb over the hole in the top, and remove your sample. A thief is so easy to use that it may lead you to take samples more often — and get you to better understand your yeast and fermentations.

**8. Ceiling hooks or clips.** When you are holding a freshly sanitized racking cane or siphon hose, there is no better place to put it temporarily than a hook above your brewing/bottling area. A clip is okay, but with a hook you can hang the sanitized item with one hand.

**9. A racking-cane clip.** This small clip attaches to the rim of a carboy neck or edge of a bucket and holds the cane above the sediment when you are racking out of your fermenter. It works in a bucket fermenter but really shines when you use a glass carboy as a fermenter; you can see the end of your racking cane and position it with precision.

**10. Clear bottles.** Yes, there is no doubt that light damages beer. However, you the brewer can keep your clear bottles (known as "flint"

in the bottle trade) in a dark cupboard or in a case box and you won't need to worry about light damage. Filling one clear bottle in each batch allows you to watch the yeast settle and really allows you to check color and evaluate chill haze even before the first beer is ready to drink. This is particularly helpful when trying a new yeast strain or technique. You will be thinking about clarity, haze, and color from the moment you cap the last bottle.

**11. Appropriate beer glassware.** Whether packaged in a keg or a bottle, homebrew is consumed from a glass. Several nonik pint glasses (Imperial-style glasses with a bulge near the top) for your English-style ales, some stemmed Belgian-style glasses for your homebrewed abbey beers, and a few narrow-waisted hefe-weizen glasses for your wheat beers will really complete the homebrew-drinking experience. Many homebrewers prefer glassware that is free of beer logos, but an assortment of glasses of different designs can help groups of imbibers keep tabs on which glass is whose when they get set down.

**12. A paradigm shift of at least medium size.** Do you put all your bottles into tight rectangular ranks at bottling time? If you fill each bottle in a single-file line with lots of room on either side, you can then take your wing capper and move right down the line, saving lots of time. You can pre-chill the water going into your immersion chiller by throwing your coiled hose into some ice upstream of the chiller. You can build a bottle-drying rack. You can brew beer during a party, to interest your guests and not miss the party. You can buy a garage-sale microscope and actually see yeast. You can rig up or invent an infinite number of little time savers that will make you more psyched about brewing and may improve your product as well. Next time you brew or bottle, take a step back and analyze the way you do things.

With the exception of the large kettle and the propane burner, these items are all cheap or even free (and the burner and kettle do additional non-brewing duty in your kitchen as well). The personal touch you put on items such as a journal are priceless. Imagine your grandchildren passing on your wort-stained brewer's journal to your great-grandchildren.

Homebrewers today are lucky to have great suppliers, interesting and tricky new devices, fantastic literature, and excellent commercial beers to emulate. Roll these in with a little good old ingenuity and a fresh viewpoint. Refer to your journal. Try new methods. Teach friends to brew. And in your search for new items and new methods, you might just make a small unexpected discovery: some fresh brewer's energy that will allow you to have more fun — and to make *even better* beer.

Sure it's possible!

# GAR

JOHN MARIONI

KARIE HAMILTON

# GARAGE VISION

**Why waste the largest room in your house on cars?**

**The author turned his into a full-fledged homebrewery.**

by John Marioni

As a teenager it was garage bands, in college it was garage parties, and in middle age it is the garage brewery. The only criteria I had when searching for a new house was that it have a two-car garage large enough to entertain my long-held vision of building a garage brewery.

Not only did I have the support of my wife in this venture but also a sanctioned $1,000 budget to build

the infrastructure. Sound too good to be true? Actually, after years of brewing in her kitchen, I probably could have finagled my wife for $5,000 due to her equally passionate long-held vision to get me the heck out of her kitchen at any cost! She also got final say and dictatorial control on every other aspect of the house, a fair trade as far as I am concerned.

When we moved into our new house about a year ago, the garage was a typical, neglected, empty shell consisting of bare studded walls, bare rafters overhead, and only two electrical outlets and two light bulbs in the entire place. By taking advantage of some special buys on materials and doing the actual electrical, plumbing, and construction labor myself, I was able to complete the project on budget, have fun doing it, and end up with killer brewing digs: finished insulated walls, hot and cold running water, electrical outlets in convenient locations, good lighting, counter space, cabinets, and ventilation.

With some custom shelving on the other side of the garage, an entire attic in which to store and organize typical garage items, and other strategically placed hooks and shelves, I have plenty of non-cluttered room for my brewing on one side of the garage. I also have workbench space on the other side and still have room to put at least one car in the garage (should I ever desire to).

The reality is that with a stereo, microwave oven, fridge, easy chair, and TV also now in the garage, my wife is quickly becoming a garage widow, but at least I am out of her kitchen!

I have definitely added resale value to the house, and I have a convenient, efficient, and fun facility in which to brew beer. I highlight three of the key features below: custom sink, sparge system, and ventilation.

## Custom Brew Sink

It's the water and a lot more (water). Beer is a water-intensive product to say the least. Not only is beer itself composed of more than 95 percent water, but also gallons upon gallons of additional water are required throughout the entire brewing process to achieve the final quaffable product. Think about it: cleaning the brew space, cleaning equipment prior to brewing, rinsing equipment, rinsing equipment again, mashing grain, sparging grain, chilling the wort, cleaning equipment after brewing, soaking the labels off bottles, cleaning bottles (or kegs), rinsing bottles, and cleaning the brew space after brewing.

I roughly calculate that for each gallon of finished product, the typical homebrewer will use at least five additional gallons of water to produce it. A water source and sink facility within the brewing area are therefore of paramount importance to the homebrewer.

Most homebrewers brew in the kitchen and therefore have access to a sink. Those of us who have been kicked out of the kitchen, however, find ourselves out in the garage, down in the basement, or out on the back porch, without convenient access to a sink. The options in the latter case are: 1) to lug heavy vessels of water back and forth from the nearest sink to the brewing location, 2) to run a hose from the nearest sink to the brewing location, 3) to install a sink at the new brewing location, or 4) to find a new hobby.

Option three is the desired solution for most of us, but making it happen is the hard part. As long as you have decided to go with option three, you might as well make the most of it.

For many years of homebrewing I put up with small-capacity kitchen and bathroom sinks that can't accommodate a four-gallon brew pot (let alone a primary fermenter or carboy). The sinks had cheap plastic faucets that couldn't hold a bottle washer without stripping threads, had stubby faucets that allowed enough clearance to wash your hands but not much else (certainly not brewing equipment), and caused my spouse to threaten me with sharp objects for disrupting her kitchen. Finally, I was able to devise a simple-in-concept and extremely practical brewer's dream sink facility. It completely eliminates all of the above noted annoyances (no guarantees with the spouse though) and creates a much more pleasant brewing experience. Three key features of the sink are described in terms of capacity, clearance, and convenience.

## Capacity

Again, as brewing necessitates large and bulky equipment that must be cleaned, rinsed, and rinsed again, bigger is better in terms of sink capacity. I use and recommend a large industrial plastic utility sink. The basin of the typical utility sink is deep, wide, and large (20 gallons) in volume. To put that in brewing terms, such a sink will easily hold 75 beer bottles.

Utility sinks come in different sizes and styles. There are those that are made to install within a standard countertop (drop ins) and those that are generally used as free-standing vessels. They are lightweight yet durable, require minimal assembly, are readily available at your local hardware store, and are relatively inexpensive.

The smaller sized, lower grade utility sinks run about $20 to $30, and the larger, more durable ones run from $50 to $60. There are also double-basin utility sinks, which are double in size, volume, and price.

## Clearance

Clearance refers to the distance between the basin floor of the utility sink and the overhead faucet. Typically, the faucet assembly is mounted onto the rim of the utility sink using the existing mount holes. This standard configuration will usually allow between eight and 15 inches of clearance, which is fine for hand washing but cumbersome for rinsing carboys, primary fermenters, and brew kettles.

The solution is to mount the faucet assembly higher above the sink to allow more space under it. I achieved this by installing a "shelf" on the wall against which the utility

KARIE HAMILTON


JOHN MARIONI

# CUSTOM BREW SINK

**When you can use 25 gallons of water to make a five-gallon batch of homebrew, a sink is not just a sink.**

KARIE HAMILTON

sink buttresses. (See photo above). I then mounted the faucet assembly onto the shelf and ran the water supply lines directly to it.

To determine the preferred height of the shelf, I first measured the length of my longest piece of brewing equipment, which is a Cornelius keg. I therefore left a good 26 inches of space under the faucet, which allows for easy filling and rinsing of carboys, kegs, kettles, and primaries.

## Convenience

Tip one. When selecting a faucet, choose one with single-lever control. It can be a hassle to have to turn on both the cold (on one side) and the hot (on the other side) valves of the dual-control faucets to get the temperature you need. The single-lever control allows you the convenience of one-handed operation, has fewer parts and less risk of operation failure, and is usually manufactured to allow both the faucet and the lever to rotate completely out of the way when needed.

The typical single-lever faucet is more expensive than the dual control ones at $50 on the low end and up to $200 on the high end. As a very inexpensive alternative, I found the perfect single-lever faucet (shown) for $10 in the discontinued-items bin at a local hardware store.

Tip two. Whether you're installing a utility sink to existing water lines or newly tapped water lines, I recommend installing dual-stop shutoff valves (also called dual outlet stops) on both the cold water line and the hot water line. This configuration will allow two lines of hot water and two lines of cold water to supply the sink.

Why do this? Well, we are talking about convenience, and this one feature provides plenty of it to the brewer. Also, it takes the same amount of time to install a dual shutoff valve as a single shutoff valve, and the cost difference is only a few dollars.

The concept is that one pair of hot and cold supply lines connects to the faucet as standard procedure. This leaves one hot supply line and one cold supply line. The remaining hot supply line will feed a hose bib (metal faucet head) mounted on one side of the mounting rim of the sink. Run the remaining cold supply line to the other side of the sink where you have installed another hose bib (see assembly instructions below). The result is a fully functional, high-clearance faucet offering hot and cold water for everyday use, cleaning, and rinsing. In addition, on both sides of the sink and completely out of the way are two other lines of water.

In my case I installed a jet bottle washer on the spare hot water line, which is used only for bottle washing. I am now able to simply walk up to the bottle washer at any time and rinse my pint

glasses, bottles, carboys, and anything else that can use a good blast of hot water, and I do not have to hook it up to the faucet and remove it every time I need to use it. I can also use this hot water line to attach a hose and fill kettles, spray out my garage, or wash the car on a cold day.

I use the spare cold water line primarily for two purposes: 1) To attach a hose and fill my brew kettles, and 2) to attach a hose and run my wort chiller. Again, the convenience is in the fact that the hose (or the bottle washer) can remain permanently installed where I do not have to hook and unhook it to the main faucet every time. The grand convenience in all this is that I can be chilling my wort (spare cold line), rinsing bottles (spare hot line), and washing other brew equipment (standard faucet) all at the same time and at the same sink.



## Utility Sink Components:

- One utility sink of choice, $20-$60
- One faucet of choice, $10-$200
- One P-trap assembly, $5-$10
- Four supply lines, $2-$5 each
- Two double-stop shutoff valves, $10 each
- Two hose bibs (faucet heads, 1/2-inch female), $5 each
- Two 1/2-inch copper elbow, 50 cents each
- Two 1/2-inch male copper adapters (male threads on one end, female receptor on other), 50 cents each
- 2 feet of 1/2-inch copper tubing, 80 cents per foot
- One laminated board (4 feet long by 1 inch high by 8 inches wide or desired) for faucet shelf, $5-$10

## Assembly Tools:

- Copper pipe cutter, $8
- Flux, $3
- Solder (lead free), $5
- Propane torch kit including propane and all of the above, $20
- Roll of Teflon tape, 50 cents per roll
- 9/16-inch drill bit
- Wrench

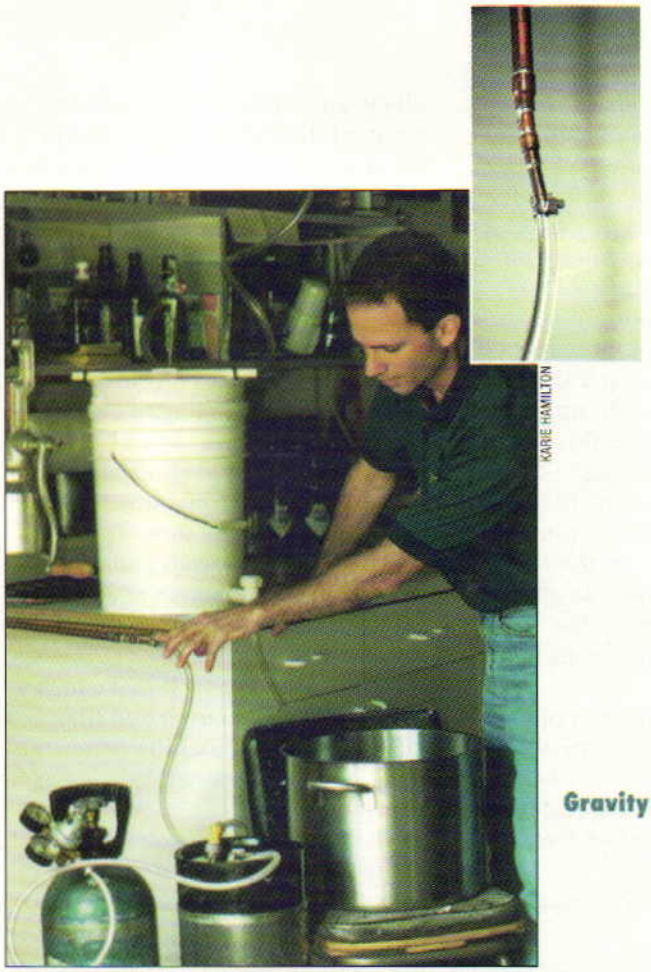
## Spare Faucet (Hose Bib) Assembly Step by Step:

1. Drill a 9/16-inch hole in each of the corners on the faucet mount ledge of the utility sink.

2. Cut a section of 1/2-inch copper tubing to desired length (about 3 inches) to run from the drilled hole in the ledge to the hose bib faucet so that the faucet is in a position that hangs over the sink basin.

