Brew Your Own

THE HOW-TO HOMEBREW B

August 1996, Vol.2, No.8
Niche Publications Inc.

BUILD IT YOURSELF!
3 GREAT PROJECTS

A Homebrew Experiment: Breakfast Cereal Beer

Brew an Extraordinary British Bitter

Step Up to Temperature Program Mashing

Michael Bryant's Micro Dream

U.S. $

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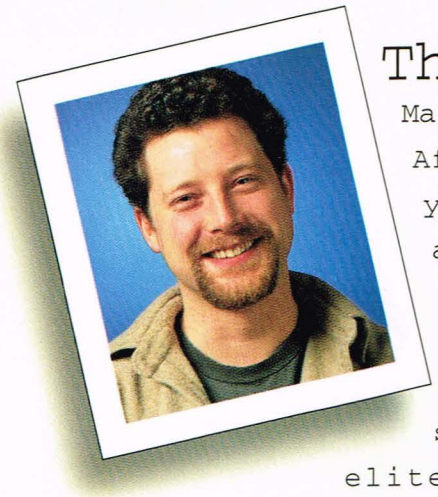
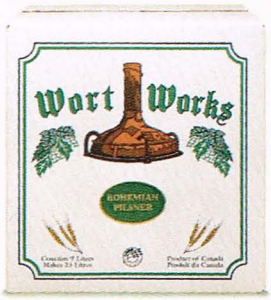


This is Sean. He's our beer guy.

Matter of fact, around Brew King, we call him "The Beer Guy". After all, he knows a thing or two about beer. And as you can see, he's pretty happy right now. Why? Because after months of self-imposed exile in Brew King's (windowless) brewing lab, Sean has emerged with Wort Works, an all-malt brewing kit of pure perfection - even by Sean's standards. You see, Sean belongs to that elite group of home brewing purists - the ones that scoff at most commercial brews and insist on choice natural ingredients for their own brewing masterpieces. With Wort Works, Sean would never cut corners. So what has Sean created? A totally unique, bag-in-a-box packaged product offering 9 litres (2 gallons) of concentrated wort made from 100% barley malt with naturally processed hops and filtered Canadian water, fully boiled in our 1000 gallon brew kettle. Sean even insisted on including a special dry hop package for extra aroma and flavour. And true to form, his instructions are comprehensive, even with information on the specific ingredients used. Sean's no dummy. He made Wort Works with his fellow homebrewers in mind, but he also made sure that its user friendly, no-boil method would be perfect for beginners too. Keep Sean happy. Make his Mom proud. Try Wort Works. The results will make you (and your friends) happy too.



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Cover photo: Kent Lacin

If I Had a Hammer...

Around here, we're into good equipment. Anything that makes brewing easier, faster, more fun, or just makes us feel cool and smart when we use it. I particularly admire people who make their own creative brewing tools. But that's not me. I'm a buyer, not a builder.

If you're one of those people who's comfortable with a router, uses a lathe like a master, and has no qualms about pouring concrete, more power to you. Me, I can't be trusted with a cordless drill, and let's not even talk about the damage I can do with a power sander.

We aren't all like that. I've given up asking BYO's managing editor, Gailen Jacobs, what she did over the weekend. The answer is invariably "Oh, we built a three-story addition to our house. Then on Sunday..."

At my place, things are different. But it's not like we need a repairman whenever anything goes wrong. If the toilet breaks or the faucet leaks, we don't call the plumber. My wife fixes it.

It's not that I don't try. I once replaced the door to a small closet that houses our hot water heater. The old door was in poor shape and didn't close very well. The new one looks much better and closes just fine. Oh, one little detail — it doesn't open. On the two occasions we've had to get into the closet since the new door went up, I had to take it off its hinges. (Note to fire inspector: Pay no attention. This is just a little joke. Nobody could be that dumb!)

Then there was the time I disassembled the squeaky refrigerator motor. Not the big motor in the back, just the little one that operates the automatic defrost mechanism in the freezer. After taking the whole thing apart — screws, washers, nuts, belts, assorted thingamajigees — it didn't take much analysis to determine that the only solution was a new motor. And I laid out the cash without any qualms, knowing I had done my best to attack the problem.

I've had my triumphs, too. Five years ago I put up a closet organizer, and it's still standing today. And I think my mother still has the spice rack I made in seventh-grade woodshop. She keeps it out of plain view, though, because I never got around to staining it.

This month's issue of *Brew Your Own* features three build-it-yourself projects: a draft box and tombstone (p. 26), a mash/lauter tun with false bottom (p. 32), and a mobile brewing stand (p. 38). Each of these projects is relatively simple and results in a cool, helpful piece of equipment guaranteed to make brewing easier.

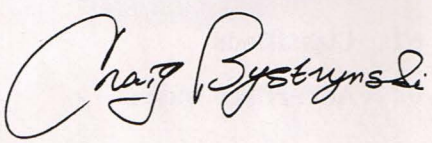
They were all written by homebrewers with plenty of hardware skills and imagination. Each of these projects had to pass two tests: First, it had to be simple enough and clear enough for me to successfully complete it without any unscheduled trips to the emergency room or the orthopedic surgeon. Second, it had to be interesting enough to get Gailen to put the plans for her new art deco bathroom with bidet and king size tub on hold for awhile.

And as usual, each of the articles has been reviewed by at least three experts to make sure it's technically correct.

So check them out. And if you have a unique piece of equipment or a new spin on the same old thing, drop us a line. We're always looking for special projects to share; it's part of the fun and creativity of homebrewing.

You can reach us at 216 F St., #160, Davis, CA 95616, by e-mail at edit@byo.com, or by fax at (916) 758-7477.

We'll be waiting in the workshop!



Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

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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. (916) 758-4596; fax (916) 758-7477. E-mail address: BYO@byo.com. Application to mail at periodicals postage rates is pending at Davis, CA and additional mailing offices. POSTMASTER: Send address changes to ***Brew Your Own***, P.O. Box 1504, Martinez, CA 94553-9932. 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 94553-9932. 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.

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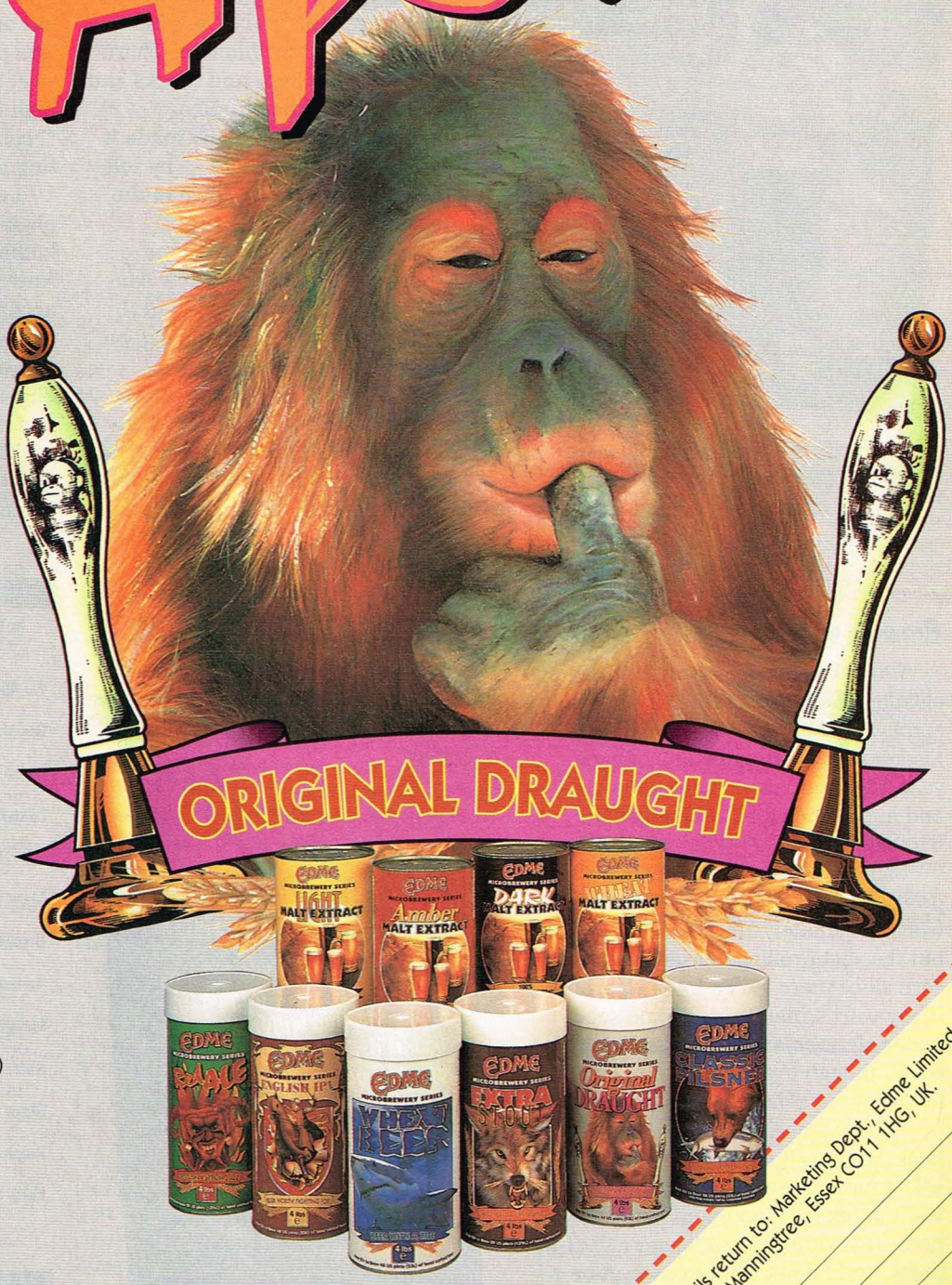

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CIRCLE 21 ON READER SERVICE CARD

Richard Denmark
Lenoir, N.C.

I moved with my wife to her hometown, which is in an almost dry county, and I really missed my beer.

Richard Denmark and his cousin Robert (left) hang out with the four coolers in their brewery/shed.

Soon after the move we visited my grandmother and a few older relatives in Illinois. While we were there, my great-aunt treated us to some homemade wine. I told her I missed my daily beer and she said "Hang on." When she returned, she had a bottle of "Aqua Sporta," which is Italian for "dirty water." You guessed it — homebrew!

We went downstairs, and she showed me the family secret. It was a winery and brewery from the depression and prohibition. There were full wine kegs and crocks and some still working off. She explained how the family made it through the hard years — by selling what they made down in the basement.

Before I left, she gave me some old recipes and a few cans of *very* old Blue Ribbon malt. I went home planning to carry on a family tradition.