3. Cut another length of 1/2-inch copper tubing (about 6 inches) long enough to extend from the drilled hole in the ledge down to where the supply line will reasonably connect to it under and behind the sink.

4. Sweat (weld using the torch, solder, and flux) the small length of tubing into the hose bib faucet on



KARIE HAMILTON

# CUSTOM SPARGE SYSTEM

JOHN MARIONI

**Gravity is easy to overcome when you have $CO_2$ pressure pushing sparge water in an over-the-head loop.**

one end and into a copper 90-degree elbow on the other end.

5. Sweat the longer piece of copper tubing into the remaining end of the copper elbow.

6. Slide the longer copper tubing down through the hole in the sink mount ledge where the hose bib and elbow will end up resting on top of the sink rim.

7. Carefully sweat the copper adapter (with the male threads on one end) onto the open end of the longer copper tubing (now behind the sink and under the mount ledge).

8. The hose bib assembly is now ready to connect to the supply line. Use Teflon tape on all male threads and tighten.

9. Turn on water and test for leaks.

The result is a faucet that just extends enough over the basin of the sink to connect a hose or bottle washer to it. It also will pivot (swing from side to side), allowing you to move it out of the way when necessary. Note: I found it helpful to affix a small block of wood (also drilled with the 9/16-inch hole) to the underside of the sink mount ledge. I slid the copper tubing through the block to add stability to the spare water line faucet assembly (shown in photo, page 25).

## Custom Sparge System

They say that necessity is the mother of invention. In my experience it is mothers who necessitate invention (of new brewing techniques) as was the case with my brewing partner, Brian Moulton. That is to say, Brian's wife Shelly, mother of their active two-year-old son Trevor, necessarily "influenced" Brian to devise a safer way to sparge his grain than with his typical makeshift gravity-based system that included teetering kettles of scalding water stacked on top of boxes and chairs. Using his kegging equipment, Brian came up with a very clever, safe, and effective means to create an anti-gravity sparge system driven by carbon dioxide pressure.

The concept: Use your brew kettle to bring the desired quantity of sparge water to desired temperature. Pour the hot water into a sterile five-gallon Cornelius keg. Connect the gas line in from the $CO_2$ tank to the Cornelius keg. Connect the line out from the Cornelius keg to the copper tubing transit line (described below). Apply enough $CO_2$ pressure (five pounds psi) to move the hot water out of the Cornelius keg, up through the copper tubing transit line, and out the sparge arm onto the (elevated) grain bed (which in our case sits on a countertop). Run the sweet wort out of the lauter tun into a kettle (which in our case is on the floor, a chair, or burner).

## Sparge System Components:

- Three 8-foot lengths of 1/2-inch copper tubing (should be enough for most configurations), $20
- Four 90-degree copper elbows, 50 cents each
- Two hose clamps, 50 cents each
- Three 8-foot lengths of pipe

insulation, $10
- 6 feet of clear food-grade tubing, 3/8-inch inner diameter, $5
- Two copper reducers from 1/2 inch to 3/8 inch, 50 cents each
- One sparge arm (we used Phil's Sparge Arm)
- One Cornelius keg
- One $CO_2$ tank

### Assembly Tools:

- Copper pipe cutter, $8
- Flux, $3
- Solder (lead free), $5
- Propane torch kit including propane and all of the above, $20
- Wrench
- Screwdriver
- Hammer

### Copper Tubing Transit Line Assembly Step by Step:

1. Determine the best locations where you will 1) place your keg and $CO_2$ tank, and 2) place your grain bed (lauter tun) for sparging. In our case the keg and $CO_2$ tank are on the garage floor near one wall and next to a counter, and the lauter tun is placed on top of the counter several feet down from the location of the keg and $CO_2$ tank.

2. Sweat (weld using propane torch, flux, solder) lengths of 1/2-inch copper tubing so that the tubing will start about three feet off the ground (at the keg and $CO_2$ tank location) and run straight up the wall to the ceiling. Note: Do all welding and assembly on the floor and mount later. You can affix the copper tubing to the walls using hooks specially made for the purpose and available with the other copper tubing supplies in the plumbing department of your local hardware store.

3. Attach a 90-degree copper elbow to run another length of copper tubing along the seam where the wall meets the ceiling to desired location (in our case a few feet down along the counter).

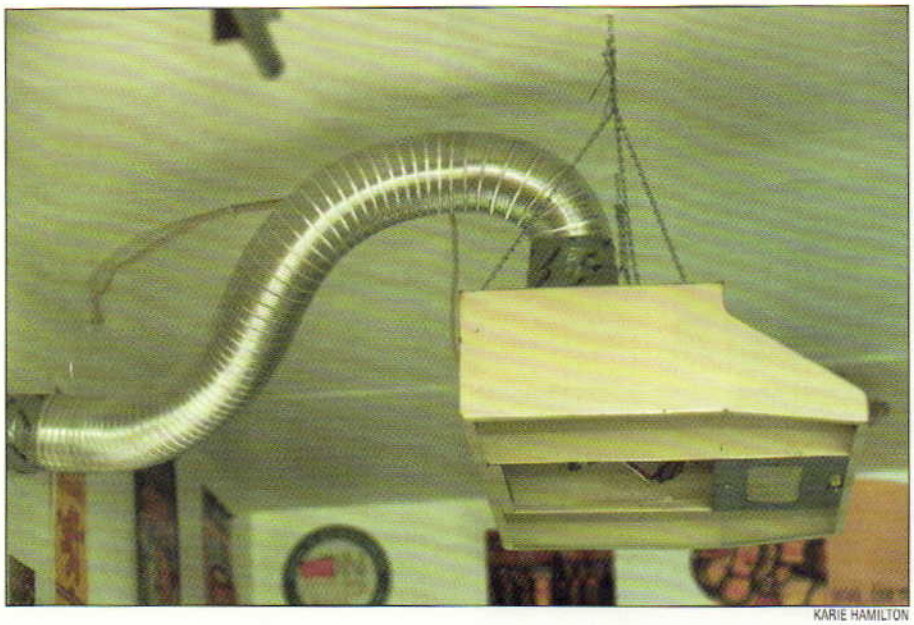
4. Attach a 90-degree copper elbow and run another length of copper tubing along the ceiling to the desired location (in our case to the end just over the center of the counter top directly below).

5. Attach a 90-degree copper elbow and run another desired length of copper tubing straight down. This will likely be a short piece (2 feet) because from here you will attach clear tubing to reach the lauter tun.

6. Attach a 90-degree copper elbow to the other end (the keg/$CO_2$ tank end — the one three feet off the ground at the wall) and attach a 2-foot to 3-foot length of copper tubing from it so that it runs out parallel to the ground.

7. Attach a 1/2-inch-to-3/8-inch copper reducer to each end (the keg/$CO_2$ tank end and the lauter tun end) of the now-assembled copper transit line.

8. Attach the 3/8-inch inner diameter clear food-grade tubing over the ends of the copper



KARIE HAMILTON

# CUSTOM VENTILATION

**Brewing indoors with an outdoor cooker requires a little air movement.**

reducers at both the keg/$CO_2$ tank end and the lauter tun end using hose clamps to secure.

9. Attach the sparge arm to the 3/8-inch clear tubing (on the lauter tun end).

10. Attach a beer pin lock to the 3/8-inch clear tubing on the keg/$CO_2$ end. Attach the beer pin lock to the Cornelius keg line out.

11. Insulate the copper tubing with foam pipe insulation.

The resulting picture in our case is a counter top with a plastic lauter tun sitting atop it, a Phil's Sparge Arm resting on top of the lauter tun, and the clear tubing dangling from the ceiling just reaching the top inlet of the sparge arm. The brew kettle is on the floor resting atop a propane cooker to collect the run-off and start the boil.

With the copper tubing insulated, there is very little loss of heat in the process. By adjusting the amount of $CO_2$, you can control the flow of water sprinkling out of the sparge arm. It is much safer than the physically unstable gravity-based system, quick and easy to hook up, and easy to clean (by running hot water or cleaning solution through it periodically), and it costs less than $50 in parts (excluding kegging equipment).

The copper tubing transit line is unobtrusive and out of the way when not in use, and it makes for a great conversation piece for brewers and non-brewers alike when they give it the inevitable double-take upon first quizzical glance.

## Custom Ventilation System

Garage brewing on a cold day has one drawback: condensation. If not properly vented, the steam generated from a 90-minute wort boil can literally result in dripping walls and ceilings. Of course you should always provide adequate ventilation any time you use a propane cooker to boil indoors (a garage). On a cold or windy day, however, it is easy to want to partially close the garage door for comfort, and if so, I suggest you provide a secondary means to ventilate.

The quickest and easiest way to do this is to mount an overhead hood (from a kitchen range) on the ceiling of your brew space directly above the area where your brew kettle and propane cooker sit. Overall, this is an easy project that requires four main tasks: acquiring the hood, mounting it, connecting electricity to it, and venting it to the outside. Details of the four parts will depend on individual circumstance. I describe mine below:

## Ventilation System Components:

- One new or used kitchen hood, $5-$200
- 8 feet of ventilation ducting, $15 for 7 feet or $8 for 4 feet
- One 7-inch-to-4-inch reducer, $4 (if needed)
- One dryer vent cap, $4
- One roll of electrical wire (50 feet), $10
- Two eye hooks
- 20 feet of chain

## Assembly Tools:

- Duct tape
- Hole saw
- Screwdriver
- Wire cutters
- Electrical tape
- Wire stripper
- Pliers

## Construction Tips:

**Acquiring the hood:** New range hoods cost $30 to $200 depending on size, fan type, and construction material. The typical 30-inch or 36-inch kitchen hood runs about $40 new. They are also easy to come by used at junk yards (where I got mine for $5) or free from friends who are remodeling their kitchens.

**Mounting the hood:** I suspended my hood with chains from hooks in the ceiling instead of permanently mounting it on or into the ceiling. This allows me to adjust the height of the hood by extending or shortening the chains.

**Connecting electricity to the hood:** For wiring, I connected a line of standard indoor 12-gauge

KARIE HAMILTON

## SUPPORTIVE WIFE

**It takes two to tango, but only one to brew. Taking it outside may be well received.**



electrical wire from a nearby existing wall receptacle to a light switch receptacle that I installed on the same wall. I then ran more 12-gauge wire from the light switch receptacle to the hood. This configuration allows me to turn the hood on and off from the wall switch. I therefore leave the hood's on/off switch in the on position.

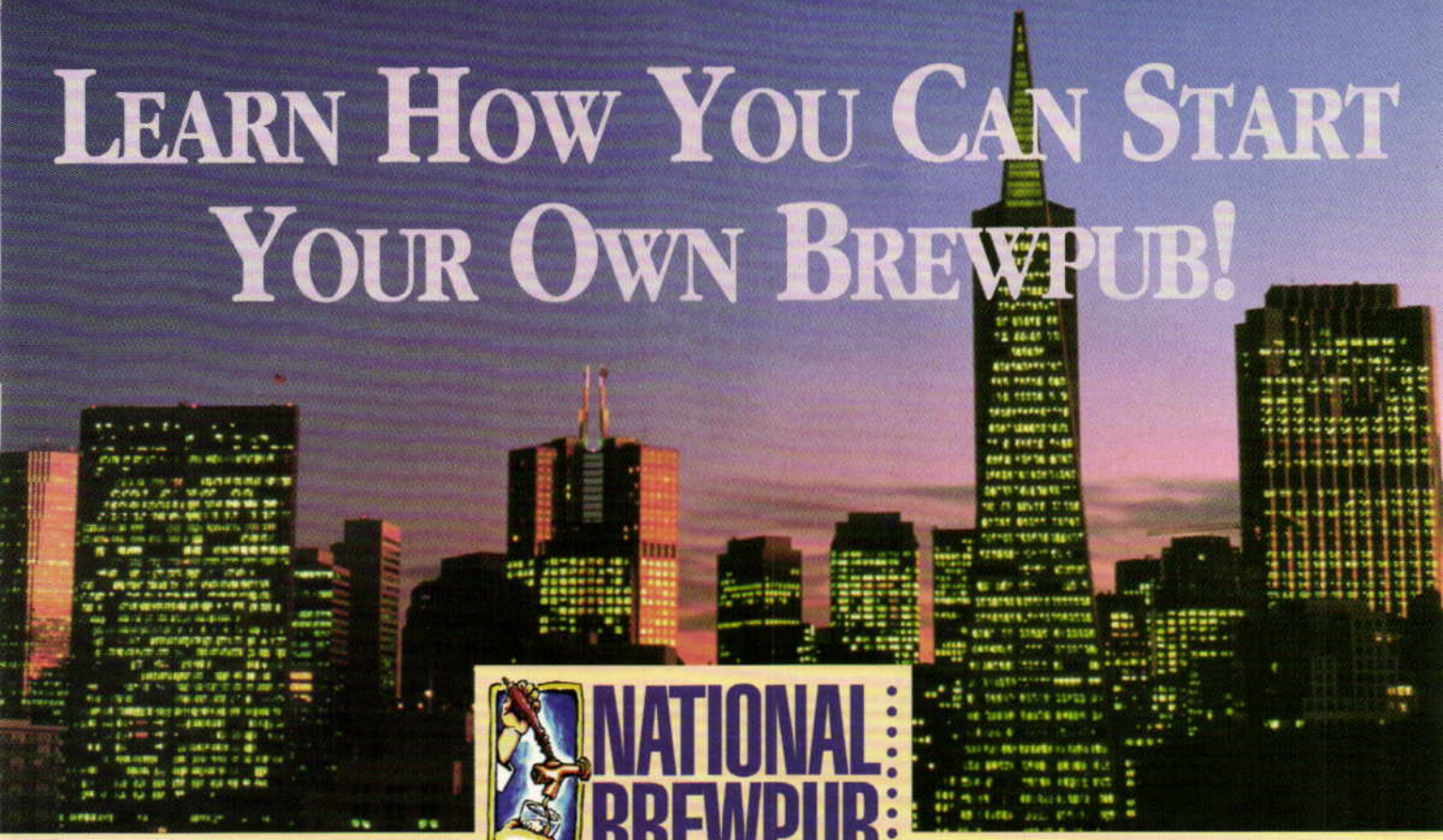
As an option, you can simply run the wiring directly from the wall receptacle to the hood. In this case, you need to stand on a chair and physically turn on and off the hood each time you use it by using the hood's on/off switch.