I did a little research and found that malt can lose its freshness but doesn't spoil in the can, so I gave it a try. I found a fermenter (which came full of birdseed) at a discount store. At the flea market I found a Mexican-made water bottle (circa 1950) to use as a secondary. I found a capper at my local hardware store and they ordered the caps for me. Just a couple of feet of garden hose and I was ready!

One Saturday I gathered my stuff and headed for my shed (my haven) and began to brew. After three weeks of fermentation, I bottled the beer.

I invited four friends to the tasting, but only one brave soul showed up. It was not beer as I knew it but a brown, sweet, frothy concoction that was very high in alcohol, hence the name "Prohibition Beer." It took a little getting used to.

I did more research, found a supplier, and have become a pretty good homebrewer since those first tries. Now I keg as well as bottle and have accumulated four old refrigerators. I converted one to a tap and keg cooler and one to a hot box so I can brew ale all year. I use the two others for bottles and other ingredients.

Now my friends stop by for a few cold ones instead of driving to the next county!

Brewing on the High Seas

You asked for the strangest brewing location. Well, I'm a merchant marine employed aboard the M.V. President Eisenhower for roughly half of each year. I brought aboard my equipment and ingredients for two five-gallon batches.

Using the galley range at night, I proceeded to heat the mash and boil the wort. Fortunately, the seas were calm, but the slight rolling caused some concern since there isn't a lot of clearance in my wort kettle. Primary and secondary fermentation occurred in my room, though I was tempted to lager it in one of our refrigerated store rooms.

Both batches, an IPA and a weizenbock, were well received. The guys asked me to brew regularly, but I don't want to lug my equipment between home and ship. (We no longer call at US ports, and I don't want to carry it on a plane.) I've considered a three-tier system to be left on board, but the future of the merchant marine is dim. Besides, there are interesting brews to sample overseas!

T.M. Freeman
en route to Singapore

Paging Dr. Brew

Are you a doctor who likes to homebrew? We'll prep you for any operation with a cool BYO t-shirt if you send in a photo of you and your brewing set-up. Send your letters to Brew Your Own, 216 F Street, Suite 160, Davis, CA 95616 or send e-mail to edit@byo.com. Be sure to include your mailing address and specialty!

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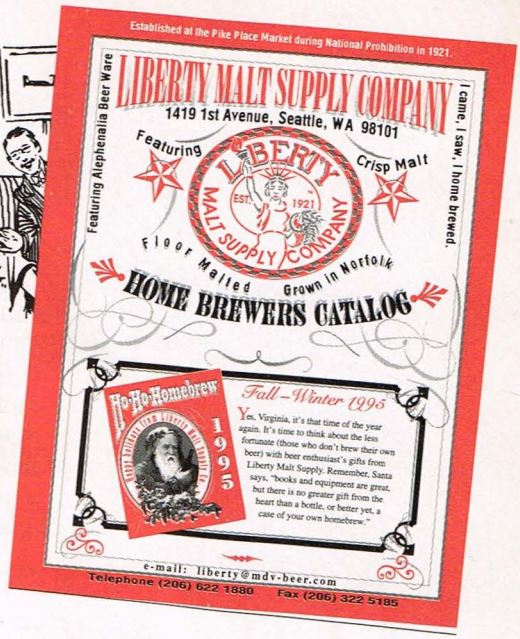
"Can it really be any good?" a young woman whispered. "Heavens no," Thomas exclaimed. "He's never brewed a drop in his life."



They Laughed When I Told Them I Was Serving My Own Home Brewed Beer, But When They Tasted My Pale Ale!—

Thomas brought a gift of his latest micro-brew discovery that he wanted everyone to try. I decided that this would be a dramatic moment for me to make my debut. To the amazement of all of my friends, I strode confidently over to my Alephenalia Micro Brewery-Home Brew Kit and began to pull out the professional looking bottles that I had placed there.

"Chuck is up to his old tricks," somebody chuckled. The crowd laughed. They were all certain that I couldn't brew any more than I could make potatoes au gratin.

"Can he really brew?" I heard Thomas' partner whisper. "Heavens, no!" Thomas exclaimed. "He's never brewed a drop in his life. But just you watch him. This is going to be good."

I decided to make the most of the situation. Holding up the wing capper, I explained that I had bottled it just for this occasion. With mock dignity, I drew out a bottle and cradled it in my arms like a great wine. "Is this another of those disappearing ink trips," called a voice from the rear. The crowd rocked with laughter.

Then I began to pour.

Instantly a tense silence fell on the guests. The laughter died on their lips as if by magic. I poured a glass for everyone, even those who exclaimed "I don't like beer." I heard a gasp of amazement. My friends sat breathless, spellbound.

I sampled it myself and for a brief moment I forgot the people around me. I forgot the hour, the place, my fellow imbibers. The little world I lived in seemed to fade—seemed to grow dim—unreal. Only the ale was real. Only the ale and the visions it brought me. Visions as beautiful and as changing as an autumn sunset, with its amber hues, just like my homebrew.

A real Triumph!

As everyone finished tasting, the room resounded with accolades. I found myself surrounded by excited faces. How my friends carried on! Men shook my hand—wildly congratulating me—pounding me on the back in their enthusiasm! Everybody was exclaiming with delight, plying me with rapid questions. Chuck! Why didn't you tell us you could brew like that? Where did you learn? How long have you been brewing?

"I simply followed the complete instructions included with the Alephenalia Homebrew kit," I replied. "And just a short while ago, I didn't know hops from malt."

"Quit your kidding," laughed Thomas, a real beer enthusiast. "You've been brewing for years. I can tell."

"Only since Rosie gave me an Alephenalia Microbrewery for my birthday, less than three weeks ago. I decided to keep it a secret so that I could surprise all you folks." Then I told them the whole story. "Ever heard of **Liberty Malt Supply Company**?" A few of my friends nodded. "That's a home brew shop and mail order catalog!" One of the oldest in the entire country!

"Exactly," I replied. "They have a great program for learning how to brew beers like a professional, the Liberty Way."

How I learned to brew without a teacher.

And then I explained how for years I had longed to brew my own beer. I shared that dream with Rosie and when she saw the Alephenalia Microbrewery in the Liberty catalog, she knew it was the perfect gift for me.

A Complete Catalog!

Pointing to the colorful Alephenalia Micro-brewery carton, I explained, "It contains brewing equipment that can be used over and over to brew beers like the professionals." I told them how pleased I was with *The Brewer's Companion*, a real home brewers bible. The Liberty Pack included with the microbrewery contained enough pre-measured, concisely labeled ingredients to brew five gallons of the Pale Ale. I explained that each of the Liberty packs used the highest quality ingredients, exclusive to Liberty Malt and that packs for each of the classic brewing styles are available.

I proudly told them that I have already begun brewing Weekend Weiss, a Bavarian style wheat beer and Liberator Dopplebock, both promptly received by simply dialing Liberty Malt's own toll free number, 1-800-990-MALT (6258).

Favorite brewing styles

"Lets order Liberty's Pals Pils Pack!" Thomas pleaded after seeing the Liberty catalog. He took another sip and said, "Which weekend is that Weiss going to be ready?"

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World Wide Outlook

Dear Brew Your Own,

We are enthusiastic homebrewers in Adelaide, Australia, the home of Coopers. In fact we have conducted much of our brewing two doors down from the site that Thomas Cooper originally used to brew his now famous sparkling ale, and in Statenborough Street the beer still flows. We would like to know more about your electronic services. What is available?

Stepney Brewers Club
Adelaide, Australia

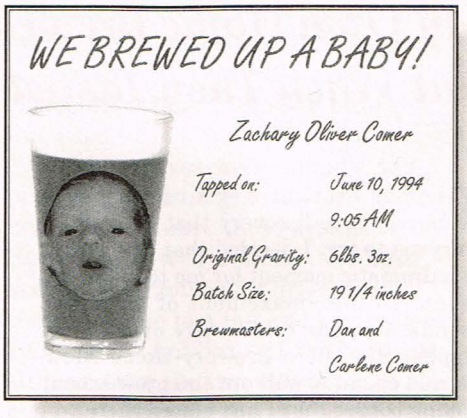
We have a web site at www.byo.com where you can read articles, see new recipes, and check out an ever-changing array of entries to the label contest (May '96) that we didn't have room to print in the magazine. You can also stop by to ask Mr. Wizard a question, send us a favorite recipe, or give us your feedback.

Brewing up Something New

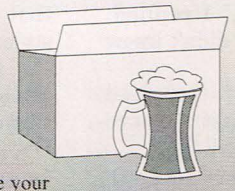
Dear BYO,

Homebrew Weddings? (April '96) How about a homebrewed baby! Here is the announcement we sent after the birth of our son, Zachary Oliver. Enjoy!

Dan and Carlene Comer
Delray Beach, Fla.



Brew Award-Winning Homebrew!