If you are not familiar with electrical wiring, get help with this project from someone who is.

**Venting the hood:** I used standard aluminum ventilation ducting (and good old duct tape) to attach to the hood and ran it out through a hole cut in the wall of the garage. I used a standard dryer vent cap on the outside of the garage wall for the venting. The top venting hoods have a 7-inch hole in the top and require either 7-inch ventilation ducting or an adapter (in my case 7-inch-to-4-inch reducer) to attach 4-inch ventilation ducting to run to the wall or roof vent cap.

It is also possible to mount the outlet end of the ventilation ducting at the screened vent in the eave where the wall meets the roof. Thus, no need to cut any holes. However, this will lead to moisture accumulating in the eaves, which you may not want. Otherwise, cut the 4-inch or 7-inch hole in the roof and vent out directly through a roof cap.

# Learn How You Can Start Your Own Brewpub!



# National Brewpub Conference & Tradeshow

*San Francisco • November 9-11, 1998*

## Attend the Only Conference & Tradeshow for the Exploding Brewpub Industry!

See you at the largest brewpub industry event ever — combining a conference and tradeshow. Experience three days of hands-on sessions and small workshops designed to give you the ultimate in practical knowledge — how to run your brewpub more efficiently and profitably. Period. From pros who have actually done it. Choose the workshops you like from tracks in Management, Restaurant, Brewery and Startups. Customize your coursework to fit your needs. Network with knowledgeable peers during welcome reception, beer breaks, lunches and the brewpub tour of San Francisco. All included as a conference attendee!

**Three Days**

**35 Hands-on Workshops & Classes**

**125 Exhibits**

***November 9-11, 1998***

*Topics include:* ***StartUps:*** *Market Strategies for Startups: Defining Your Customer Base • Brewing Decisions for Startups • Successful Strategies for Financing Brewpubs • Hands-on Design Workshop • Panel: Kitchen Planning Workshop • Site Selection • Working with Contractors • Panel: Brewery Installation* ***Brewery:*** *10 Important Brewing Trends • Effective Yeast Management • Advanced Recipe Formulation • Beer Finishing & Filtration • Lines and Taps: An Insider's Guide • Make Nitrogen Work for You • Brewing Belgian-Style Beers* ***Management:*** *Anticipating Change in the Brewpub Market • When, Where, Why & How to Advertise Your Brewpub • Business Management for the Brewery Side • Planning for Expansion • Panel: My Best Promotions • Building Distribution* ***Restaurant:*** *The Cost-Efficient Restaurant: A Tactical Guide • Operations Secrets of Chain Restaurants • Staff Training Methods for Long-Term Stability • Cutting Costs: Controlling Restaurant-Side Expenses • 15 Ways to Keep Customers Coming Back • Advanced Menu Design • Fine-Tune Inventory and Purchasing Systems and much more.*

**Show Organized by BrewPub Magazine**

## YES! I'm Interested in the Brewpub Industry's Only Conference & Tradeshow!

❑ Send me a complete conference brochure.

❑ Send me information on exhibiting.

NAME

COMPANY (If applicable)

MAILING ADDRESS

CITY STATE ZIP

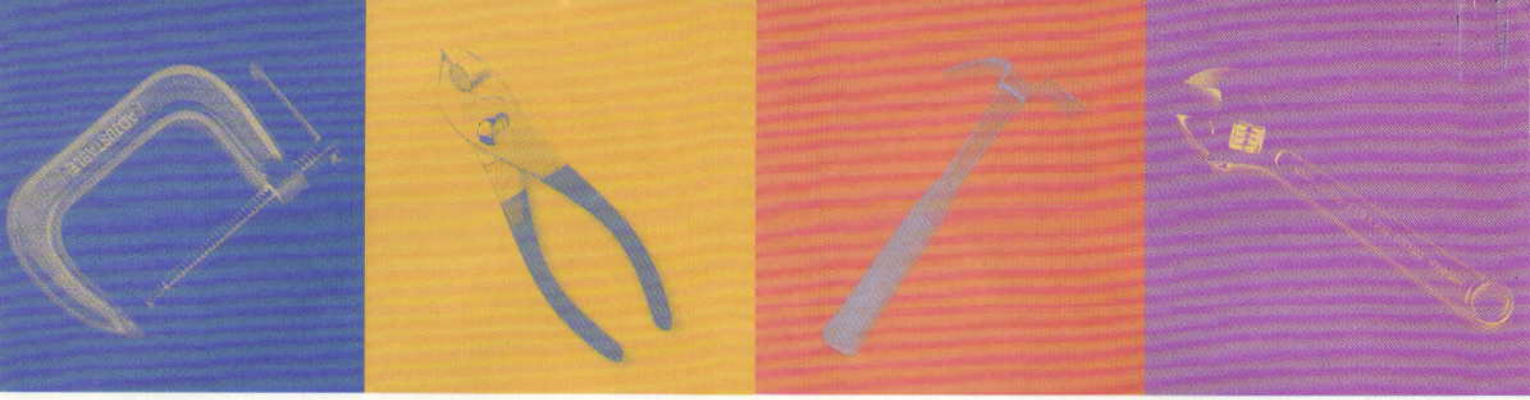
PHONE FAX

*Media Partner*

Brew Your Own
The How-To Homebrew Beer Magazine

**Send or fax to: National Brewpub Conference & Tradeshow**
216 F Street, Suite 160, Davis,CA 95616 Tel: (530) 758-4596 Fax: (530) 758-7477

BYO5



# Killer RIMS

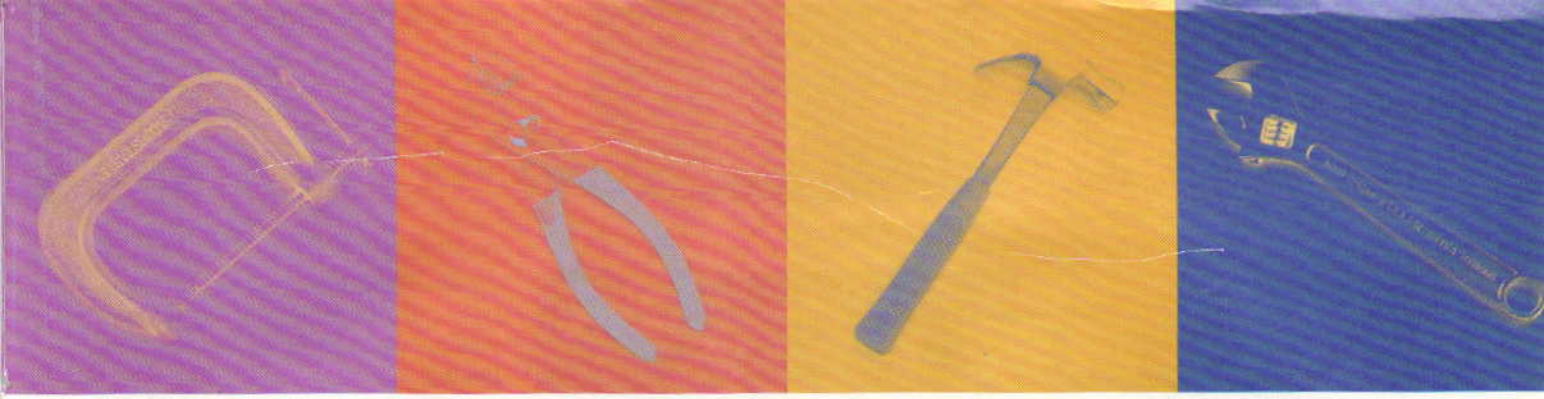
Like many homebrewers, I came to a point with my partial-mash brewing that provided great beers but didn't allow for the full creative control of the process that I wanted. Of course the next logical step is all-grain brewing. There are numerous methods to choose from for this style of brewing, but which was right for me?

I already owned a propane-fueled King Kooker and a converted 15.5-gallon stainless steel boil kettle to handle 12 gallons of wort. To avoid wasting money already spent, I wanted to incorporate these pieces with any new setup I bought.

My decision on what method to use was made for me at a home-brew club meeting in a fellow member's basement.

In that basement was a one-half barrel RIM (recirculating infusion mash) system. Natural gas was piped into the burners. Two faucets from an overhead water pipe poured water directly into awaiting vessels. Two linked boil kettles

by Colin Markham




MIKE FROID PHOTOS

Interlocking construction in the upper corners and bolts gives the table its strength. The table can be partially or completely dismantled for transport and storage.

accepted the lautered run-off for a true half-barrel output. Ventilation was provided by a restaurant-grade hood.

After I picked my jaw off of the floor and stopped drooling, I began gathering as much information about RIMS as I could. I talked to homebrewers and shop owners, and scoured books and magazines. I began drawing diagrams and sketches of different potential system setups. This helped me resolve questions about possible construction and operational problems before I built or bought anything else. I made a list of wants and needs. This RIM system had to be safe, strong, back saving, portable, storable, expandable, and versatile. Low cost wouldn't hurt, either.

What I finally envisioned on paper was an open-frame steel table

on which to place two kettles. Rails placed lower on the table would hold the burner and allow it to slide from under one kettle to another. A pump would first recirculate the mash liquid and then be used to transfer sparge water from the boil kettle to the mash/lauter tun. After collection, the pump would transfer the wort back to the boil kettle.

Now that the system is built, I must admit that I have achieved my goals. This system is very safe by virtue of its incredible sturdiness and strength. An engineering friend calculated that the table can hold 800 pounds in the center without flexing. He refused to be quoted because he fears somebody will make one, max the load with something hot and heavy, and get hurt in the process. He doesn't want a lawsuit, and neither do I. So don't park your car on it. In reality, two very full 15.5-gallon kettles would weigh a maximum of 400 pounds combined. With an even weight distribution across the entire table and its low center of gravity, a tipover would be very hard to initiate (at the dimensions of my table and with similar steel).

The strength of the table actually comes from the construction of the upper corners and the bolts. In each corner three rails meet to create six joining faces. Three bolts are used per corner, yet each rail receives two bolts at each corner. This interlocking makes for an extremely rigid structure. The bolts used in my table are anti-shear bolts, the same type used in suspensions and undercarriages of large vehicles. Technically, they are termed ASTM A325 Slip Critical Bolts. It may be overkill, but I'd rather be safe than sorry.

Using a pump to transfer liquid eliminates the height requirement found in many gravity-feed systems. When handling 10 to 15 gallons of liquid at a time, this is a back saver. The chances of a nasty liquid burn are greatly reduced, increasing the safety factor. Also, the minimal height allows the operating system to tuck under spaces a gravity feed can't, which was a major construction concern at my South Philadelphia row home.

The table can be taken apart for transport or storage in several different ways. Removing the end rails and loosening the remaining bolts allows the two separated sides to scissor to a convenient size. Complete disassembly gives me a bundle of metal 36 inches long and 6 inches high,

weighing 70 pounds. For speed and ease the entire assembled table can actually fit into the back of a standard station wagon.

The table was built with the potential to expand to a larger system, if needed. The table's height was determined by the relationship between my kettle's plumbing and the height of my fermentation bucket. I wanted gravity feed for the cool wort transfer to my buckets, so the low point of the interior plumbing needed to be higher than the bucket's top-off point. If I ever get a taller primary fermentation vessel, perhaps a demi-john, all I need to do is increase the height of my table legs. The width of my table was determined by the burners, so if they change, so can the table. It is very important to stress that structural integrity must always be kept in mind, so any changes in dimension must be carefully thought out before the hacksaw begins its work.

The versatility of this RIM system is tremendous. Since the mash tun is heated along with the strike water, accurate resting temperatures after doughing in can be calculated. The mash tun capacity is huge. I used the parti-gyle method to make a barleywine and a Scotch ale from the same grain bill. There were 29 pounds of crushed grain and 10 gallons of water in the mash tun with room to spare. The mash didn't stick.

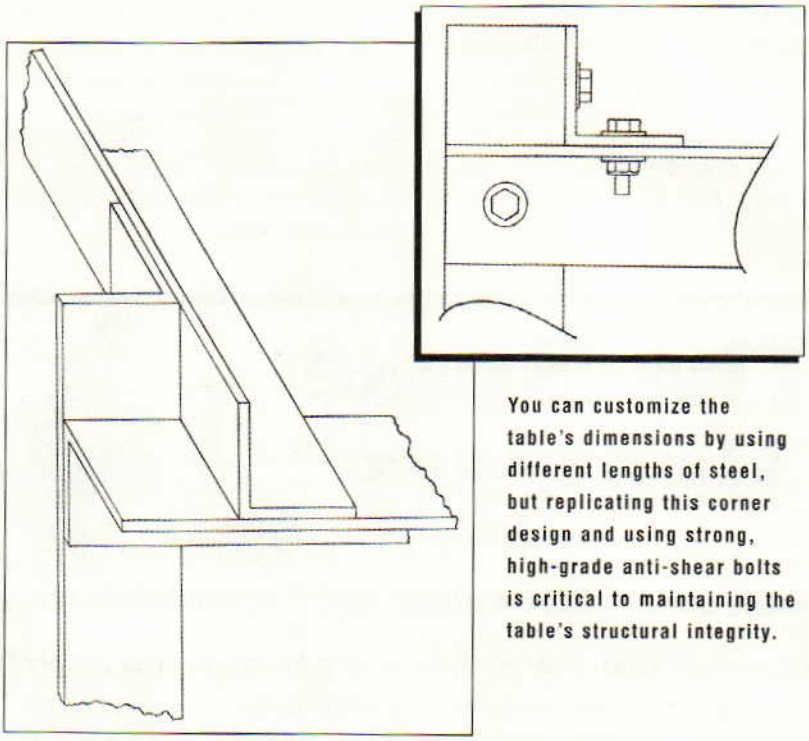
Temperature step infusions are handled with ease. There is a liquid volume of three cups under my mash tun's false bottom. With a low flame and the burner's baffle plate swung into place to help spread the heat, grain scorching is eliminated during recirculation. Since a small volume of hot wort is briefly exposed to a cooler environment during recirculation, slight downward drifts of resting temperatures may occur. These drifts are eliminated with periodic applications of flame.