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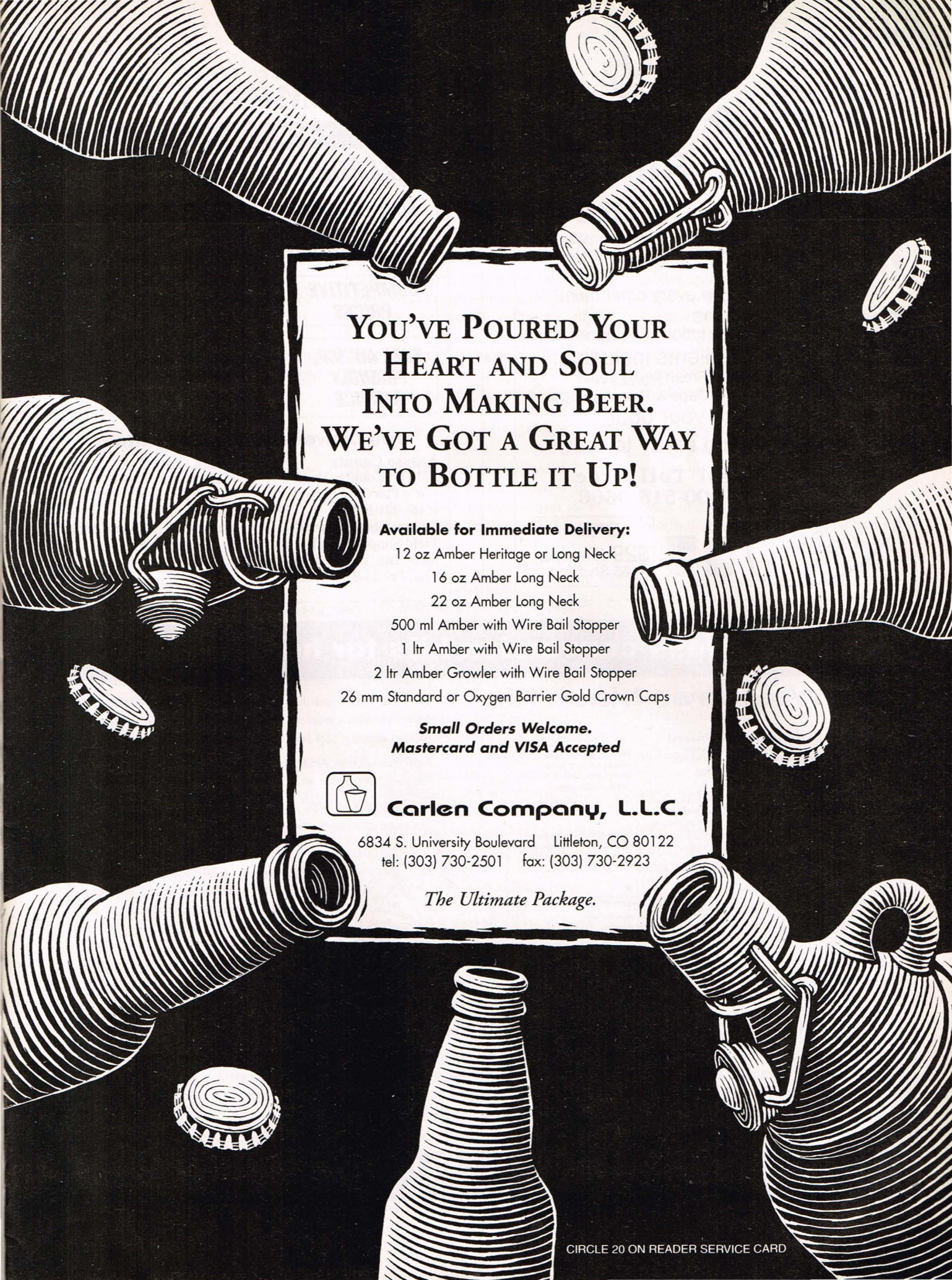

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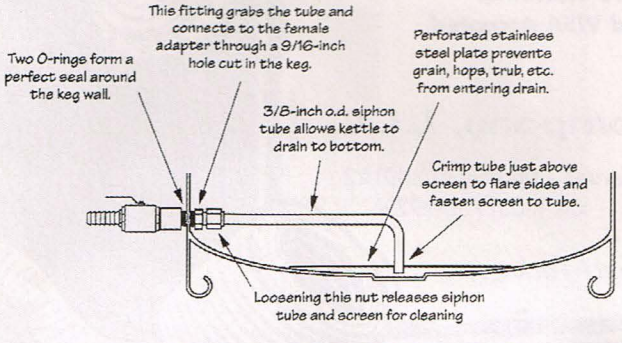

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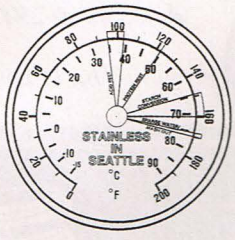

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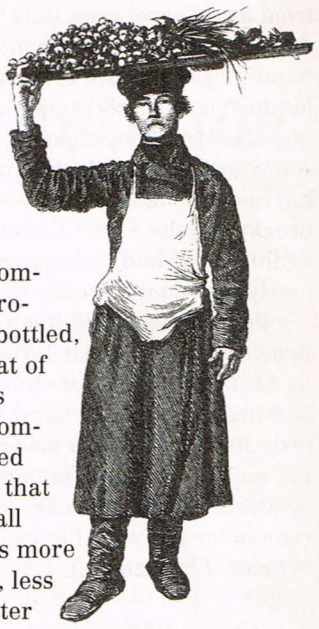
Remembering Russian Rye



by Scott Russell

It is with no small amount of trepidation that I present this month's featured recipe. Not because it isn't any good, but rather because it may cause some furor among purists and beer historians.

You see, my wife and I were invited to chaperone a school trip to the Soviet Union. Naturally, we jumped at the chance to experience *glasnost* firsthand. Just a short trip, a few days in Moscow, a few in Leningrad sandwiched around two-and-a-half memorable days in the capital of Soviet Estonia, Tallinn. Without question, Tallinn was one of the most beautiful old European cities I have ever visited and the people were remarkably open and friendly.

One of the treats that awaited us in Tallinn was a beverage whose name I never did learn, drunk from wooden bowls with dragon-boat handles. It was like a brown ale, although only barely effervescent, with a sour, tangy, nutty taste and a sharp, acidic bite in the nose. I learned later that it was made with a large quantity of rye, aromatized with juniper berries and filtered through juniper branches. I only had it once in Estonia, but the memory has clung with me many years.

Our trip included a stopover in Helsinki on the way home, and there we discovered a similar local beverage (although commercially produced and bottled, whereas that of Estonia was more of a community-based homebrew) that the Finns call Sahti. It was more carbonated, less tangy, sweeter — not quite the same thing.

When I began homebrewing, in the back of my mind I kept hearing a voice reminding me of this brew I'd had in Estonia. Batch nine was my first attempt at it, and it came out more like the Finnish version, too sweet. I

T.A.F.K.S.
(5 gallons, grain and extract)

Ingredients:

- 0.5 lb. medium crystal malt, 50° to 60° Lovibond
- 0.5 lb. Vienna malt
- 0.25 lb. chocolate malt
- 0.75 lb. malted rye
- 0.25 lb. malted wheat
- 4 lbs. amber malt extract syrup
- 1 lb. wheat dry malt extract
- 0.5 lb. Belgian candi sugar (or 0.5 lb. dark brown sugar)
- 0.5 oz. Hallertauer or Tettnanger hop pellets (2% alpha at most)
- 12 to 15 slightly crushed fresh or dried juniper berries
- 10 to 14 grams dry ale yeast, or liquid culture (Wyeast 1007)
- 1/2 cup corn sugar

Step by Step:

Crush together crystal, Vienna, and chocolate malts, malted rye, and wheat. Heat 1 gal. water to 165° F. Mix in grains. Mash should stabilize at about 152° F. Hold at this temperature for 45 minutes (in prewarmed oven or insulated lauter tun) then add 0.5 gal. 180° F water to raise mix to about 165° F. Hold for 10 minutes, then run off liquid (through a sparging bag or lauter tun false bottom set-up). Sparge with 1 gal. water at 170° F. Collect all runoff in the kettle (you should get approximately 2.25 gals.) and heat to boiling. Remove from heat and stir in extracts. Add in sugar.

Return to heat and raise to boiling again. Boil 40 minutes, then add hop pellets. Boil five more minutes, then remove from heat. Place in sinkful of cold water and ice.

As wort cools, steep (in muslin hop bag) juniper berries for approximately 15 minutes. Add to your fermenter and top off with preboiled, chilled water to make 5.25 gals. Remove juniper berries. When cooled to 70° F, pitch yeast. Primary fermentation should be complete within five to six days.

Rack to secondary and age at cool temperatures (50 to 55° F) for two weeks. Prime with corn sugar and age three to four weeks in the bottle.

Notes and Alternatives:

The brew may be lagered as well, and I suggest using the Wyeast 2042 Danish lager.

If you can arrange a convenient and sanitary hop-back arrangement, you can achieve a kind of dry hop touch to this beer by racking it through the hop-back filled with fresh green juniper branches on the way to the fermenter (or to your wort chiller) while it is still warm.

All-Grain Brewers:

Make a mash of 5 lbs. 6-row brewer's malt, 0.5 lb. amber malt (or light crystal, 20° Lovibond or so) and 1.5 lbs. wheat. Use a two-step mash, with a 30- to 40-minute rest at 130° F and saccharification at 152° F as above. Add the recipe's adjuncts to the mash tun between steps.

Extract-only Brewers:

Increase the malt syrup to 5 lbs. and steep 0.5 lb. rye and 0.5 lb. wheat in the brewing water, removing them at 170° F.

tried again several months later, this time with a partial mash and fresh, hand-picked juniper branches in the lauter tun. I overdid something, because I got floor cleaner. *Very* acidic. A few moths later, during juniper berry harvest time and a few weeks after the breakup of the Soviet Union, I tried again. I felt I had to commemorate the newly liberated Republic of Estonia.

I'm sure Estonian Rye and Juniper Brown Ale (or The Ale formerly Known as Sahti, T.A.F.K.S. for short, because I had been mistakenly using the Finnish term for the Estonian beverage) is not the recipe that an Estonian homebrewer would use, but it tastes like I remember it. I wish I knew how to say "Cheers!" in Estonian.

Reader Recipes

Dan Doyle's Happy Times Honey Ale
(five gallons)

"I've been very happy with the taste and I don't do a secondary fermentation. This is a beer that even the non-homebrew drinker will love!"

Ingredients:
- 7 lbs. pale malt extract
- 2 lbs. mountain flower honey
- 0.5 lb. cara-munich malt
- 0.5 lb. crystal malt, 60° Lovibond
- 0.25 lb. cara-pils malt
- 2 oz. Crystal hops
- 0.5 oz. dried orange peels
- 1 tsp. Irish moss
- Pale ale yeast
- 3/4 cup corn sugar

Step by Step:

Fill boiling pot with 1.5 gals. water. Add cara-munich, crystal, and cara-pils. Remove grains as soon as water begins to boil. Sparge with 1 gal. of 170° F water. Add extract and honey to water and bring to a boil. When boil begins, add 1.5 oz. crystal hops. After 50 minutes, add 0.5 oz. Crystal hops, orange peels, and Irish moss. Boil for three more minutes and remove from heat. Add to carboy and adjust volume to 5 gals. Cool wort to room temperature and pitch yeast. Ferment at room temperature. Bottle or keg as usual.

John "Hump" Humphries High Flyin' ESB
(5 gallons, extract and all-grain)

"I hope everyone enjoys the beer; it is my wife's favorite."

Ingredients:
- 6 lbs. light malt extract syrup
- 2 lbs. Gambrinus ESB malt
- 2 lbs. crystal malt
- 2 oz. Willamette hops
- 1 oz. Tettnanger hops
- 1 oz. Tettnanger hop pellets
- 1 tsp. Irish moss
- 1 tsp. gypsum (for water hardness)
- London ESB liquid yeast

Step by Step:

Heat 2.5 qts. of water to 170° F and mash grain. Hold at 155° to 158° F for 60 minutes. Sparge grain with 2.5 qts. 170° F water and add water to make 6.5 gals. Add gypsum and extract. Bring to a boil. Add Willamette hops. Boil 45 minutes. Add Irish moss. Boil 13 minutes. Add 1 oz. Tettnanger hops. Boil for two minutes. Reduce to 5 gals. Remove from heat and cool to 75° F. Pitch yeast. (Start yeast in 1 pint 1.010-gravity wort 24 hrs. before pitching.) Dry hop with 1 oz. Tettnanger pellets two days before bottling. Put pellets in a hop bag with marbles in it so it sinks. Bottle after 17 days. Age in bottles for two weeks. ■

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FG = 1.018

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Don't Get Steamed Over Hot-Side Aeration

Mr. Wizard

I am a little concerned about the statements made in your magazine regarding oxidation. I've always thought that oxidation after fermentation had begun was bad, but your article was the first time I'd heard of splashing the hot wort as potentially ruining the beer.