I like to get a lot of beer out of a brewing session. Occasionally, I will make 10 gallons of all-grain and five gallons of partial mash during the same brew day. The day can be surprisingly short if it is structured well. I start by using my boil kettle to make the partial-mash batch. While this is cooking, I prepare the mash tun for the grain batch. By the time I dough in, I am cooling the first batch. During recirculation, the cooled wort from the boil kettle is put into a fermenter. The boil kettle

is cleaned, filled with sparge water, and heated. Starch conversion with RIM-ing is fast. Lauter, boil, and chill as normal and 15 gallons are done in a day. Pitch the grain batch with two different yeast strains, and three separate beers have been made. Of course 10 gallons of extract could be made, but I like the shorter heating and cooling times that a five-gallon batch provides.

This system will last a very long time for what I need. The pump is the only thing that can malfunction, and that is covered by warranty. Besides, this system can work in the manual mode if necessary. It is fabulous for ales and with experimentation could be used as a decoction system for lagers.

A system like this can be integrated with existing pieces as mine was, or it could be designed from



You can customize the table's dimensions by using different lengths of steel, but replicating this corner design and using strong, high-grade anti-shear bolts is critical to maintaining the table's structural integrity.

scratch. Sketching details, talking to fellow brewers, sourcing materials, and reading everything I could get my hands on helped me custom fit this practical and efficient RIM system to what I wanted, needed, and could afford.

## The Table

When I was done diagramming my complete setup, I wrote out a shopping list: metal for the brewing table, a pump for recirculation, a 15.5-gallon converted stainless steel mash/lauter tun.

My local homebrew shop provided me with the kettle, pump, and directions to the best steel distributor in the region. My table required close to 30 feet of 2-inch by 2-inch by 3/8-inch angle steel, which they cut in lengths to size for me on a mammoth industrial pinch cutter for a nominal fee. The price for the nuts, bolts, steel, and cuts was less than $35.

There are three important measurements to obtain before metal is cut for the table: the diameter of the kettles, the height of the burners, and the height of the collection or fermentation buckets. I allowed for a small amount of extra space around my kettles for extra stability.

### Parts:

The following list of parts represents the pieces cut to size to fit my components; your sizes may vary. Remember, unlike lumber, the listed size of metal is accurate. This means that a 2-inch by 2-inch by 3/8-inch angle is 2 inches wide, 2 inches high on the outside of the angle, and 3/8-inch thick throughout. I suggest that you get your metal cut at the point of purchase. This steel is tough, heavy material, and having it cut there will make things much easier. All rails are 2-inch by 2-inch by 3/8-inch angle steel.

- Two long kettle support rails, 36 inches long
- Four short kettle support rails, 17 3/4 inches long
- Two burner support rails, 36 inches long
- Four table leg rails, 18 inches long
- Two side rails, 22 3/4 inches long
- 16 bolts, washers, and nuts, 1 1/2 inch by 1/4 inch
- One or two pieces scrap two-by-four lumber

### Tools:

- Drill with 5/16-inch, high-speed steel bit
- Oil for drill bit lubrication
- Hammer

# MAKE YOUR OWN GREAT-TASTING WINE AT HOME — IT'S EASY!

## AT LAST, A MAGAZINE FOR PEOPLE WHO MAKE THEIR OWN FINE WINES!

*WineMaker* magazine gives you the knowledge and expertise you need to craft world-class wine. Every story and picture supports this hands-on, step-by-step approach. The magazine is designed to help everyone from beginning winemakers working with kits to advanced winemakers who start with fresh fruit! This premier Annual Edition of *WineMaker* has all the information you need to create great tasting wine the very first time. Just $4.95.

*WineMaker* is created by the same people who publish *Brew Your Own.*


### READ GREAT FEATURES SUCH AS:

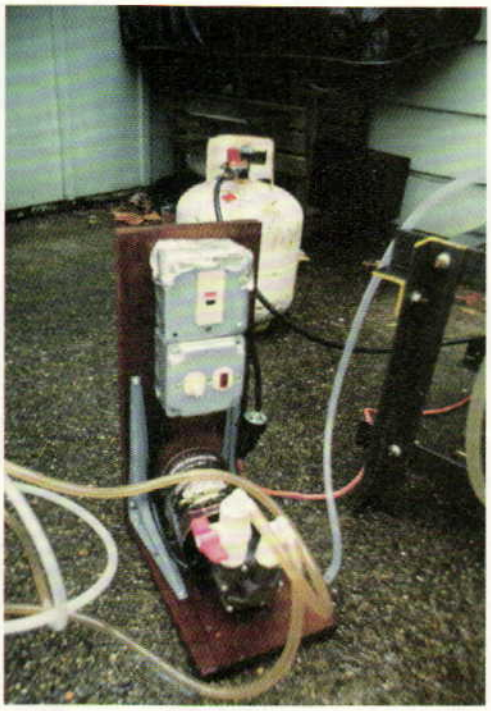
- Great Wine from Kits, Step by Step
- Flavor Secrets You Should Know
- Choosing the Right Kit
- Finding the Best Grapes
- 5 Keys to Identifying Wine Flavors
- Troubleshooter's Guide: Conquering Off-Flavors
- Beyond Grapes: Tips for Making Fruit Wine
- Bottling Basics and much more!

### PLUS REGULAR COLUMNS AND DEPARTMENTS SUCH AS:

- Varietal Focus
- Tips from the Pros
- Must Haves
- Cellar Dwellers
- Winery Spotlight and much more!

**CALL (530) 758-4596 TO FIND A COPY NEAR YOU!**

## AVAILABLE AT HOMEBREW & WINEMAKING SUPPLY STORES AND NEWSSTANDS EVERYWHERE!



Using a pump to transfer liquid eliminates the height requirement found in many gravity-feed systems. When handling 10 to 15 gallons of liquid at a time, it's also a real back saver.

- Center punch
- Two to four C-clamps
- Paper towels
- Permanent marker
- Measuring tape

## Putting It Together

For clarity I will use the terms left, right, front, and back as if you are looking at the table from the same point at all times. I built my table on the ground, but a decent size work bench will do.

Study the photographs accompanying this article. The stability and strength of the table come from the interlocking construction of the corners. It is of great importance that this design be replicated. Of equal importance is the quality of bolt used. Use strong, high-grade anti-shear bolts with this project because its structural integrity relies on

them. They are not expensive and are easy to find.

Begin with the front left corner. Place a side rail on the ground, positioned from front to back. The interior opening of the angle should be facing down and to the left. A piece of two-by-four can be used to hold the rail in the proper position. Measure two inches in from the front end of the side rail and place a mark on the top. Place a long kettle support rail from left to right on top of the side rail, the left end of the kettle rail equal with the upper left edge of the side rail at the mark. The interior opening of the angle of the kettle support rail should be facing up and back. Clamp these two rails together.

Take a leg rail and hold it with the opening of the angle facing out and to the right. Place the leg in front of the kettle rail and to the immediate right of the side rail. The top of the leg should be flush with the top of the kettle rail, and the front edge of the leg should be flush with the front end of the side rail. Clamp the leg to either other rail. Loosen the clamps slightly and adjust the rails so everything is square, then retighten. The corner should look like what is shown in the diagram on page 37. There should be an empty space the size of a two-inch cube at the upper left front corner.

Three matching 2-inch-square areas along the rails have been created at the intersection of the side rail and kettle rail, side rail and leg rail, and the leg rail and kettle rail. The holes will be drilled here. From one side only, find and mark the center of each area with the center punch. Be sure to pick which side will be easiest for you to drill from. Using ample oil for lubrication, drill one hole. It will be a slow process. Clean out the hole and wipe away metal debris. Place a bolt and tighten down the nut. Move on to the second and third locations, repeating the process. When finished you should have a solid, uneven-length tripod.

The remaining three upper corners are completed in the same fashion, in mirror image.

The installation of the burner rail is an easier process. Decide on the clearance for your burner(s) under your kettle rail, remembering the kettles will be approximately two inches higher than the bottom of the kettle rail when the table is complete. Combine your clearance, burner height, and three-eighths of an inch for rail thickness. Use this measurement and mark the four

table legs from the bottom of the kettle rail. Holding the burner rail in the same alignment as the kettle rail, place the bottom of the rail against the new marks and clamp. I suggest that you clamp both rails at the same time and try to place your burner. You want to be sure it fits before you drill. Mine was a very tight fit, which takes a bit of twisting to get in place with the table in one piece. If the table is partially assembled, burner installation is easier. You decide what you want. Make sure the top of the burner is below the bottom of the kettle rails.

Find and mark the center of the overlapped areas of the leg rail and burner support rail and drill.

Insert the bolts, tighten, and the major construction is finished.

At this point I suggest marking the rails in some permanent manner to make sure all the pieces are matched from this time on. If your drill holes were not perfectly centered, marking it will make reassembly easier by tenfold.

Take the table apart to the component pieces and give the metal a good washing to remove remnant oil and metal fragments. Coat the table pieces with a high-temperature paint of your color choice. I may recoat mine with Chevy Orange or stripe it with yellow and black caution lines.

After the paint has dried, put the table back together. Install the burner(s). Take one of the four unpainted short kettle support rails and hold it like an inverted V. Place this rail from front to back across the long kettle support rail at the left end of the table. The second short kettle support rail is placed in a similar fashion across the long kettle support rails at the right end of the table. The remaining two short kettle support rails are placed side by side across the long kettle support rails at the center of the table. There should be a four- or five-inch gap between the center short kettle support rails. These support rails were cut one-quarter of an inch shorter than the interior distance between the upper rail sides. This gives the supports more than adequate room for heat expansion.

Place your kettles on the short support rails, two rails per kettle. Adjust the short supports side to side to make a nice, stable platform on which the kettles will rest. The short rails should be spaced far enough apart so they won't block the burner's flame but not far enough

away to allow a wobble in the kettle. The table is now complete.

### The Pump

The pump I use for my RIM system is a March MDX-MT3. It is a magnetic drive pump that eliminates the conventional shaft seals found in most pumps. This means there is no leaking or fluid contact with metal surfaces, a plus for brewing. The pump can handle temperatures up to 200° F. This pump runs at a constant 3,000 RPM. It will pump water at eight gallons per minute (GPM) at a 1-foot head (height) and pump six GPM at a 6-foot head (height). There is plenty of power for this system.

The pump housing contains the impeller magnet assembly. The impeller spins on a ceramic spindle and pushes the fluid. The housing has one inlet and one outlet port for liquid to enter and exit.

These ports are threaded with 1/2-inch MPT threads, the same as used on a common garden hose. A trip to the home store netted the pieces I needed to reduce the ports to the 3/8-inch barbed plumbing common on my system. Because the pump runs at one speed, I placed an adjustable ball valve between the port and 3/8-inch barb on the outflow side.

The impeller should not run for more than 30 seconds dry, or it will bind to the spindle. Placing the valve on the outflow greatly reduces the chance of the housing running dry. The impeller can spin forever with fluid, so a closed ball valve with a running pump is no concern.

Making a base for the pump is not necessary, but it makes things a lot easier to handle when all of your brew equipment is out. The possibilities of shape, size, and location are completely up to you. I created a large L-shaped wooden structure. The pump was bolted to the base of the L. An on/off switch and safety features were attached to the vertical part of the L. For carrying ease, a hinged handle was placed on the back of the vertical L piece.

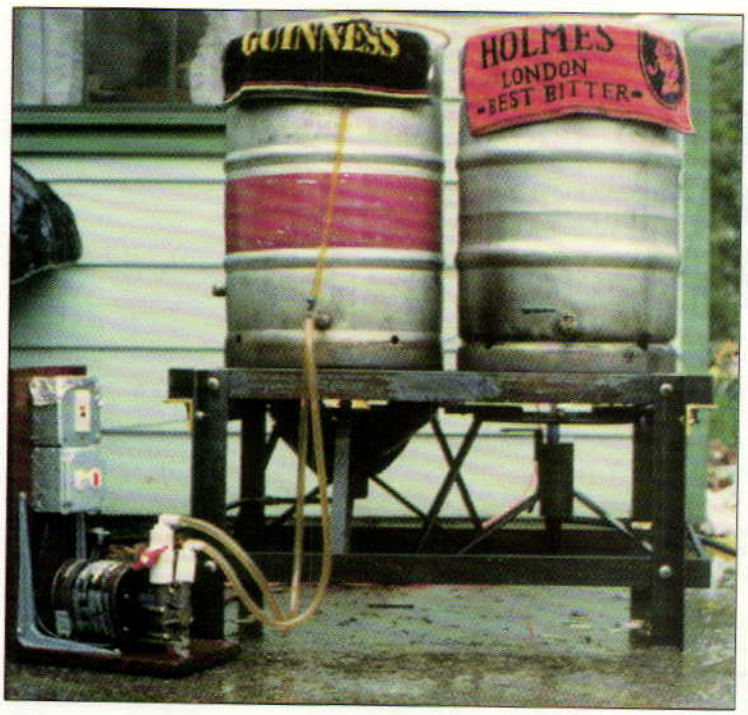
Starting and stopping the pump safely is the next issue to be addressed. The pump as purchased has only an electrical cord. It is up to the buyer what type of on/off switch and plug to use. The on/off switch I purchased has a pilot light to indicate the switch's status. This is very handy. The plug I purchased is a good quality, heavy-duty piece.

Because the pump is to be used in a very wet environment, it is of great importance to include a ground fault circuit interrupter (GFCI). The GFCI, when installed correctly, senses voltage fluctuations like those seen when the bad guy dumps a plugged-in radio into an occupied bath tub, and it stops the current in a micro-second. This device can be a life saver, and it must be used.

If you are familiar and competent with electrical wiring, this hook-up should take no more than 30 minutes to complete. If you have even the slightest doubt about what you are doing with the electrical hook-up, I advise in the strongest terms possible to let somebody who does know what he is doing complete it. Pay him with a homebrew and a promise of more to come.

The operation of the pump in a RIM system is easy, but there are some items to remember. First, think ahead about where you want your fluid to go. Second, make sure the plumbing valves are closed when they are supposed to be closed. Third, gravity still works in a RIM system. That is both a good thing and a bad thing.

I use a total of three clear, 3/8-inch hoses when I brew. Hoses are




The complete system can fit into tight spaces that a gravity-feed system can't.

attached to the plumbing with circular plastic clamps. I leave my pump in one position during the brew day, so each hose is a different length to correspond to a specific job it has in the system.