What about sparging? If the discharge from my sparge set-up dribbles into the brewpot for an hour, splashing the whole time, will this have the same negative effect? I've even read that those who can't achieve a long rolling boil should vigorously stir the hot wort to promote protein coagulation.

How serious is this hot wort oxidation? Is it really likely to ruin the beer?

John Rezabek
Lima, Ohio

I think it's time to take my gloves off and clearly state my opinion on this oxidation stuff. I'm not sure which article you're referring to (this topic has come up more than once), but if your beer tastes great and you splash the wort around, *don't worry*! There are members of the homebrew world who love to make doomsday statements. I think this wort oxidation stink is one such example.

In past issues I have cited the brewing practices of successful breweries where splashing hot wort is part of their process. These pragmatic brewers don't worry because their beers come out how they want them to.

My advice regarding oxidation is as follows: 1) Treat your mash as gently as possible, but if you splash around a little bit at mash-in, don't assume you're in for a disaster. 2) Try to keep the wort from splashing around too much during collection. After all, wort is sticky and makes a big mess if it lands on the floor!

On a serious note, splashing hot wort can cause wort darkening — this is undesirable if your goal is to produce a very pale beer.

Let me repeat, this will not ruin your beer. To cite commercial brewing practice, grants (copper vessels used to drain the mash during transfer to the lauter tun) used in wort collection do splash the wort, yet beers brewed using grants are not inferior. Grants are commonplace throughout the world.

3) Aerate your wort after cooling; yeast need some oxygen for growth. 4) Eliminate any further air pickup from this stage onward, unless you must rouse your yeast (not a common practice).

I swore I'd never say this, but on this issue I can't resist: "Relax, don't worry, have a homebrew!"

Mr. Wizard

I've been brewing for about nine years, with a gap of four years while I lived in Germany. While I was there I found you could on occasion find weizen on draft. Could you provide any info on kegging this high-carbonation brew?

Jay Krause
Wabash, Ind.

Another lover of weizen beer! It's one of my favorites as well. Tips on carbonating and kegging weizen are consistent with kegging other types of beer. The idea behind kegging is that you want to have the CO_2 pressure on the keg be the same as the pressure you want to dispense the beer with. So the key to kegging this product lies in dispensing the beer rather than carbonating the beer.

The recommended serving temperature for a wheat beer is about 38° F. You need about 16 pounds per square inch on the keg to fully carbonate the beer. The trick to dispensing the beer is to use the same pressure (16 psi) to push the beer out of the keg. At this high pressure it is difficult to dispense beer because it comes out of the tap so quickly. I recommend using a 3/16-inch draught line that is longer than normal. Eight feet should be enough to sufficiently slow the beer down to pour gently into the glass.

The best way to carbonate the beer is to put your finished weizen in a keg and store it at 38° F. Apply 16 psi of CO_2 pressure and leave the system hooked up so that you have gas pressure coming in through the "inlet" valve on the keg. Let it sit for about four days, after which the beer should be at an equilibrium with the CO_2 pressure and fully carbonated. If the keg is kept hooked up to 16 psi, you can then tap the beer with your long draught line.

One of the things you may have seen in Germany was the beautiful glassware. Nothing is better than a homemade wheat beer served in the proper glass.

Mr. Wizard

I'm a college student, and I recently started to brew beer. On my third batch I decided to buy a some equipment to add CO_2. I did some extensive looking around and wandered upon a gold mine — a little bar on wheels that a guy built and sold to us for a couple of bucks.

Everything was going great. I added

CO_2 (40 psi) for two days while shaking the keg periodically. I kept it very cold in our beer fridge and last night decided to take a little taste to check on the CO_2. I released the pressure of the keg down to zero, then attached the tank and kept the CO_2 at 10 psi.

When I poured the first beer, pure foam came out. I figured that was natural — the first few beers are always foamy. An hour later they were still very foamy, so I looked at the equipment. I noticed that on the tap there is a little screw where the beer enters. Do you know what the adjustment of this screw does? Do you know why I am getting so much foam? Just when the beer reaches the tap it back-eddies around in the clear plastic cone that connects to the tap and turns into foam.

Robert Artibise
Victoria, Canada

So another crazy student who thought that kegging would be an end to all problems. You've pointed our several interesting things about kegging.

The first thing that caught my eye is that you added 40 psi of CO_2 for two days while shaking the keg periodically. Forty pounds of CO_2 for two days can grossly over-carbonate your beer. Commercial microbreweries and brewpubs that force carbonate (which is what you've done) use the same pressure to carbonate the beer that it will ultimately have as an equilibrium headspace. In other words a fully carbonated beer that is cold, say 38° F, will have approximately 13 to 14 psi of CO_2 pressure over the beer in a closed container. That's called the equilibrium CO_2 pressure. Your method is a quick way of carbonating beer using high pressure, but two days is too long for that.

In the future if you use that method, use the 40 psi CO_2 pressure for a couple of hours only, shaking periodically. Before tapping, reduce the keg's pressure down to about 14 psi.

That takes care of the first problem — overexposure to CO_2. Fixing this will decrease your foaming problems, because pouring an over-carbonated beer is difficult.

Over-carbonation may not be your real problem. You mention that you have a very unusual tap. It is plastic with a cone embedded in the rear and a set screw on it, which is typically used to dispense soda. The screw moves the distance of that cone closer or further away from the back of the tap as a regulation system.

The problem is the "back eddy" around that plastic cone you describe. Those eddies are disturbing the beer and forming small bubbles. It's sort of like ice crystal formation. Beer quietly flows into the tap and because of the disturbance that the cone creates, small bubbles form in the line. Those small bubbles act as nucleation sites for more bubbles. The result is rapid release of CO_2.

My recommendation would be to give me your kegging system, and I will install it in my pub garage with my dart boards, because I'm in great need of such a device — I'll fix it and make it work.

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The real answer is that you have a very nice device, a keg cooler with a tap tower on it. The first thing you need to do is keep your system the way it is and to attempt to carbonate your beer the way I recommended, because I think your problem could be over-carbonation. If that doesn't solve the problem, change the soda tap and put a conventional beer tap on your tap tower.

If the storage container is sealed, it can explode. Take my word for it. I simply cover it with aluminum foil and tape over the foil. That will make a good seal but will allow built-up gas to escape.

There is a lot of talk about feeding the yeast during storage, or getting it going again. That's simply not done in the commercial industry. After the yeast is harvested, it's kept cold and undisturbed until it is needed.

Mr. Wizard

O Wise and Wonderful Yeast Rancher,

In the June issue you answered a question about yeast starters. Now that I know the proper quantity and propagation technique, what about storage? Assume that I have done a great job of getting a ferocious bunch of yeasties just itching to chow down on some wort, but brew day needs to be postponed or I just want to make extra yeast for a couple of batches. What is the best storage and how long?

Please do not disappoint, O sagacious one.

Sean M. Drew
Gilbert, Ariz.

You've got a propagation of yeast growing and something interferes with your sacred brewing time. First, cover the propagation flask and throw it in the refrigerator. It can sit for about two weeks without major problems.

Beyond two weeks the yeast will begin to die, and you don't want to add a high population of dead yeast to your fermentation. It would slow down fermentation and could contribute some pretty bad off-flavors.

After you've gone through the trouble of propagating your yeast and have used it in one fermentation, I recommend harvesting and re-using it. The best way to harvest it is to rack the beer out of your carboy after primary fermentation is over. This is easiest if you cool the beer first. The yeast will flocculate (clump and sink), settling at the bottom of the carboy. Rack the beer out, leaving a little bit of beer in the bottom, and swirl the carboy. Then simply pour the yeast out into a storage container.

Mr. Wizard

I recently read a letter to BYO (Mail, June '96) about adding Everclear to hops. The writer said this would reduce the possibility of contamination before adding the hops to the secondary fermenter.

When I dry hop, I use a stainless steel screen ball (boiled each time, of

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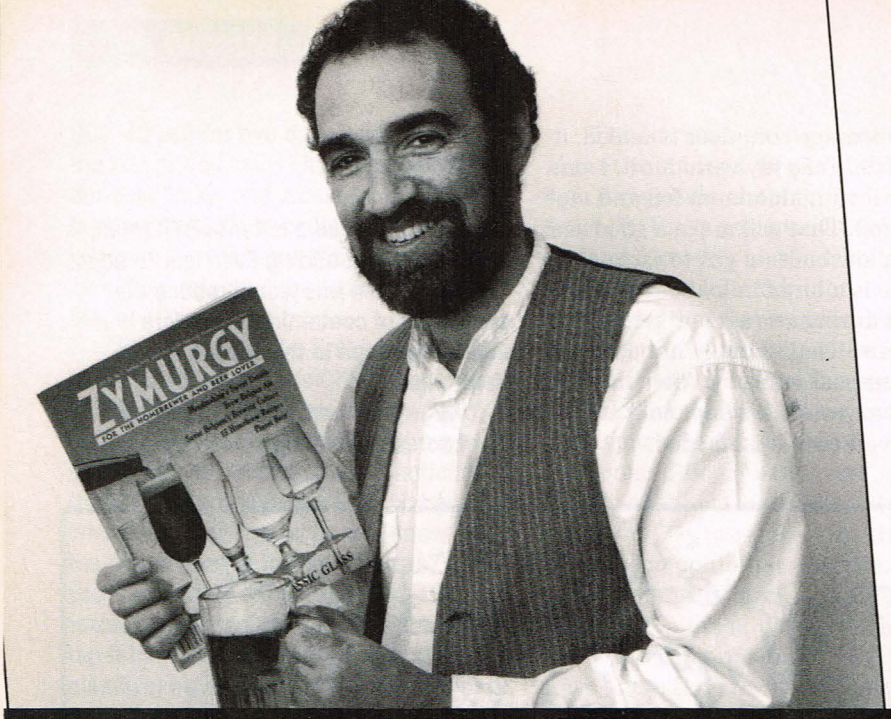

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Mr. Wizard

course). Is my risk of contamination high when I do this?

Vassey Dante
Jenny Lind, Calif.

I know this will come as no surprise to my editors: I have very strong feelings about this.

You do not need to go steeping your hops in vodka or any other toxic liquid to kill bacteria on the hops before dry hopping. Brewers have been dry hopping for a couple hundred years now and this whole issue of hops introducing bacteria has never been seriously addressed in commercial brewing. It doesn't cause any problems.

However, there have been some studies done. Scientists at the University of California, Davis, brewing lab experimented with dry hopping by counting the bacteria on the hops. The hops did contain bacteria, which were isolated before the hops were added to the beer.

The scientists tracked the bacteria over time. The original bacteria were not found in the finished beer. They died.

The conclusion was that bacteria on hops do not spoil beer because they do not survive. Hallelujah! You do not need to worry about steeping your hops in Everclear before using them.

The method that you described — using a stainless steel screen ball and boiling it before each use — is a dandy idea.

You're sanitizing the tea ball, 'cause who knows what type of bacteria could be on that? You're putting hops in it, but we've established that you don't need to worry about bacteria from them. Just keep that tea ball clean. ■

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.

In-line skating from town to town with a keg strapped to his back, the itinerant Mr. Wizard passes along brewing knowledge and good beer wherever he goes.

From the Brewing X-Files

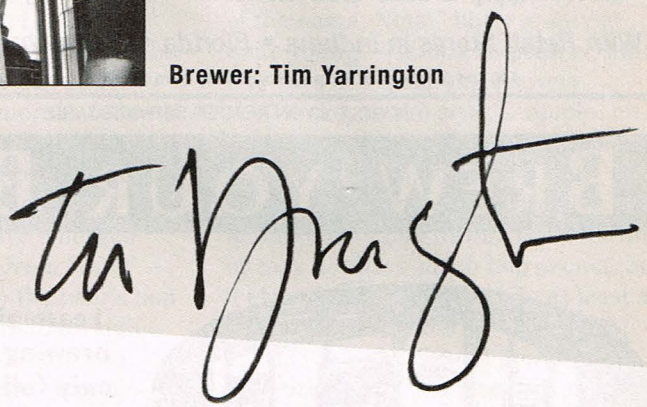
by Susan Walton

There is some information that seems like common sense that is just plain false. This month, we asked a pro to debunk a popular myth for intrepid homebrewers who seek only the truth and know that it's out there.

Long Valley Pub and Brewery

"I would venture to bet that most people, if you put the amber and the porter next to each other and ask them which they thought had a higher alcohol content, would point at the porter based on appearance."

Brewer: Tim Yarrington



Brewer: Tim Yarrington
Brewery: Long Valley Pub and Brewery
Years of experience: Pro one year, homebrewer eight years
Education: MS in Brewing Science, University of California, Davis
House Beers: Grist Mill Golden, German Valley Amber, Black River Brown, Lazy Jake Porter

Many people believe that light-colored beers are lower in alcohol than dark-colored beers. That's not necessarily true. Alcohol content relates to the amount of fermentable sugar that is delivered to the yeast for fermentation. You derive more fermentable sugar from lighter-colored malts than from darker malts because during the malt drying process the starches become changed in form. Part of the drying process (which is what creates the color) is the high-temperature kilning. The starches become involved in the color formation process and therefore are no longer available to provide fermentable sugars.

People think that lighter beers have less alcohol than darker beers because the dark beers tend to be heavier. When people refer to heavy beer, they mean in terms of weight. When I think of a heavy beer, I think of a beer that has weight in mouthfeel and body, due to unfermented sugars. Dextrins are neither fermentable nor sweet to the taste. They are viscous, so you feel them in your mouth and ultimately in your stomach. It is true that dark often means heavy, so perhaps that's where the myth came from — heavy beer, dark beer, therefore higher alcohol because it's weightier. Whereas the opposite is true.

You can make a beer light in color with dilution, making it a lower-alcohol beer. A beer can also look light in color because the majority of the sugars were fermented by the yeast and converted to alcohol. Alcohol is much

lighter than water, so it gives the feel of a light-bodied beer but it's still very high in alcohol.

Another reason people may be confused on this is the example set by barleywine, which is really an extreme. In the case of barleywine it's absolutely true that heavy mouthfeel, high alcohol content, and dark color go together. That's just a case of more of everything. With barleywine you use extreme amounts of malt and by virtue of the sheer extreme quantity, you get more fermentable and unfermentable sugars in the beer. Another factor in barleywine is that there is so much fermentable sugar that the yeast can't possibly convert it all to alcohol.

Here you have this extreme amount of fermentable sugar in your wort and the yeast will convert that sugar to alcohol. At a certain point the alcohol concentration in the liquid becomes inhibitory to the yeast's own activity. So in effect it poisons itself. Often times in barleywines you'll end up with sweetness and weight because the yeast was unable to completely convert all the sugar to alcohol.

But when you talk about common, universally popular styles like stout, lager, and porter, the alcohol content is more a measure of how much fermentable versus unfermentable sugar you deliver to the yeast.

In my brewery I produce two beers with the same original gravity. One is an amber ale and one is a porter. I would venture to bet that most people, if you put the amber and the porter next to each other and ask them which they thought had a higher alcohol content, would point at the porter based on appearance. It's a very dark, black beer, whereas the amber's much lighter. But the same amount of substance goes to the fermenter. Both beers have the same original gravity, but the finishing gravity on the amber is much lower than on the porter. That means that more of the sugar that I sent to the fermenter in the amber was converted to alcohol. A lot of the weight that was sent to the fermenter in the porter was unable to be turned into alcohol. ■

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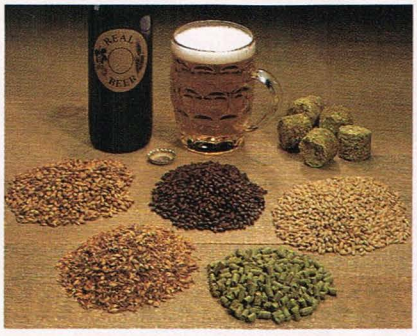

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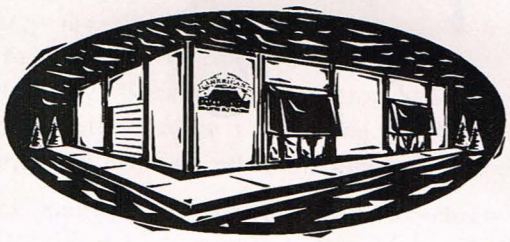

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AMERICAN BREWERS GUILD
EDUCATION AND TRAINING

CIRCLE 4 ON READER SERVICE CARD

Brew an Extraordinary British Bitter

by Jeff Frane

Maybe it's genetic. As much as I enjoy a good German lager, a Czech pils, or a Belgian abbey beer, nothing tugs at my heart like a good British bitter. I figure it's the blood of all those working-class Nottingham souls calling for their "pint of bitter."

British Bitter

(extract, 5 gallons)

Ingredients:

- 4 lbs. Alexander's extra light malt extract syrup
- 1 lb. Laaglander dry malt extract
- 0.5 lb. Belgian biscuit malt
- 0.5 lb. British crystal malt
- 2 oz. flaked barley
- 2 oz. Target hops (10% alpha)
- 1 oz. Kent Golding or Fuggle hops
- 1/2 cup priming sugar
- Edme dry ale yeast

Step by Step:

Crush the malts and soak them with flaked barley in 1 gal. water at 150° F for one hour. Sparge grains with 170° F water, collecting a total of about 2.5 to 3 gals. for boil. Boil for 15 minutes, then add Target hops. Boil 75 minutes and add the finishing hops. Strain wort into 2.5 gals. preboiled, chilled wort (to make 5 gals.). Aerate thoroughly! Pitch the yeast. When kraeusen falls, rack to closed secondary fermenter and follow normal bottling/kegging procedures, but use only about 1/2 cup priming sugar. (Experiment with various sugars at this stage: invert sugar or dark brown sugar are interesting possibilities).

OG = 1.035
FG = 1.006

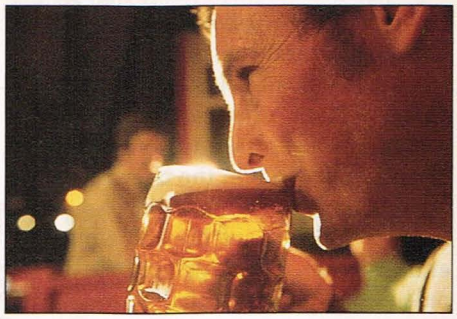
Or maybe it's the weather. Stouts, porters, and barleywines have their place warming damp bones, but there's nothing quite as bracing as a solid jolt of intense hop bitterness on a cool evening. And there's nothing quite as social as a round of bitter at a table filled with friends.

The truth is, my British ancestors weren't ordering bitter before they left England in the 1920s. Although it has become the quintessential British beer, "bitter" didn't become a notable style or common term until the years around World War II. The seminal British brewing text, H. L. Hind's *Brewing: Science & Practice*, from the 1930s, never uses the term at all, although there are numerous references to pale ale. My ancestors may have been drinking "bitter" but they probably didn't call it that.

"Bitter" seems to have emerged purely as a distinction from "mild" — both terms referring to the beer's hopping rate, either low (mild) or high (bitter). In the days when the tied-house system assured that a pub carried only one brand and each brewery offered drinkers such a choice, the distinction was simple. But defining "bitter" as anything but "not mild" is difficult — especially when milds have never been an American style and have faded badly even in England.

Regional preferences and distinct variations from brewery to brewery make over-precise definitions of bitter suspect. As the *Guide to British Breweries* notes: "...the type of drink which the definition covers is quite remarkable in its variety. Some bitters are dry and hoppy, others sweet and luscious." The beers range widely in color as well, from pale gold to deep bronze, generally copper colored, but they are always "pale," which is to say, they are clear.

Although bottled and canned bitters exist (luckily for Americans), the term is usually reserved for draught versions and the purists know that only "real" cask-conditioned bitter is worthy of the name. "Real" bitter is served quite young — hitting its peak within a few days of leaving the brewery.



COURTESY OF THE BRITISH TOURIST AUTHORITY

The key to the style is simple: bitter. The beer must have a liberal dose of bittering hops, which not only assure an assertive bitterness but a foundation of hop flavor. The beer may or may not have much hop aroma, but it should always have a bite at least as formidable as its bark.

As the style grew in popularity, breweries often produced several versions in varying strengths. The basic or "ordinary" bitter (about 1.035) evolved for several reasons. A low-gravity "session" beer offers drinkers the chance to stay upright through long evenings.

Taxes are an important factor as well. British beers are taxed at the brewery on a scale determined by the original gravity (OG). Beers brewed to an OG of 1.035 can be sold for much less than those at 1.045 (more in line with an American ale).