I begin my pump use with recirculation. The plumbing of my mash tun is connected by hose to the inlet port of the pump. A hose placed on the outlet pump runs up the side of the mash tun and lays coiled on top of the grain bed. I open the mash tun's valve completely. Remember, do not restrict fluid flow into the pump. The outlet valve is then opened. Fluid will flow by gravity into the pump housing and out into the outflow hose. The pump is started, and recirculation begins. Use the outlet ball valve to adjust the flow of fluid into the grain bed. A hole can be bored into the grain bed by a high flow. This will reduce the efficiency of extraction, and that is the opposite of our intentions.

When conversion is complete, the pump is stopped and valves are closed. A new hose is placed on the sparge water kettle's plumbing and then placed onto the inlet fitting of the pump. If the outflow valve is not closed, gravity will begin to siphon wort from the grain bed and deposit it onto the ground. Remember valve position! (Can you tell this happened to me?) The still-connected mash tun's hose is placed into a wort collection bucket. The hose on the outlet side of the pump is attached to a sparge arm. All valves are opened, the pump started, and sparging begins. I use a flying mash, so I am always adjusting the pump's flow to maintain an even saturation of the grain bed.

Once I have finished collection, the pump is turned off and all valves are closed. Any remaining sparge water is dumped into another bucket to clean equipment. My collection buckets have valves similar to bottling buckets. I place the bucket on a cinder block to have the fluid level higher than the pump head. I place

a hose onto the collection bucket's valve and connect it to the inlet valve of the pump. The hose is removed from the sparge arm and put into the boil kettle. All valves are opened, the pump started, and the wort transfers to the boil kettle for cooking.

## Using the System

Finally, I was ready for my RIM system's test run. This system is perfect for a single-step infusion, so I chose a pale ale to start. For this first batch I also decided to make a five-gallon batch to minimize any losses from the ever lurking Mr. Murphy. I planned a thin, wet mash of 1.5 quarts of water per pound of grain to help avoid a stuck mash.

Using a calculation to determine final resting temperature from strike temperature, I doughed in to the preheated mash tun. I hit the resting temperature within a degree. Manual recirculation set the grain bed after about one gallon. I connected a short hose to the mash tun's plumbing and then to the inlet of the pump. I then connected a long hose to the outlet of the pump.

This hose snakes up and into the mash tun and rests on top of the grain bed. Opening the ball valve all the way on the mash tun and halfway on the pump, I turned on the power. Recirculation started with a rush of fluid boring a hole into the grain bed. I turned the pump's ball valve back to achieve a more gentle flow. By the time the sparge water had reached temperature over a medium flame, the mash had starch conversion.

With the pump off and valves closed, I switched hoses. The short hose was placed to collect sparge water from the boil kettle's plumbing, and the long hose was attached to a rotating sparge arm. Lautering was begun. Wort collection into a bottling bucket was easy since 45 minutes of recirculation had established a strong grain bed. Setting my bottling bucket onto a cinder block above the level of the pump head and switching hoses again, I transferred the wort to the now empty boil kettle. I began the boil with Mr. Murphy never showing up.

A year and eight batches has gone by, and I have hardly changed anything. The only improvements I have made were to add a second burner — no more sliding back and forth — and an additional bucket with a spigot to aid in large-volume wort collection.


9
8
SHAWN TURNER

# Multi-grain Brewing

by Scott R. Russell

Remember when all bread was white and squishy? Remember when all beer was light and bland? Just as consumers are clamoring for more flavorful beers, so too are better-tasting breads winning popularity. First it was wheat bread, then whole-wheat bread. One current favorite is multi-grain bread, made from a combination — often seven — different types of grains melded together to create a rich flavor.

Well, just as merging various grains creates better bread, it can

also create terrific beer. The following recipes feature seven grains, but you can mix and match to create your own multi-grain gem.

Each recipe is still based on barley malts, because barley is the ideal base malt and greatly improves the mashing and fermenting process when using other grains. But there's so much more to them. Each of the recipes requires mashing, but many of these grains can be steeped in an extract-based recipe.

## Is Your Oatmeal Flaky?

Barley, wheat, and rye are readily available in homebrew shops in malted form. Malted grains are much easier to brew with than non-malted grains, so use these if you can. Other grains, including oats, rice, and corn (as well as wheat, rye, and barley), can be found in flaked form. Flaked grains can be used in the mash with no further preparation (again, check with your homebrew supplier first). For dinkel, triticale, amaranth, buckwheat, spelt, and others you will have to deal with the hardship of pre-mashing to gelatinize. Likewise if you can't find flaked rice.

To gelatinize, simply boil one to 1.5 quarts of water for each pound of grain, add the grain, and soak it, covered, for 45 minutes. Add these precooked grains with the cooking water into the mash with the malts and flakes. If you really want to go authentic, you can try to malt these grains, but most brewers wouldn't recommend it.

So which grains should you use? Whatever you can find, of course.

Dinkel and spelt are more or less ancient forms of wheat, so they will taste similar to wheat in a mash. Triticale is a modern hybrid grain, combining the qualities of wheat and rye. If you go to a whole foods store, you should be able to track down several different varieties. Baking supply stores often have many of them as well. You want to find whole grains, not flour, though. Cereal aisle, rice and pasta aisle, ethnic foods aisle, sprouting seeds aisle. Admittedly, some will be harder to find than others but worth it if can you find them. You can substitute almost any one of them for another, depending on what you can find. And different varieties will give slightly different results (for instance red wheat berries will be a bit different from white ones). This is not an all-inclusive list of grains. Write and let us know what other grains you've found to brew with.

## Birdseed Blonde Ale
### (5 gallons, all-grain)

Light in color and body but with a nice complex, nutty taste.

**Ingredients:**

- 4 lbs. pale malted barley
- 1 lb. Munich malt
- 0.5 lb. flaked rye

- 0.5 lb. popcorn
- 0.5 lb. pre-cooked millet seed
- 0.5 lb. pre-cooked sorghum
- 0.5 lb. pre-cooked quinoa (or grain amaranth or dinkel)
- 1 lb. rice syrup solids
- 1.5 oz. Tettnanger hops (4% alpha acid): 0.75 oz. for 50 min., 0.75 for 10 min.
- German ale yeast (Alt or Kölsch strain) built up to at least a quart of slurry
- 3/4 cup corn sugar for priming

**Step by Step:**

Pop the popcorn in an oil-free air popper. Do not butter or salt! Pre-cook the millet, sorghum, and quinoa in about 3 qt. water. Heat 2.5 gal. water to 162° F. Add the barley malts, popcorn, and the precooked grains (with the water they soaked in), which should settle to about 152° F. Hold at this temperature for 75 min. Begin the runoff and sparge with 3 gal. of 168° F water.

Add a little water to the kettle if necessary to make 6 gal., then bring to a boil. Total boil is 50 min. Add rice syrup solids and about half of the hops. Boil 40 min. Add the rest of the hops. Boil 10 min. more, which should bring the volume down around 5.25 gal. Remove from heat and chill the wort. When cooled to 70° F, pitch the yeast.

Ferment between 65° and 68° F for 10 days. Rack to the secondary and age cool (50° F) for two weeks. Prime and bottle. Bottle condition at 50° F for three weeks.

## Kashi Amber Ale
### (5 gallons, all-grain)

Reddish amber, because of the rye and the crystal, this is a rich-tasting beer with an intriguing blend of spicy flavors.

I must give credit where credit is due. I was talking about this article with my wife one morning when my children pointed out that the box of cereal on the table in front of them (Honey Puffed Kashi, produced by The Kashi Co. of La Jolla, Calif.) had seven grains in it. This recipe is based on that box of cereal.

**Ingredients:**

- 3 lbs. pale malted barley
- 1 lb. medium crystal malt (50° to 60° Lovibond)
- 1 lb. malted wheat
- 0.5 lb. malted rye
- 0.5 lb. flaked oats
- 0.5 lb. brown rice
- 0.5 lb. buckwheat
- 0.5 lb. triticale
- 0.5 lb. red winter wheat berries
- 2 cups honey
- 2 oz. whole sesame seeds
- 1 oz. Willamette hops (4% alpha acid) for 30 min.
- 1 oz. Cascade hops (4% alpha acid) for 30 min. steep
- American Ale yeast, built up to at least a qt. of slurry
- 2/3 cup brown sugar for priming

**Step by Step:**

Precook (as above) the brown rice, wheat berries, triticale, and buckwheat in 3 qt. water. Heat 3 gal. water to 162° F, add precooked grains (with cooking water), flaked grains, rye, wheat, and barley malts. Mash should stabilize at about 151° F. Hold at this temperature for 90 min. Begin run-off and sparge with 3 gal. 169° F water.

Add honey to kettle and bring to a boil. Boil until volume is down to about 5.5 gal. Add Willamette hops for the last 30 min. of the boil. Add Cascade hops and the sesame seeds (in a fine mesh bag to facilitate removal) as you turn off the heat. Steep 30 min., and then chill the wort. When the wort has cooled to 68° F, pitch the yeast.

Ferment at 68° F for 10 days. Rack to secondary and condition warm (62° to 65° F) for 15 days. Prime and bottle. Bottle condition for three weeks.



## Cheater's Stout
### (5 gallons, all-grain)

Dark and creamy-smooth, but it's cheating because it only has six different grains — unless you count malted and unmalted barley as two separate ones.

**Ingredients:**

- 3 lbs. pale malted barley
- 1 lb. dark crystal malt (90° to 120° Lovibond)
- 1 lb. roasted unmalted barley
- 1 lb. flaked wheat
- 1 lb. flaked oats
- 1 lb. flaked maize (corn)
- 0.5 lb. spelt
- 0.5 lb. brown rice
- ½ cup dark molasses
- 1 oz. Northern Brewer hops (8% alpha acid) for 65 min.
- 1 oz. Kent Goldings hops (3.5% alpha acid) for 5 min.
- English or Irish ale yeast (built up to at least a qt. of slurry)
- 2 oz. lactose (milk sugar)
- 1 cup unhopped dark malt extract for priming

**Step by Step:**

Precook the spelt and brown rice (as above) in about 2 qt. water. Heat 3 gal. water to 164° F. Add precooked grains (with cooking water), flaked grains, malts, and roasted barley. The mash should stabilize at about 152° F. Hold at this temperature 90 min. Begin run-off and sparge with 3 gal. 168° F water.

Bring to a boil. Total boil is 65 min. Add molasses and Northern Brewer hops, boil 60 min. Add Goldings hops, boil 5 min., and remove from heat. Chill, pitch yeast at 68° F.

Ferment two weeks at 62° to 65° F. Rack to secondary and age two weeks at 60° F. Prime with dry malt extract and add lactose to sweeten a little. Bottle and age four to six weeks in cool (50° F) and dark place.

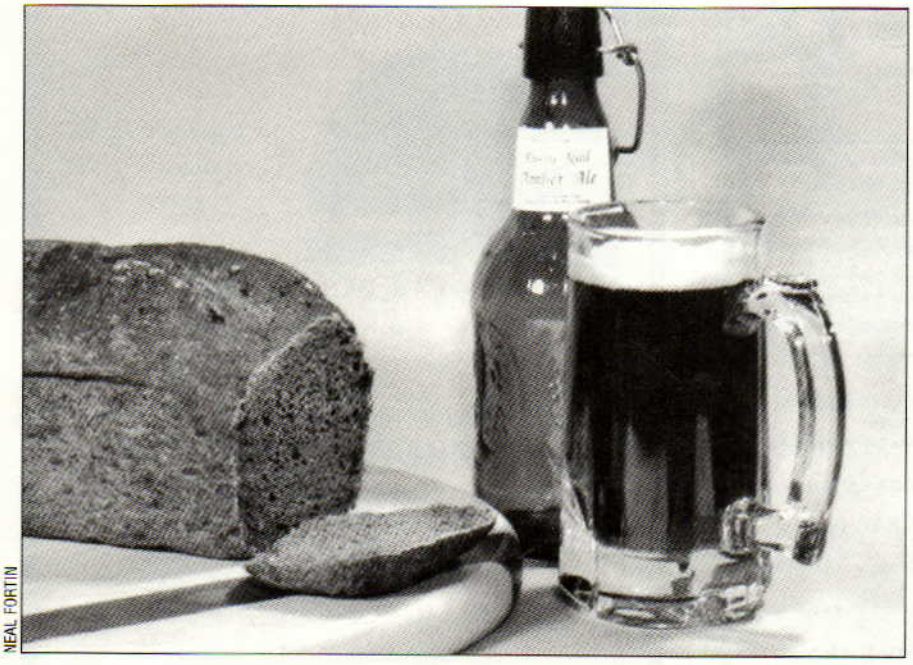
# Cooking With Spent Grain

*by Neal Fortin*

*Brewing your own beer doesn't have to mean wasted malt at the end of the process. Cooking with spent grain is an economical way to create great food.*

To Americans, barley brings to mind just two items, beer and soup. However, in ancient times barley was a prominent, important food. It was one of the first domesticated grains and was the chief bread grain of the ancient Hebrews, Greeks, and Romans. Barley was so significant that at times it even served as currency.

Both economical good sense and the desire for nutrition invite us to put our spent grain to good use in food recipes. Extracting malt for beer brewing removes mostly carbohydrate. The remaining spent grain constitutes a concentrated source of nutrition, high in vitamins (particularly niacin and thiamin), high in fiber and protein, yet very low in fat. The malted barley used for beer making, in fact, is more nutritious than traditional white "pearled" barley, which has the nutritious germ removed.



NEAL FORTIN

The ancients were on to something good. Our spent malt is simply too good to waste. The following four recipes provide nutritious and tasty uses for your spent grain.

## Hints and Tips for Spent Grain Cooking

Two of these recipes call for two parts crystal malt for each part of chocolate malt. The different malts are not kept separate in brewing, but rather this ratio comes from the mix of spent grains left from a beer recipe with a 1:2 ratio of chocolate malt to crystal malt. Don't feel locked in by this ratio; go ahead and experiment. Also, note that if you steep or partial mash, you may find you need to reduce the amount of grain, particularly in bread. That's because more sugars and nutrients are often left in these grains.

The easiest way to store spent grains is in your freezer. After you've sparged the grain, just strain it well. If you don't remove most of the surface water, the grains will freeze into an ice cube and will be difficult to divide for the recipes.

## Neal's Real Barley Bread

This recipe calls for whole-wheat flour, but don't let that intimidate you. Even people who don't like whole-wheat bread do like this one enough to ask for the recipe. The whole wheat stands up better to the flavor of the barley than regular white flour. However, you can substitute white flour for the whole wheat if you prefer. The

result will still be a really fine loaf of bread. If you have trouble with the texture of the dough, consider adding more flour in the mixing bowl or reducing the amount of spent grains.

**Ingredients:**

- 3 cups lukewarm water
- 1/4 cup honey, molasses, or sugar
- 1 cup dry milk
- 4 cups whole-wheat flour
- 2 eggs
- 4 cups spent American crystal malt (wet)
- Yeast
- 4 tsp. salt
- 1/4 cup oil or butter
- 1 egg (optional)
- 1/4 cup water or milk (optional)
- Sesame or poppy seeds (optional)

**Step by Step:**

Put the malt and 1 1/2 cups of water in a blender or food processor and blend until liquefied.

In a large bowl sprinkle the yeast over 1 1/2 cups of water and stir to dissolve. Add the sweetener, dry milk, and eggs and mix well. Add the blended grains to the bowl and mix well. Gradually add enough flour to form a thick batter. Beat 100 strokes with a spoon. Cover the bowl with a damp cloth and let the sponge rise for about an hour or until at least double in bulk.

Sprinkle the salt and pour the oil over the sponge. Fold into the sponge until well combined. Begin folding in the remaining flour until the dough pulls away from the sides of the bowl and it is difficult to manage with the spoon.

Turn the 3 to 4 cups of dough onto a well-floured board and knead. Use as much additional flour as necessary to keep the dough from sticking to the board or your hands. Continue to knead for 10 or 15 minutes, until the dough is very smooth. Place the dough in an oiled bowl, cover with a damp cloth, and let rise about an hour or until double in bulk. Punch the dough down with your fist 25 times. Cover and let rise again until doubled. (This step may be eliminated, but the loaf will be a little heavier.)

Divide the dough into three equal pieces and shape into loaves. Place in well-oiled loaf pans. Cover and let rise until double in bulk.

Optional: Beat the egg with the water or milk. Cut slits 1/2-inch deep in the tops of the loaves and brush with the egg wash. Sprinkle the loaves with the seeds.

Bake in a preheated 350° F oven for about one hour. Remove from the pans and cool on a wire rack or across the tops of the loaf pans.

Yield: 3 loaves

## Barley Pumpernickel Bread

The potatoes, molasses, and chocolate make this bread seem exotic. Prepare it in large pans or as mini-loaves. Sliced thin, it makes a good companion for a beer tasting.

**Ingredients:**

- 2 cups spent chocolate malt (wet)
- 4 cups spent crystal malt (wet)
- 1 Tbsp. salt
- 2 packages dry yeast
- 9 to 10 cups white flour
- 3 1/2 cups lukewarm water
- 1/4 cup dark molasses
- 1 Tbsp. butter
- 2 squares unsweetened chocolate
- 2 cups mashed potatoes at room temperature (fresh or instant)
- 1 Tbsp. caraway seeds

**Step by Step:**

Put the malt and 2 1/2 cups of water in a blender or food processor and blend until liquefied. This is easier in two batches. Pour the liquefied malt into a large bowl, add the salt and the yeast, and mix well. Mix in two cups of flour.

In a saucepan combine 1 cup water, the molasses, butter, and chocolate. Heat over low heat until the chocolate and butter melt. Gradually add this liquid to the flour, malt, and yeast mixture and stir well. Add the potatoes and another cup of flour or enough to make a thick batter. Stir well. Stir in additional flour and the caraway seed. When the dough begins to pull away from the sides of the bowl, let the sponge rest for 15 minutes.

Turn onto a floured board and begin kneading, using more flour as necessary. Knead until the dough is smooth and elastic, about 15 minutes. Place in an oiled bowl. Cover with a damp towel, set in a warm place, and let rise until double in bulk. Punch the dough down with your fist a few times. Cover and let rise again, about 45 minutes. This second rising can be skipped, but the resulting loaves will be a little heavier.

Punch the dough down and turn out onto the board. Divide into three equal pieces and shape each into a round ball. Place the dough in three greased, 8-by-9-inch cake tins. Cover and let rise until double in size. Bake in a preheated 350° F oven for about 50 minutes. Remove from the pans immediately and cool on wire racks. You can also divide the dough into smaller balls and place in miniature loaf pans.

Yield: 3 large loaves

## Barley Grain Griddlecakes

From the number of mixes, refrigerated batters, and frozen pancakes available, it seems that few people make pancakes from scratch these days. However, homemade pancakes really only take a couple of moments longer than a mix and are worth the effort.

The robust flavor of the chocolate malt balances well with the syrup, but remember that a little bit of chocolate malt goes a long way in a recipe. You can adjust the recipe for less chocolate malt, but adding much more could be overpowering.

**Ingredients:**

- 2 cups all-purpose flour

# BREWER'S MARKETPLACE

- 4 tsp. baking powder
- 1 tsp. salt
- 2 eggs
- 1 1/2 cup milk or 2 cups yogurt
- 1/4 cup oil or melted butter
- 1/3 cup spent chocolate malt (wet)
- 2/3 cup spent American crystal malt (wet)

**Step by Step:**

Combine all the dry ingredients in a mixing bowl.

Put the milk, oil, and eggs in a blender or food processor. Add the malt a little at a time and blend until it is all liquefied. Mix in the dry ingredients.

To bake, pour the batter on a hot, lightly oiled griddle. Turn when bubbles break on the surface and the edges seem cooked.

The batter will thicken as it stands. If this happens while you are baking, just stir in a little more milk.

Yield: 24 pancakes

## Great Barley Grain Granola

Great for a morning meal or a snack any time, this granola will go fast.

**Ingredients:**

- 1/4 cup margarine
- 1/2 cup honey
- 2 cups oatmeal (regular or quick)
- 2 cups sunflower seeds (raw, unsalted)
- 4 cups spent crystal malt
- 3 tsp. cinnamon
- 1 cup shredded or flaked coconut (optional)
- 2/3 cup raisins

**Step by Step:**

In a large skillet with an oven-safe handle or 9-by-13 inch baking pan, melt the margarine and stir in the honey. Stir in all the remaining ingredients except the raisins. Bake in a preheated 350° F oven, stirring occasionally.

Bake for 25 minutes or until lightly browned. Remove from the oven and stir in the raisins. Cool completely before placing in the storage container. The granola will last for weeks in a jar or other storage container with a tight lid (if you haven't gobbled it up by then). ■

# CLASSIFIEDS

## SUPPLIES

**DRAFTSMAN BREWING COMPANY** You'll love our prices! Call today for our FREE homebrew suppy catalog. 1-888-440-BEER www.draftsman.com

**HOPS & DREAMS** Homebrew and WInemaking supplies. Great prices & FREE catalogue! 1-888-BREW-BY-U www.hopsanddreams.com

## BREWING EQUIPMENT

**NEW AND USED** full mash brew-on-premise systems; kettles, boilers, kegs and bottle washers, filters, carbonators, recipes, expertise call Dennis at (604) 589-1057 or www.brewpro.com.

## INGREDIENTS

**CANNED MALT BLOWOUT** - Tom Caxton, Youngs - $18/case plus S&H. Minimum 3 case order. Call 1-800-374-BREW for details.

**ORGANIC BREWER'S INGREDIENTS!** No sprays, chemical residues, or additives. Organically grown malts, hops, and adjuncts. Organic beer kits. FREE CATALOG! Seven Bridges: 1-800-768-4409 Website: www.josephson-ent.com/7bridges

**PUTERBAUGH FARMS - HOPS** DIRECT 686 Green Valley Road Mabton, WA 98935. (509) 837-3616. Order direct www.hopsdirect.com

## WINEMAKING

**FREE INFORMATIVE CATALOG.** Since 1967! 1-800-841-7404. Kraus, Box 7850-B, Independence, MO 64054.

## HOMEBREW SUPPLY RETAILER

**ATTENTION LAMBIC BREWERS** - Aged leaf hops. Bullion 1994, Willamette 1995. $1.75. German Hersbrucker 1994. $2.00. Call Beer Unlimited at (610) 889-0905.

**MAKE QUALITY BEER & WINE!** Supplying home beer and wine makers since 1971. FREE Catalog/Guidebook - Fast, Reliable Service. The Cellar Homebrew, Dept. BR 14411 Greenwood Avenue N. Seattle, WA 98133. 1-800-342-1871. Secure Online Ordering www.cellar-homebrew.com

**THE PURPLE FOOT** - big variety of quality ingredients, competitive prices, ask for FREE CATALOG (414)-327-2130, 3167 S. 92 St. Milwaukee, WI 53227.

**STARTER KITS** and Cajun Beers. Call for a FREE catalog. 1-800-641-3757. Alfred's Brewing Supply.

## MISCELLANEOUS

**LABELS MADE EASY!** You make your own beer, why not your own labels? Complete instructions for Word and WordPerfect. Sample & Info. Labels, 673 Stewart Lane, Mansfield OH 44907.



# Advertiser Index



The index on this page is provided as a service to our readers. The publisher does not assume any liability for errors or omissions.

# Equipment Basics: Buckets and Beyond

*by Alison Crowe*

There's a saying in the wine industry (and perhaps, less congenially, in the brewing industry as well) that "wine just makes itself." Thousands of years ago, when wine was "discovered," this was certainly true. All a nomadic hunter and gatherer had to do was to stay in one place long enough for his pit of freshly picked grapes to froth, foam, and ferment, and presto! Wine (if we can call it that) was seemingly transformed magically into existence by the then-unknown powers of wild yeast cells. No fancy barrels, bottles, or bungs needed.

These days winemaking is less of an "art" and more of a science. And with the increased ability to control the process, home winemakers can make clean, consistent, and truly outstanding products — even in their own backyards or garages.

The well-equipped winery contains the following gear, which will enable you to start making wine in five-gallon batches, the equivalent of about 24 bottles. You should be able to pick up all of these items at your local homebrewing or home winemaking supply store for less than $100 which, if that seems steep, is less than you'd pay for a case of decent wine.

## The Crush Pad

**1.** Large food-grade plastic bucket (capacity of at least six gallons). This container is your primary fermenter, the place where the yeast will convert sugar into carbon dioxide and alcohol. This bucket needs to be big enough to allow for expansion of the must during fermentation but should be small enough to be easily stored in a quiet corner of your "winery." Commercially available trash cans and the like are not advisable for winemaking because they can be made with plastics that contain heavy metals. Wine is an effective solvent and might dissolve some of these dangerous compounds into your finished product.

**2.** Plastic sheet or cloth large enough to cover the primary fermenter. Used to keep bugs, errant pets, and the random falling tool (if you make wine in your garage) out of the primary fermenter, this covering should be secured with a bungee cord or something similar. Common sense caution: If you use a plastic cover, don't tie it down too tightly or the carbon dioxide pressure will pop it right off!

**3.** Small buckets. Buckets are great. Wineries never seem to have enough of them. As a mixing vessel, a yeast proofer, an ad hoc stool for those long, hot afternoons on the bottling line, buckets are certainly some of the most-used items on any winery's equipment list. Make sure yours are clean, sanitized, and free of any chemical residue they may have accumulated in a past life. Buy food-grade buckets from the winemaking supply store just to be on the safe side.

**4.** Long-handled stainless steel or wooden spoon. Used for mixing acid, yeast, and sugar additions into your fermenters or carboys, a long-handled spoon can give you added reach for access into tight spaces.

Though wooden spoons are okay, be wary. They're impossible to get really contaminant-free, so it's a good idea to work with cleanable, sanitizable stainless steel

tools. Do not use any other metals in winemaking; metal ions can leach into your wine and cause irreparable damage to the product and possibly to your health.

**5.** Siphon hoses. Without them, home winemaking (and commercial winemaking, to some extent) would be much more of a back-breaking task. They make liquid transfer operations a snap and allow you to take wine off of spent yeast cells (racking) without disturbing the unwanted sediment.

The best setup is a 5- to 6-foot length of clear, plastic tubing (about 3/16 inch in diameter) attached to a 2-foot length of rigid plastic tubing at the end so you can insert it easily into carboys and bottles. Alternately, do what a lot of winemakers do and just attach the last 2 feet or so of your siphon hose to a wooden or stainless steel dowel with rubber bands — a little improvised but, well, if it works, it works.

## Tools for the Lab

**6.** Graduated pitcher. It's always helpful to have an accurate measuring device for parceling out additions of acid, water, and sugar. Try to obtain one with imperial *and* metric measurements because you never know in what kind of units recipes will be written.

**7.** Hydrometer set. Hydrometers are absolutely essential for sound winemaking. They let winemakers track the progress of the fermentation and allow them to determine when the wine has reached the desired level of residual sugar.

Try to obtain a couple of hydrometers that each cover a portion of the 30° to minus-5° Brix spectrum, because they will give more accurate readings than if that entire range is covered with one hydrometer only.

**8.** Thermometer. Be sure to take the temperature of your fermentations each time you take a hydrometer reading, as the temperature of the juice affects the density of the solution — and the reading. Handle your thermometers carefully because they are fragile and can contaminate juice or wine with mercury if broken.

**9.** Acid titration kit. Litmus paper is for sixth-grade science experiments. When it comes to determining the acidity of your wine, don't mess around. These kits are easy to use, easy to understand and, more important, give you an accurate measurement of the total acidity of your wine.

## Tools for the Cellar

**10.** Secondary fermenter. A five-gallon carboy (think glass, office water-cooler bottles) will amply serve as a secondary fermentation vessel. After the wine has completed its primary fermentation in your large food-grade bucket, rack off your wine (using your siphon hose) into a carboy to exclude air and possible contaminants. Plastic carboys suffice (and can be cheaper), but glass carboys tend to be easier to clean, less permeable to oxygen, and they allow an easy view of your new wine's color, clarity, and sediment level.

**11.** Fermentation locks. Available in a couple of different styles, these guys fit on top of your carboys and protect the newly fermented (or still fermenting) wine from the environment. They let carbon dioxide escape but exclude air as well as possible microbial contaminants. You should buy a couple in case one breaks or has a leak.