And as Michael Jackson notes in *The New World Guide to Beer*, "that hop-acid bitterness cannot emerge so well in a bigger ale." The trick, the British brewer's gift, is to be able to produce a low-gravity beer that isn't insipid but rather full of flavor — the flavor of hops and, to some extent, of

good British malt.

Of somewhat higher gravities are the premium bitters (about 1.045) and strong bitters (in the 1.050s). These ranges and terms are more accurate (in their vagueness) than references to "special" or "extra special" bitters, which are primarily breweries' marketing terms with no general application.

Bitters are British beers through and through. British and American hops, malts, and yeast may be similar but not identical. British malts taste different from American malt, with a sort of nuttiness hard to define but clearly noticeable in the beer.

For the all-grain brewer the choice is simple; bitters are brewed almost entirely from well-modified British pale ale malt. British malts have more color than American lager malts, and more color is derived during the boil. Because British bitter is intended for quick consumption after leaving the brewery, staling is hardly a consideration and some color is derived by deliberately aerating the hot wort.

Small additions of adjuncts like flaked or torrified barley or malted wheat aid in head retention and enhanced mouthfeel, while flaked maize has become increasingly popular as a source for boosting the gravity while maintaining a pleasant dryness and aiding in clarity. Kettle sugars, while frowned on by the purist (and virtually unknown among American micros), find their way into many excellent bitters. The British use sucrose, invert sugar, and caramel, separately and in blends, in the kettle and for priming the cask.

Brewing water is critical to the all-grain bitter brewer. Soft waters or very carbonate waters have their place in brewing, but clarity and full hop flavor are best created in gypseous water (high in calcium sulfate).

British mashes are the simplest imaginable — one temperature infusion (about 150° F) until conversion — so equipment needs are simple and mashing itself goes quickly.

Extract brewers have to approach bitter a little differently. While it seems logical that British malt extracts (abundantly available to the homebrewer) would be the ideal choice, there are some problems. British extract manufacturers design their products to be mixed with a large amount of cane sugar. However, the results of mixing several pounds of sugar with an equivalent amount of malt extract can be less than wonderful. The standard suggestion — using two cans of extract and leaving the sugar out entirely — makes a more flavorful beer but not anything quite like a bitter.

Here are a few strategies: Rather than substituting the sugar with extract syrup, use one of the extra-light dry extracts (DME), which seem to ferment more thoroughly and add much less color than the canned variety. Or for the mash-extract brewer, pick up the lost fermentables by mashing several pounds of British pale ale malt and sparging this in with the extract.

A third, perhaps blasphemous, suggestion that seems to work well: Get a paler, drier result by using a combination of very light syrup and extra light DME. In order to approxi-

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CIRCLE 51 ON READER SERVICE CARD

mate the distinctive flavor of British ale malt, I add a portion of Belgian "biscuit" malt and a small amount of British crystal malt.

The hop, of course, is of great importance. The British method of hopping tends to be very simple: Virtually all the hops are added near the beginning of the boil. Some hops — usually the most expensive and delicate — are reserved for late hopping or for dryhopping in the cask. The level of aroma and flavor can vary tremendously, as long as the kettle hops are abundant.

Once again, while American ales can be delicious, American hops have no place in a British Bitter. Even the bittering hops should be of British lineage. Good high-alpha choices include Northern Brewer (7 to 8 percent alpha), Bullion (10 percent), Challenger (6.5 to 8.5 percent), and Target (10 to 12.5 percent). For finishing hops, East Kent Goldings may come to mind first, but other excellent choices abound: Fuggle (or its American version, Willamette), Bramling Cross, Progress, WGV, or one of the new varieties emerging from British research.

Finally, the yeast should be a good, flavorful strain. British yeasts are not known for being neutral but rather make a contribution of fruitiness, buttery-ness, or mineral notes. The ever-popular strain used by Sierra Nevada (Wyeast 1056) is perfect for American ales, but something with more character works better in a bitter. And of course, this is a perfect opportunity to explore open fermentation, the traditional British method. ■

Longtime homebrewer Jeff Frane has been studying beer styles for more than a decade. He can be reached by e-mail at jfrane@teleport.com.

British Bitter

(all-grain)

Ingredients:

- 6.5 lbs. British pale ale malt
- 5 oz. British crystal malt
- 5 oz. Flaked maize
- 5 oz. Flaked barley
- 1 oz. Target (11% alpha)
- 1 oz. Progress (5% alpha)
- Wyeast 1968 London ESB yeast
- 1/2 cup priming sugar

Step by Step:

Mash in 2 gals. water at 152° F for 90 minutes (or until conversion). Sparge to 6 gals. Boil for a total of 90 minutes. Add Target hops for 75 minutes and Progress hops for 5 minutes.

Cool to pitching temperature, aerate thoroughly, and pitch a 1-qt. starter of yeast. Ferment in open fermenter at 65° to 68° F until krausen falls, then rack to secondary. Follow standard kegging or bottling procedures.
OG = 1.037

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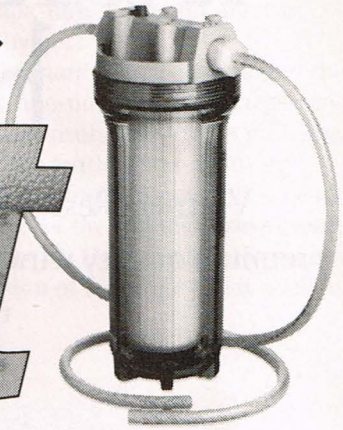

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CIRCLE 71 ON READER SERVICE CARD

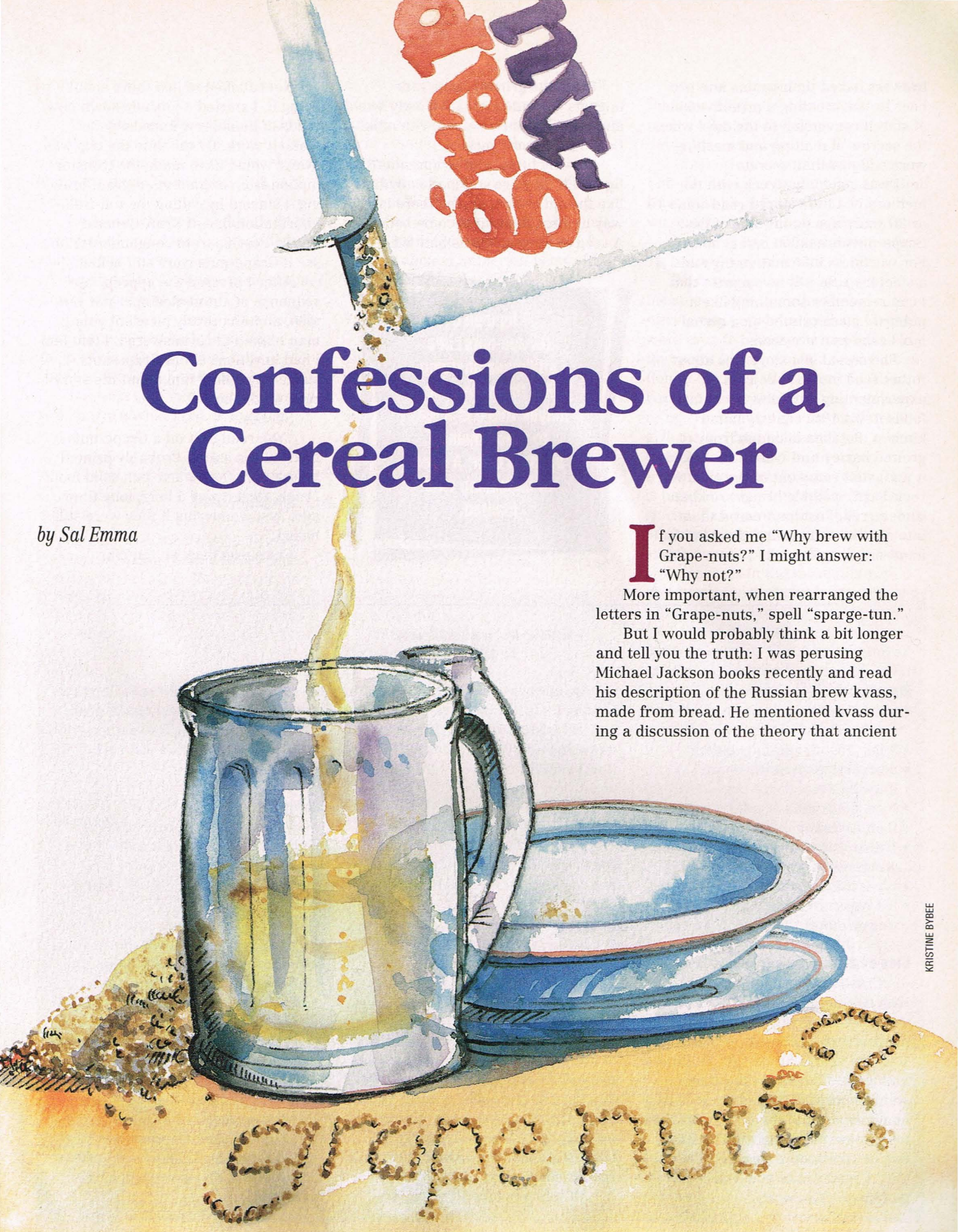
Confessions of a Cereal Brewer

by Sal Emma

If you asked me "Why brew with Grape-nuts?" I might answer: "Why not?"

More important, when rearranged the letters in "Grape-nuts," spell "sparge-tun."

But I would probably think a bit longer and tell you the truth: I was perusing Michael Jackson books recently and read his description of the Russian brew kvass, made from bread. He mentioned kvass during a discussion of the theory that ancient



KRISTINE BYBEE

brewers baked their grains into pre-beer bread, creating a primitive kind of starch conversion in the days when the secrets of malting and mashing were still just that, secrets.

I was suddenly struck with the memory of a little story I read some 15 or 20 years ago on the side of Post Grape-nuts breakfast cereal box. For worthless information my mind is a steel trap. So it is no surprise that I can remember something like a publicity piece printed on a cereal box I read as a pre-teen.

The cereal box story was about future food mogul C.W. Post experimenting with new breakfast foods in his 19th century home kitchen. Post made dough from ground barley and wheat. He baked it and what came out of the oven were rock-hard, inedible bread brickbats. Undeterred, Post hammered them into chunks and ground them in his hand-crank coffee mill.

From the grinder came little nuggets of nuttiness, satisfyingly sweet and crunchy when topped with milk. Grape-nuts were born.

So, why brew with Grape-nuts? I figured if they are still made anything like the old recipe, maybe there is a way to force them to become beer. A seed of obsession was planted.

I figured if (Grape-nuts) are still made anything like the old recipe, maybe there is a way to force them to become beer. A seed of obsession was planted.