**12.** Aging vessels. Here's where you can venture into wine geek territory. Your glass carboy can serve you well as a permanent wine storage vessel, but as you dip into it the remaining wine will become

increasingly oxidized as it's exposed to air. For this reason you should consider using the standard 750-milliliter glass wine bottles for long-term storage. For the particularly adventurous, oak barrels can be had (for a price) and will add pleasing spicy vanilla notes to your wine as well as adding nifty ambiance to your winery-cum-garage.

## The Truly Tricked-Out Chateau

So you've been making wine at home for a while and are ready to invest in some more winemaking toys.

As things get more technically involved they inevitably get more expensive, but if you're willing to slap down the cash, you'll find yourself amply rewarded with increased technical and creative control over your winemaking.

**Grape processing equipment.** After making wine with kits a couple of times, some home winemakers are interested in buying and crushing their own grapes or other fruit. To do this you need a crusher/destemmer (unless you want to do whole-cluster fermentations) and a small press. The folks at your friendly neighborhood home winemaking store should know where to find these things if they don't carry them in their shops already.

**Sulfite-measuring kits.** Pre-packaged kits that measure the levels of sulfites in wine are almost indispensable for the serious winemaker. Sulfites (delivered in tablet, powdered, or liquid form) act as antimicrobial and antioxidant agents in winemaking, but too much or too little can be equally disastrous. These kits are relatively easy to use and are a very good investment, especially if you don't want malo-lactic fermentation (which occurs when a strain of lactic acid bacteria is introduced to the wine either accidentally or by design) to occur in your wine or if you have residual sugar levels that are high enough to be a re-fermentation risk.

**Gram scale.** Any home winery worth its grapes will have an accurate, well-maintained scale for weighing acid, sulfites, and yeast. If you like to freelance-ferment without recipes or pre-weighed ingredients from kits, scales are essential for making your own accurate additions.

**Barrels.** The end-all, be-all wine storage Mecca for many, barrels are nice to have if you can afford them. Keep in mind that barrels require a lot of extra maintenance and can add significantly to both your financial and hourly investments.

Winemaking is a very rewarding activity that, like many other pursuits, requires an initial investment that will pay for itself many times over as you successfully make and enjoy your very own homemade wines. ■

# HOMEBREW DIRECTORY

## ARIZONA

**Brew Your Own Brew**
2562 North Campbell
Tucson (520) 322-5049
*Our staff is trained by the American Brewer's Guild!*

**Brewers Connection**
1435 East University, #10
Tempe
1-800-879-BREW (2739)
*FREE Starter kit, catalog & classes SECURED Web site www.desertbrewers.com*

**Homebrewers Outpost & Mail Order Co.**
823 North Humphreys
Flagstaff 1-800-450-9535
FREE CATALOG!
*Over 20 years of brewing experience. www.homebrewers.com*

**What Ale's Ya**
6362 West Bell Road
Glendale (602) 486-8016
*Bulk LME and kegging equipment too!*

## ARKANSAS

**The Home Brewery**
77 W. Colt Square Drive, #2
Fayetteville 1-800-618-9474
*Top-quality Home Brewery products.*
*homebrewery@arkansasusa.com*

## CALIFORNIA

**Beer Crafts**
843 W. San Marcos Blvd.,
San Marcos (760) 591-9991
*Beer, Wine, Soda, Liqueur & Vinegar! www.beercrafts.com*

**Beer, Wine & Cheesemaking Shop**
22836-2 Ventura Blvd.
Woodland Hills (818) 884-8586
*Serving Discerning Brewers & Winemakers Since 1972!*
*www.silicon.net/~homebrew*

**The Beverage People**
840 Piner Road, #14
Santa Rosa
(707) 544-2520
*32-page Catalog of Beer, Mead & Wine Supplies!*
*www.imall.com/stores/The Beverage People*

**Brew Wizard**
18228 Parthenia St.
Northridge 1-800-603-9275
*Discount Kegging Equipment and More!*

**Brewer's Rendezvous**
11116 Downey Ave.
Downey (562) 923-6292
*http://www.bobbrews.com*

**Chino U-Brew**
5536 Philadelphia St.
Chino (909) 627-5311
*Brew your own beer!*
*www.naomisplace.com*

**Culver City Home Brewing Supply**
4358 1/2 Sepulveda Blvd.
Culver City
1-800-3-UBREWIT (827-3948)
*Check us out at www.brewsupply.com*

**Double Springs Homebrew Supply**
4697 Double Springs Road
Valley Springs 1-888-499-2739
*Visit our Web site:*
*www.doublesprings.com*

**Heffernan's Homebrewing Supplies**
134 North 2nd Ave., Suite G
Upland (909) 949-3088
*Open 7 days a week for the beginner to advanced!*

**The Home Brewery**
1506 Columbia Ave. #12
Riverside 1-800-622-7393
*Top-quality Supplies for the Home Brewer or Vintner.*
*acmebrew@empirenet.com*

**Murrieta Home Brew**
39872 Los Alamos Road, A-4
Murrieta 1-800-879-6871
*Quality Products For Home Brewers Serving Inland S. CA, AZ, Nevada & You!*

**Nostalgic's**
2003 South Miller, Santa Maria
1-800-773-4665
Fx: (805) 934-4665
*www.nostalgic-s.com.*
*Homebrew club meets 1st Thurs. of month 8 p.m.*

**Original Home Brew Outlet**
5124 Auburn Blvd.
Sacramento (916) 348-6322
*Open 7 Days. Questions Answered!*

**Ruud-Rick's Homebrew Supply**
7273 Murray Drive #15
Stockton 1-888-333-BREW
*Fantastic selection, low prices & FREE classes!*

**South Bay Homebrew Supply**
23808 Crenshaw Blvd.
Torrance
1-800-608-BREW (2739)
*Southern California's Best Selection!*
*http://members.aol.com/southbayhb*

**Stein Fillers**
4180 Viking Way
Long Beach (562) 425-0588
*Best darn brew store in Southern California!*

## COLORADO

**Beer at Home**
3157 South Broadway
Englewood (303) 789-3676
*www.beerathome.com*
*1-800-789-3677*

**Brew Hut**
16883 East Iliff Ave.
Aurora 1-800-730-9336
*Beer, Wine, Mead & Soda — WE HAVE IT ALL!*
*www.thebrewhut.com*

**Carlen Company L.L.C.**
2275 East Arapahoe Road, #207
Littleton (303) 730-2501
*Bottles, crowncaps, shippers & glassware.*

**The Hombrew Hut**
555 I Highway 287
Broomfield (303) 460-1776
*One Stop Brewing Supply Since 1993!*

## CONNECTICUT

**Appy's Homebrew Supply**
7 Marion Drive
East Lyme (860) 691-1473
*Quality beer and wine supplies.*

**The Brews Brothers**
695 Foxon Road
East Haven, CT (230) 468-5451
140 Whitehall Ave.
Mystic, CT (860) 536-BREW
*www.brewsbros.com*

## FLORIDA

**BrewCrafters**
11212 Blue Sage Place
Bradenton 1-800-HOT-WORT
(468-9678) *FREE CATALOG!*
*www.brewcrafters.com*

**Brew Shack**
4025 W. Waters Ave.
Tampa (813) 889-9495
*Check out our website!*
*www.wp.com/brewshack*

**Heart's Home Beer & Wine Making Supply**
5824 North Orange Blossom Trail
Orlando 1-800-392-8322
*Low Prices — Fast Service — Since 1988.*
*www.heartshomebrew.com*

**Homebrew Emporium**
661 Beville Road, Ste. 117
South Daytona (904) 767-8333
*Beer, Wine, Coffee & Gift Packages!*

**The Home Brewery**
416 So. Broad St.
Brooksville 1-800-245-2739
*Top-quality Home Brewery products.*
*E-mail: chinsegt@atlantic.net*

**For details on listing your store in the Homebrew Directory, call (530) 758-4615.**

**Worm's Way Garden Center & Home Brewing Supply**
4402 North 56th St.
Tampa 1-800-283-9676
*We brew gardens, too!*

## GEORGIA

**Beer Necessities**
9850 Nesbit Ferry Road
Alpharetta (770) 645-1777
*http://www.brewme1.com*

## HAWAII

**Oahu Homebrew Supply**
856 Ilaniwai St. #103
Honolulu (808) 596-BREW
*Call for a FREE catalog!*
*http://1stpage.com/1/ohs*

## ILLINOIS

**Bev Art Homebrew & Wine Making Supply**
10033 S. Western Ave.
Chicago (773) 233-7579
*Honey, meadmaking, grains and kegs.*

**The Brewer's Coop**
30 W 114 Butterfield Road
Warrenville
(630) 393-BEER (2337)
*Dupage county's LARGEST homebrew shop!*

**Chicagoland Winemakers, Inc.**
689 West North Ave.
Elmhurst 1-800-226-BREW
*26 years experience & FREE instructions!*

**Crystal Lake Health Food Store**
25 E. Crystal Lake Ave.
Crystal Lake 815-459-7942
*Honey - Sorghum - Maplesyrup - Bulk Herbs!*

**Home Brew Shop**
307 West Main St.
St. Charles (708) 377-1338
*Complete line of beer & wine making supplies!*

## INDIANA

**Beer & Wine by U**
1456 North Green River Road
Evansville (812) 471-4352 or
1-800-845-1572
*Call for a FREE Catalog!*

**The Gourmet Brewer**
PO Box 20688
Indianapolis (317) 924-0747
or 1-888-860-1600 ext. 328394
*www.the-gourmet-brewer.com*
*Free e-mail or paper catalog!*
*Call or e-mail gbrewer@iquest.net*

**Great Fermentations of Indiana**
1712 East 86th St.
Indianapolis
(317) 848-6218 or toll free
1-888-463-2739
*E-mail us at grtferm@iquest.net*

**Worm's Way Garden Center & Home Brewing Supply**
7850 North Highway 37
Bloomington 1-800-598-8158
*FREE catalog*
*call 1-800-274-9676!*

## KENTUCKY

**New Earth Hydrogardening & Homebrewing**
9810 Taylorsville Road
Louisville 1-800-462-5953
*Huge line of homebrew & hydroponic supplies!*

## MARYLAND

**Brew Masters Ltd.**
12266 Wilkins Ave.
Rockville 1-800-466-9557
*Also in Baltimore!*

**Four Corners Liquors & Homebrew Supply House**
3439 Sweet Air Road
Pheonix
1-888-666-7328
Fax: (410) 666-3718
*Secure website http://homebrewsupply.com or e-mail: 4corners@homebrewsupply.com*

**Maryland Homebrew**
6770 Oak Hall Lane #115
Columbia
1-888-BREWNOW
*Mega Inventory. We ship UPS daily. www.mdhb.com*

## MASSACHUSETTS

**Beer & Wine Hobby**
180 New Boston St.
Woburn 1-800-523-5423
*For the most discriminating beer & wine hobby.*
*e-mail: shop@beer-wine.com*
*Web site: www.beer-wine.com*

**NFG Homebrew Supplies**
72 Summer St.
Leominster
(978) 840-1955
*Great Prices! Personalized Service!*

**Strange Brew Beer & Winemaking Supply**
197 Main St.
Marlboro (508) 460-5050
or Toll Free 1-877-460-5050
*High Quality, Low Prices, "We Treat You Kind!"*

**Worm's Way Garden Center & Home Brewing Supply**
1200 Millbury St.
Worcester 1-800-284-9676
*FREE catalog*
*call 1-800-274-9676!*

## MICHIGAN

**Bell's General Store**
427 1/2 East Michigan Ave.
Kalamazoo (616) 382-5712
*BELL'Swear, hot sauces & cigars, too!*

**The Home Brewery**
49652 Van Dyke Ave.
Utica 1-888-577-2739
*Top-quality Home Brewery products.*

**Mt. Clemens Hardware**
67 North Walnut
Mt. Clemens (810) 468-5451
*Wyeast, Fresh & Pellet Hops!*

**Pete's Pipe & Barrel**
305 East Mitchell St.
Petoskey (616) 347-3322
*Quality ingredients, excellent service, and competitive prices.*

**The Red Salamander**
205 North Bridge St.
Grand Ledge
Ph: (517) 627-2012
Fx: (517) 627-3167
*Brand New Store!*
*Phone or fax your order.*

**Things Beer**
100 East Grand River
Williamston 1-800-765-9435
*Home of the Fermentation Station!*
*www.thingsbeer.com*

**Wine Barrel Plus**
30303 Plymouth Road,
Livonia 48150 (313) 522-9463
*World's LARGEST Independent Retail Homebrew shop!*
*http://www.winebarrel.com*

## MINNESOTA

**L.L. Kraemer Co.**
9925 Lyndale Ave. South
Bloomington (612) 884-2039
*Call us for a FREE Newsletter.*
*www.llkraemer.com*

**Semplex of USA**
4171 Lyndale Ave. N.
Minneapolis (612) 522-0500
*Est. 1962 — Best Service & Prices! FREE CATALOG!*

**Von Klopp Brew Shop**
Highway 52, South
Pine Island (507) 356-8336
*Winemaking & Brewing Supplies Shipped Anywhere!*
*www.hps.com/vonklopp*

## MISSOURI

**The Home Brewery**
So. Old Highway 65 (P.O. Box 730)
Ozark 1-800-321-2739
*Top-quality Home Brewery products.*

**For details on listing your store in the Homebrew Directory, call (530) 758-4615.**

# HOMEBREW DIRECTORY

**Schmitty's Brew Shoppe**
408 East 63rd St.
Kansas City
1-888-333-7610
*FREE 40 page catalog!*
*www.schmittys.com*

**St. Louis Wine & Beermaking**
251 Lamp & Lantern Village
Chesterfield 63017
(314) 230-8277
*The Complete Source for Beer, Wine & Mead Makers! Fax us at (314) 527-5413*

**Worm's Way Garden Center & Home Brewing Supply**
1225 North Warson Road
St. Louis
1-800-285-9676
*Knowledgeable staff, great products!*

## NEW HAMPSHIRE

**Red, White & Brew, Inc.**
865 2nd St. -
Mallard Pond Plaza
Manchester, 03102
(603) 647-ALES
*Visit our website at RedWhiteandBrew.com*

**Stout Billy's**
61 Market St.
Portsmouth (603) 436-1792
*Online catalog & recipes!*
*www.stoutbillys.com*

## NEW JERSEY

**BEERCRAFTERS, Inc.**
110A Greentree Road
Turnersville (609) 2 BREW IT
*So. Jersey's COMPLETE Homebrew Supplier.*

**Cherry Hill Homebrew Supply**
1845 Route 70 East
Cherry Hill
(609) 424-3636
*E-mail:*
*njhomebrew@compuserve.com*

**The Home Brewery**
56 West Main St.
Bogota (201) 525-1833
or 1-800-426-BREW
*Top-quality Home Brewery products.*

**WHAT'S BREWING Inc.**
201 Tilton Road
Northfield
(609) 485-2021
*Bulk extract, wine supplies & CIGARS! Wbrewing@aol.com*

## NEW YORK

**At Home Warehouse Distributors**
1068 Main St.
Clarence 14031
(716) 685-2306 Toll Free
1-800-210-8585 *or ahwd.com*

**Beer Necessities**
71 Dove St.
Albany (518) 434-0381
*Check out our website!*
*www.albany.net/~homebrew*

**Brewshop @ Cornell's**
310 White Plains Road
Eastchester
1-800-961-2739
*www.cornells.com/brewshop.htm*

**E.J. Wren Homebrewer Inc.**
Ponderosa Plaza (behind Heids)
Liverpool (315) 457-2282
*Largest Selection in Central NY*
*ejwren@brew-master.com*

**Homebrew & Grow/East Coast Hydroponics**
439 Castleton Ave.
Staten Island (718) 727-9300
*& 146-49 Horace Harding Exwy. (Long Island Exwy. Service Rd.) 2 locations in New York City to better serve you!*

**The Home Brewery c/o Smith Restaurant Supply**
500 Erie Blvd. E., Syracuse
1-800-346-2556
*Top-quality Home Brewery products.*

**New York Homebrew Inc.**
Carle Place,
Huntington Station,
Port Jefferson
*CALL 1-800-YOO BREW*

**Niagara Tradition Homebrewing Supplies**
1296 Sheridan Drive
Buffalo 14217
(716) 877-8767
*Try our private label extracts!*
*www.nthomebrew.com*

## NORTH CAROLINA

**Alternative Beverage**
114-0 Freeland Lane, Charlotte
Advice Line: (704) 527-2337
Order Line: 1-800-365-2739
*76 recipe packages, liquid & dry yeasts, beginner to advanced!*
*www.e-brew.com*

**Asheville Brewer's Supply**
2 Wall St., #117
Asheville (704) 285-0515
*The South's Finest — Since 1994!*

**Assembly Required**
340 North Main St.
Hendersonville 1-800-486-2592
*Your Full-Service Home Brew Shop!*
*www.assemblyrequired.com*

**Homebrew Adventures**
9240 Albemarle Road
Charlotte 1-888-785-7766
*Charlotte's best stocked store, with low prices to match.*
*www.homebrewadventures.com*

## OKLAHOMA

**The Brew Shop**
3705 North Western
Oklahoma City (405) 528-5193
*OKC's premiere supplier of home-brewing equipment & supplies!*
*thebrewshop@msn.com*

**Cher-Dan's SSS Wine & Beer Supplies**
827 West Maine
Enid (580) 237-6880 or
(580) 237-6881
*Home of the Fermented Minds Wine & Beer Club.*

**Deja Brew**
116 West Main St.
Norman (405) 447-3233
*Largest selection of beer & wine making supplies in Oklahoma!*

## OHIO

**The Grape and Granary**
1302 East Tallmadge Ave.
Akron (330) 633-7223
*Complete Brewing & Winemaking Store. www.grapeandgranary.com*

**HoMade Brewing Supplies**
505 Superior St.
Rossford 1-888-646-6233
*Retail Store, Web Store, FREE Catalog!*
*www.primenet.com/~homade*

**JC Homebrewing Company**
8306 State Route 43
East Springfield
1-800-899-5180
*Place your order on our website! www.jchomebrew.com*

**Leener's Brew Works**
9832 Valley View Road
Macedonia, 44056
(330) 467-9870
*Your Do-It-At-Home Store!*
*www.leeners.com*

**Shreve Home Brewing & Wine Making Supply**
299 Jones St., P.O. Box 17
Shreve 44676
(330) 567-2149
*Call or write for a FREE catalog!*
*E-mail: bkr@bright.net*

## OREGON

**Bridgeview Beer & Wine Supply, Inc.**
622 Main St., Oregon City
or 6432 S.E. 82nd Ave.,
Portland
Toll Free: 1-888-650-8342
*Large selection and over 1000 beers to go!*

**HomeBrew Supply of Oregon**
20101 N.E. Sandy Blvd #D
Fairview (503) 665-3355
or 1-800-269-BREW (2739)
*www.homebrewed.com*

**For details on listing your store in the Homebrew Directory, call (530) 758-4615.**

## PENNSYLVANIA

**Beer Unlimited**
Route 30 & 401
Malvern (610) 889-0905
*We also do wine!*
*Open 7 days a week.*
*Guaranteed fresh ingredients.*

**Bierhaus International Inc.**
3723 West 12th St.
Erie 1-888-273-9386
*World's BEST ingredient kits — FREE catalog!*

**Brew By You**
3504 Cottman Ave.
Philadelphia (215) 335-BREW
*Visit us on the web at http://members.aol.com/BrewByMe2*

**Keystone Homebrew Supply**
779 Bethlehem Pike (Rt. 309)
Montgomeryville
(215) 855-0100
*Quality Ingredients and Expert Advice!*

## RHODE ISLAND

**Blackstone Valley Brewing Supplies**
407 Park Ave.
Woonsocket (401) 765-3830
*Quality Products and Personalized Service!*

## SOUTH CAROLINA

**Happy Dog Brewing Supplies**
401 West Coleman Blvd.
Mount Pleasant (843) 971-0805
or 1-800-528-9391
*Everything for homebrew!*
*Visit us on the web*
*www.catalog.com/happpydog*

## TENNESSEE

**New Earth Hydrogardening & Homebrewing**
139 Northcreek Blvd.
Metro Nashville 1-800-982-4769
*Huge line of homebrew & hydroponic supplies!*

## TEXAS

**Austin Homebrew Supply**
306 East 53rd St.
Austin 1-800-890-BREW
*Make your own damn beer!*
*E-mail: brew@onr.com*

**Brew Masters**
426 Butternut, Abilene
Ph: 1-888-284-2039
Fx: (915) 677-1263
*The BIG Country's Homebrew Supply Store!*
*www.texasbrew.com*

**Foreman's / The Home Brewery**
3800 Colleyville Blvd.
(P.O. Box 308)
Colleyville 1-800-817-7369
*Top-quality Home Brewery products. Check out our site www.flash.net/~greg10/*

**Lubbock Homebrew Supply**
1718 Avenue H
Lubbock 1-800-742-BREW
*Check us out at http://door.net/homebrew*

**St. Patrick's of Texas**
1828 Fleischer Drive
Austin 1-800-448-4224
*FREE CATALOG!*
*www.stpats.com*

**The Winemaker Shop**
5356 West Vickery Blvd.
Fort Worth (817) 377-4488
*FREE Catalog — www.winemakershop.com*

## VIRGINIA

**The Brewmeister Shop**
1215-G George Washington
Mem. Highway, Yorktown
(757) 595-HOPS (4677)
*The place for ALL your brewing needs!*

**Roanoke Homebrew Supply**
1902 D Memorial Ave. S.W.
Roanoke (540) 345-2789
*Your one stop homebrew shop!*

**Vintage Cellar**
1313 South Main St.
Blacksburg 1-800-672-9463
*Ingredient kits with White Labs Yeast, Belgian Ales & Glassware! Complete line of brewing supplies*
*www.vintagecellar.com*

**The WeekEnd Brewer - Home Brew Shop**
4205 West Hundred Road
Chester (804) 796-9760
*www.weekendbrewer.com*
*LARGEST variety of malts & hops in the area!*

## WASHINGTON

**Bader Brewing Supply**
711 Grand Blvd.
Vancouver (360) 750-1551
*E-mail: bader@pacifier.com*
*Secure online ordering available next month!*

**Cascade Brewing Supplies**
224 Puyallup Ave.
Tacoma (253) 383-8980
or 1-800-700-8980
*http://members.aol.com/greatbrew/home.html*

**The Cellar Homebrew**
Dept. BR 14411 Greenwood Ave. North
Seattle 98133
1-800-342-1871
*FREE Catalog/Guidebook, FAST Reliable Service, 25 Years!*
*Secure ordering online*
*www.cellar-homebrew.com*

**Homebrew Heaven**
9109 Evergreen Way
Everett
1-800-850-2739
*Call for a FREE catalog.*
*Formerly The Home Brewery.*

**Larry's Brewing Supply**
7405 S. 212th St. #103
Kent 1-800-441-2739
*Products for Home and Craft Brewers!*

**Northwest Brewers Supply**
316 Commercial Ave.
Anacortes
1-800-460-7095
*All your brewing needs since 1987! nwbs@fidalgo.net*

## WEST VIRGINIA

**Ed's Beer & Wine Cellar**
1015 Maddex Square
Shepherdstown
(304) 876-2930
*200 Kits — 300 Beers!*
*Homebrew supplies & a full deli.*

## WISCONSIN

**Homebrew Market**
520 East Wisconsin Ave.
Appleton 54911
(920) 733-4294 or
1-800-261-BEER
*Retail Store and Mail Order Specialists!*

**The Market Basket**
14835 West Lisbon Road
Brookfield 1-800-824-5562
*Visit our online catalog!*
*www.glaci.com/market/brewing/homepage.html*



**For details on listing your store in the Homebrew Directory, call (530) 758-4615.**

# Brewing the Faith

*by Judy Micou*

Okay, let me just say it: You homebrew people are weird. I'm hoping it's not a cult type of thing you're all in, but it sure seems that way, since my husband is now a born-again beer lover. This is a person who wouldn't touch the stuff and once said, "The devil himself peed in a glass and named it beer." His conversion was swift; literally an overnight epiphany brought on by a Guinness stout. Now, Mark not only consumes his favorites of all types — stouts, lagers, ales, porters — but also brews his own! His day of worship, Friday night, is observed faithfully at local brewpubs, and I am invited to go along. I have tried my share but can't say I enjoy the liquid. Maybe on an extremely hot day and if there were nothing else to drink. So I remain in the ranks of the unconverted. Life has certainly changed, and I'm still wondering, what is this force that takes over an otherwise normal person?

Like any new convert, the enthusiasm is high, and beer is infiltrating almost every aspect of our lives and plans. Vacation destinations are determined by whether there is a microbrewery in the area. Mark talks about visiting my friend in Austria next summer as if it were a pilgrimage, in a Homer Simpson-like trance: "beeerrr...Austriaaa." Our kitchen isn't always for preparing meals anymore. I came home the first afternoon he brewed beer and was greeted by a strange odor, almost sweet but like rotting hay. "What is that smell?" I asked. "Oh, that's the wort boiling," he beamed. I have tentatively assisted with parts of the process, hoping to speed it along, including rocking carboys, washing bottles, and stirring yeast starter. And then came the cleanup — thick brown sludge stuck to the sides of the stew pot. He assured me that the first batch turned out great, as evidenced by the raves he got from his fantasy football group, who drank it during their team draft last fall.

This isn't just about quenching thirst; this is devotion. Already Mark partakes in a kind of fasting. "I don't think I'll eat a lot tonight, that way I'll have room for more beer." Only because he wants to try a variety, to compare, he says. I think his blood type is now IPA+.

So is it too strong to call it a religious experience? It's like any other hobby, right? I compare beer to fruitcake: foul tasting but popular. What would it be like if you came home and your wife announced, "All I'm going to eat from now on is fruitcake; it's incredible!" Your eyebrows would raise and you would ask those tentative questions like a foreign tourist trying to find a street: "Why fruit...cake?" Soon, issues of Bake Your Own arrive in the mail. Then, your house becomes a bakery as she tries new recipes, foil-wrapped cakes pile up on the counter, loaves are stuffed in the freezer, and dirty pans are constantly in the sink. You eventually eat a slice here and there while your wife digs in with knife and fork. But you never get to the point where you really like the fruitcake (who ever does?). You wonder how she can stand to eat just that one thing. Doesn't she ever want a bowl of cereal? But, week after week it's only fruitcake for her, all the time. It's not hurting anyone; it's just strange.

*I have tried to help my husband with the brewing, hoping to speed it along.*

Mark is trying to convert me. So far I haven't been pulled in. He offers recipes to me: "Hey, I bet you'd like this one with raspberries!" He actually attempted a lemon pilsner, knowing my love for that citrus flavor. But when it came out tasting like furniture polish, he was dissuaded for awhile.

Again he swears to me it's nothing more than a hobby, as he runs to check the airlock on his latest concoction for the third time in an hour. I think to myself, just tell me there aren't meetings in secret where you perform ancient rites dressed in robes made of hop leaves; that there aren't dues or indulgences to be paid with batches of premium brew at some beer-stained altar; that I won't find a "Relax, don't worry, have a homebrew" bumper sticker on our car. If that happens, I might have to start baking fruitcake. ■

*Do you have a 750-word story for Last Call? Mail it with a color photo to Last Call, c/o Brew Your Own, 216 F St., #160, Davis, CA 95616.*

# WEISS SQUAD

## BRIESS BAVARIAN WHEAT

Create an unlimited lineup with Briess Bavarian Wheat. The Briess Concentrated Brewers Wort™ (CBWs®) are available in four basic types: Golden Light, Sparkling Amber, Bavarian Wheat and Traditional Dark. Briess Bavarian Wheat... for sensational natural brews.

For more than 125 years Briess Malting Company has been a leader in developing quality brewing ingredients for the domestic and overseas brewing industries.

Briess CBWs ®are now available to homebrewers in new convenient 3.3 lb. reinforced bags. Malt extracts are also available in 2.5 gallon (30 lbs. or 15 kg) containers with a wide mouth for ease of pouring.

Ask for Briess at your local retailer.

BRIESS™


Quality Malts Since 1876

Briess Malting Company • 625 South Irish Road • P.O. Box 226 • Chilton, WI 53014-0226

Telephone 920-849-7711 • FAX 920-849-4277

CIRCLE 10 ON READER SERVICE CARD