Not satisfied to just think about doing it, I started a journey down new roads of homebrew knowledge to make it work. By the time the trip was over, I would have made the transformation from extract to all-grain brewing. I started by calling the toll-free information line of Kraft-General Foods, Post's parent conglomerate, to see if Grape-nuts were still baked.

After I pressed the appropriate sequence of automated operator buttons, an unnaturally pleasant young man named Chris answered. I told him I had questions about Grape-nuts. I started by telling him about the story I read on the box.

Silence.

"You read that on a Grape-nuts box?" Chris asked. Probably printed before Chris had started on solid foods. "Yeah. Well it was a long, long time ago. Just wondering if they were still baked."

Chris was back on familiar

Grape-nuts Kölsch-bier
(5 gallons)

Ingredients:

- 6 lbs. American 6-row malted barley
- 3 lbs. Post Grape-nuts cereal
- 8 oz. crystal malt (German, if available)
- 1 oz. black malt
- 2 oz. Tettnanger hop pellets
- 1 tbsp. Irish moss, reconstituted in 1 cup warm water.
- Wyeast European ale yeast
- 3/4 cup corn sugar (for priming)

Step by Step:

Crush grains and mash in along with Grape-nuts in 2.5 gals. 130° F water. Proceed with a 30-minute protein rest. The mash should stabilize near 120° or 122° F. Add 1.25 gals. of boiling water and stabilize at 150° F. Hold for at least one hour or until the mash passes an iodine test. Mash out at 170° F for five or 10 minutes. Sparge with 170° F water until you collect six gallons of clear wort.

Bring wort to a boil. Boil 15 minutes and add 1.5 oz. hops for bittering and Irish moss. Boil 30 minutes more and add 0.5 oz. hops for flavor. Boil 15 minutes more. Chill, pitch yeast, and ferment.

Brewing Notes:

The sweet wort weighed in at 1.048 specific gravity. After boiling and topping off, the gravity was 1.042.

I started the mash at 7 a.m. Two stuck run-offs later, it was nearly 4 p.m. by the time I cooled, pitched, and cleaned up. But all my numbers were right and the wort tasted sweet. I was optimistic.

After 24 hours the wort stabilized at 65° F. The European Ale yeast fermented great guns for 48 hours. By day three in the primary the airlock had quieted considerably. The trub was nearly two inches thick at the bottom of the barrel, and I decided to rack to secondary.

All was quiet for the next five days. I bottled at 1.009 specific gravity. The fermented brew tasted good. It was clean, smooth, and rather light. I primed with 3/4 cup corn sugar.

Tasting Notes:

It is very hazy if poured right from the fridge. If I made this brew again, I might use gelatin or isinglass to fine it more clearly than the Irish moss.

The color is a deep amber. It has the best head of any beer I have yet brewed. Creamy and rock solid. The head stays in a perfect glass-size disk, sitting on top, undisturbed until the last sip.

It has a clean, nutty, malty aroma and crisp hop bite at first sip. The finish starts with the Tettnanger bitterness and ends malty but dry.

One question remains: would Grape-nuts Kölsch-bier have reminded naturalist Euell Gibbons of wild hickory nuts? The world will never know.

ground: That material was in his scripted index cards.

"Yes, just like the original recipe. The baking creates grape sugar. That and their nutty taste and texture gave them the name Grape-nuts," he said, brightly.

Chris volunteered the bit about the grape sugar. I did not even ask about starch conversion.

I asked "Do you know their proportion of wheat and barley?"

"That would be proprietary," Chris said. I guess they have to protect themselves against cereal spies. I thanked Chris and said good-bye.

The next step in my weird odyssey was to learn what kind of sugar is called "grape." My garden-variety dictionary provided the answer. "Grape sugar: dextrose, the sugar of grapes, a term popular in the 19th century." Right about the time C.W. Post was pulverizing Grape-nuts by hand in his home coffee mill.

Since my conversation with Chris, I read Charlie Papazian's account of making ancient Sumerian beer with bappir, hard barley bread.

I knew I had to try it. Even if I hadn't a clue how to go about it.

First I infused six pounds of Grape-nuts in water and heated it until the pan scorched. I dumped it into a fermenter with a packet of dry yeast. (I didn't even strain it.)

It went immediately lactic, pinning the household olfactory disgust-o-meter. I flushed the whole sour mess down the commode.

Obviously, I was missing something. I hit the books, rereading Papazian and Dave Miller's chapters on starch conversion, enzyme action, and the mash — chapters I had only skimmed before. This time I took notes.

As I studied the literature, it became evident that the Grape-nuts were going to need some help if they were ever to become fermentable. At that point I really started to pay attention to the diastatic power of malted barley and the whole enzyme-action thing. That is, the special enzymes that give malted barley its ability to convert built-in starch supplies to sugar.

And I learned that six-row barley is best for converting adjunct grains, since it has diastatic power to spare. In other words it can convert its own starch supply, plus more starch from other sources in the mash. Six-row also has more husk, making a more effective filter bed at sparge time.

I learned that starchy adjuncts must be heated. The heat gelatinizes the starch, making it susceptible to the converting power of malted barley. I made the assumption that the industrial ovens at Post probably gelatinized Grape-nuts.

So I got some six-row and cooked up a mini-mini mash in a small saucepan on the stove top. I mashed half six-row and half Grape-nuts. It converted partially, very stubbornly. So I made the six-row to Grape-nuts ratio two to one in the final batch.

I knew Grape-nuts contained wheat. I did not really want to make a weiss or weizen, so I scanned recipes and style sheets for a barley-based brew that used wheat as an adjunct. I found several recipes for altbier and kölsch, Germany's top-fermenting ale styles, that fit the bill. I went with the kölsch.

I used Irish moss and a bit of black malt to help clear the brew, crystal malt for color, Tettnanger hops for boiling and flavor, and Wyeast's European ale yeast. Chances are, you won't see this next to the muffin recipes on the Grape-nuts box any time soon.

Rice Krispies, Yes. Froot Loops, No.

All breakfast cereals are rich in starch, making them natural candidates for brewing. They should be used as adjuncts; that is, non-malt sources of starch. However, before using your favorite breakfast cereal in beer, consider a couple of key points.

First, when starch is heated in a moist environment, it gelatinizes. Gelatinization changes the starch's form from a crystalline to a less organized state, allowing amylases (enzymes important in changing starch to sugar) easier access to the molecular structure of starch.

Some starches, such as barley and wheat starch, gelatinize at temperatures typically found in a brewer's mash. Other starches, such as rice and corn starch, must be gelatinized before mashing because of their high gelatinization temperatures. Most commercial breweries gelatinize these starches by boiling them before mashing. Three common, effective alternatives to boiling are steam rolling, flaking, and torrification (commonly known as "puffing").

Rolled cereals (oats), flaked cereals (Corn Flakes), and torrified cereals (Rice Krispies and Sugar Smacks), are common breakfast foods. They can each be added directly to the mash as an adjunct without special treatment. Of course malted barley is still needed to provide enzymes for mashing and the husks for lautering.

The second key point involves the other ingredients found in cereal besides a starch source. Some cereals contain simple sugars as sweeteners, fats and salt for flavor and mouthfeel, and vitamins for nutritional purposes. Some cereals have unusual ingredients, such as blue stars, pink diamonds, and green clovers that are made of something strange and provide no known nutritional benefit.

In general stay away from cereals that contain a lot of fat or unidentified tidbits. Fats, commonly found in granola cereals, are detrimental to beer foam and can lend rancid flavors if the cereal is old. Salt will increase beer sweetness and palate fullness in moderate concentrations (less than 150 ppm) and may lend salty flavors at higher concentrations. And blue, pink, or purple tidbits simply don't belong in beer.

Based on their published ingredients lists, Puffed Kashi, Cheerios, Corn Flakes, Rice Krispies, Sugar Smacks, Special K and, of course, Grape-nuts would all make interesting adjuncts in any home brewery.

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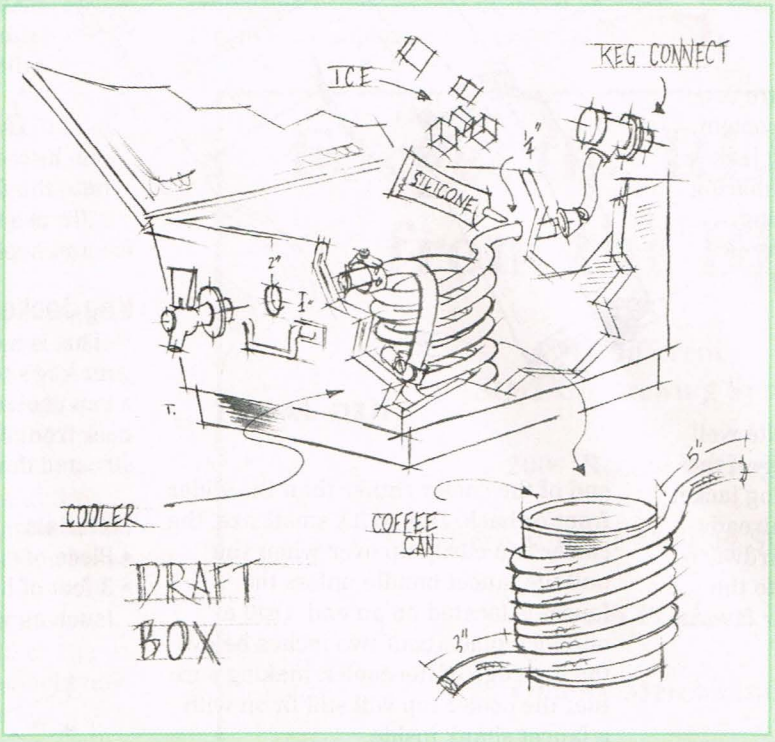


SHAWN TURNER ILLUSTRATIONS

Build a Draft Box to Serve Cold Beer Any Time, Anywhere

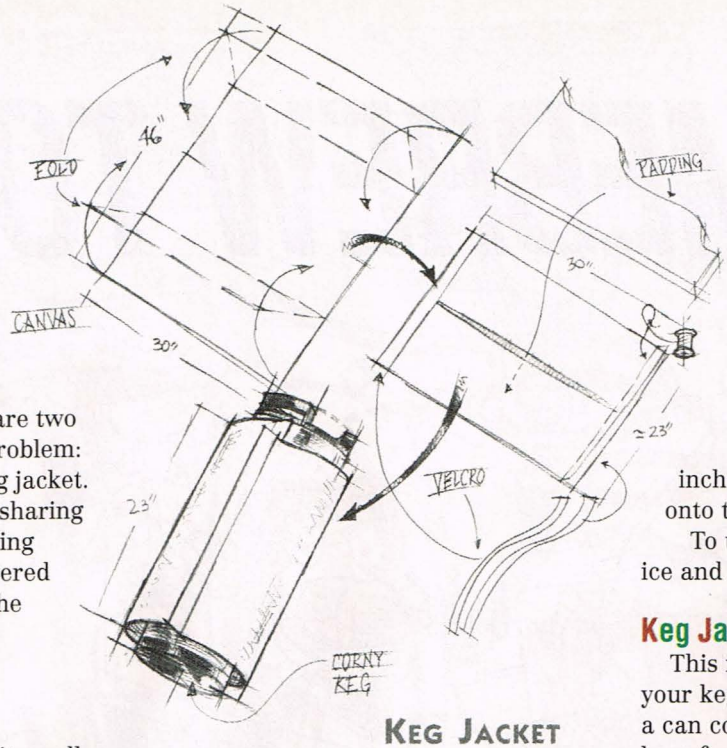
by Tom Fuller

One the most satisfying things about creating your own beer is sharing it. To be sure you always have enough beer on hand, you need a keg. But sharing often requires transportation or serving in the great outdoors. Unless you have a keg fridge in your backyard near your grill and all of your friends have keg fridges, kegs can really be a pain in the butt to keep cold.

If you don't drink all the beer and it gets too warm, your beer could be ruined.

You can always put the keg in a container with ice, but ice melts. It's also hard to find a suitable container for a cornelius keg and its ice. Here are two solutions to the warm-keg problem: a draft box and a keg cooling jacket.

The other problem with sharing your homebrew is the drooping cobra faucet — if it's not covered with grass, it's dripping on the carpet. A tombstone tower should solve that problem.



KEG JACKET

The Draft Box

This draft box works quite well for a cornelius keg, especially if the keg is equipped with a cooling jacket (described later). You may already have much of the needed hardware, but it's a good excuse to go to the hardware store nearest your favorite pub and do some shopping.

Materials:

- 8-qt. plastic cooler
- 12 to 20 feet 1/4-in. OD (outer diameter) copper tubing (or stainless steel, a commercial standard but more expensive and harder to use)
- Draft faucet
- Faucet shank
- Length of 3/16-in. ID (inner diameter) tubing
- 1/4-in. flare nut
- 1/4-in. flare to 1/4-in. flare adapter
- 2 hose clamps

Putting It Together

Essentially we're building a box to cool your beer just prior to filling your glass. It's the same type you see at festivals and other events. You could, of course, build a much larger box using a regular-sized picnic cooler, but for practicality this small version is perfect.

1. Decide where you want to locate the tap. I prefer the narrower end of the cooler rather than the wider front or back. Due to it's small size, the cooler can easily tip over when you pull the faucet handle unless the faucet is located on an end. Drill a one-inch hole about two inches below the top edge of the cooler, making sure that the cooler top will still fit on with a faucet shank inside.

2. Insert the faucet shank and attach with supplied fasteners. Attach faucet.

3. Next we need to make the cooling element. Bend the length of copper tubing around a round, solid object such as a small paint can — just small enough to fit inside the cooler. Leave at least five inches unbent at one end of the coil and at least three inches at the other.

4. Drill a one-quarter-inch hole through the side of the cooler opposite the faucet. Insert the longer of the two unbent portions of tubing through the hole. Slide on a flare nut and flare the end of the tubing. Put a small bead of silicone sealer around the hole.

5. Cut an appropriate length of the three-sixteenths-inch tubing and attach it to the other end of the cooling element with a hose clamp. Attach the other end of the tubing to the faucet shank with a hose clamp.

6. Thread a one-quarter-inch-to-one-quarter-inch adapter onto the flare nut.

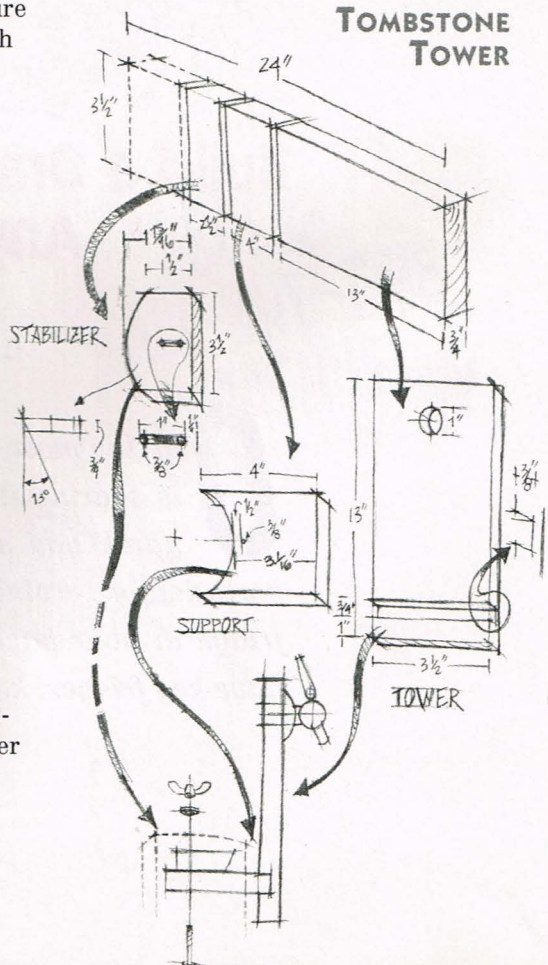
To use the box simply fill it with ice and hook it up to your keg.

Keg Jacket

This is a device that helps maintain your keg's temperature. It's kind of like a can cooler (not that you drink your beer from cans). This is an easily constructed device that works wonders.

Materials:

- Piece of canvas at least 2 by 4 feet
- 3 feet of hook-and-loop fastener (such as Velcro)



- Piece of carpet padding, 2.5 by 2 foot
- Thread

Putting It Together

You can make your own beer; you should be able to sew. If you can't, maybe you know someone who can and will for a few beers (yes, beer is also a tool).

1. The first thing you want to do is wash your canvas. If you don't, you will get this whole thing made, spill some stout on it, wash it, and it will shrink, never again to fit your kegs.

2. The average cornelius keg has a circumference of about two feet and three inches. You will want at least a one-inch hem at both ends to affix your Velcro to. Cut the height of the canvas (top to bottom of the keg) to about three feet, 10 inches and the width (the part that will wrap around the keg) to about two feet, six inches.

3. Fold the canvas lengthwise so the ends meet in the middle. The height of your folded piece should now be about one foot, 10 1/2 inches.

4. Fold in the ends at the width to make one-inch hems. Sew the hems. You now have a pocket in the canvas that opens in the middle. This is where the padding will go.

5. Now you need to sew on the Velcro. First, see how this jacket fits around your keg. This will give you an idea exactly where to put the Velcro. Sew a strip of Velcro on each hem so that when the ends meet, the jacket is snug enough.

6. Slide in the padding.

Tombstone Tower

Now we need the device that will help you keep the faucet off the ground and the beer off the jacket. If you plan to use a draft box, then you have no real need for the tombstone tower. The tombstone is a device that allows you to use a chrome faucet on a cornelius keg. This is a wood-working project, and quite an easy one.

Materials:

- 1 board 3/4 in. by 3 1/2 in. by 2 feet (any wood will do except plywood as the plys can separate with moisture)
- 1/4 by 20 threaded insert (1/4-in. diameter, 20 threads per inch)
- 1/4 by 20 thumb screw
- 1 washer

Putting It Together

1. Start by cutting the wood to

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CIRCLE 3 ON READER SERVICE CARD

size. Cut one of each of the following pieces: (a) tombstone (tower), 3 1/2 inches by 13 inches; (b) the support, 3 1/2 inches by four inches; (c) the adjustable stabilizer, 3 1/2 inches by 2 1/2 inches. These are the rough cut pieces, see drawing (page 28) for actual size.

2. Cut a three-quarter-inch dado in the tombstone (a) three-eighths inch in depth, one inch from the bottom. Cut the top in any shape you find aesthetically pleasing.

3. Drill a one-inch hole in the top of the tower to accept a faucet shank.

4. Cut the support (b) with the arc indicated in the drawing (page 28). This arc is crucial to the stability of the tower, as it fits tightly against the lip for the top opening of the keg.

5. Drill a three-eighths-inch hole about three-quarters of the way through the support, one-half inch from the center of the arc, to accept the insert. Drive in the insert.

6. The stabilizer (c) is the tricky part. The arc should be cut as indicated in the drawing (page 28), but with the saw (sabre saw, bandsaw, or scroll saw) set at a 13-degree angle. This angle makes the stabilizer seat correctly against the inside of the keg handle.

7. Now you must make the slot in the stabilizer to make it seat tightly against the handle. Start by drilling a three-eighths-inch hole, one-quarter inch back from the center of the stabilizer. Drill another three-eighths-inch hole toward the angled arc so that the two holes are one inch apart at the outside ends of the holes. The space in between the holes can now be chiseled or cut out to form a slot.

8. Now the support (b) can be glued into the tower (a).

9. To use, attach the faucet and insert the support into a keg handle. Put the stabilizer on and insert the thumb screw through the washer and thread it into the insert. Push the insert tight up against the handle and tighten down.

Other stability modification can be done such as a block on the lower part of the tower under the support. This would rest against the keg to aid in stability. The dimensions for this vary, as kegs differ by manufacturer.

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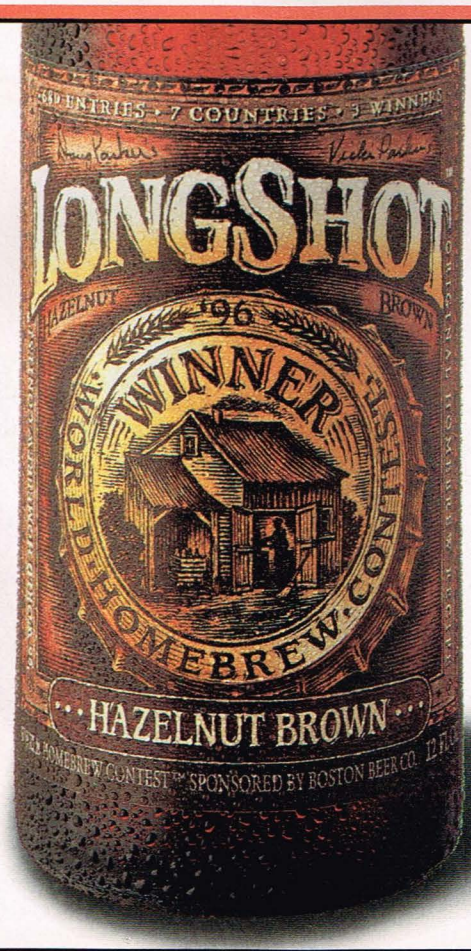

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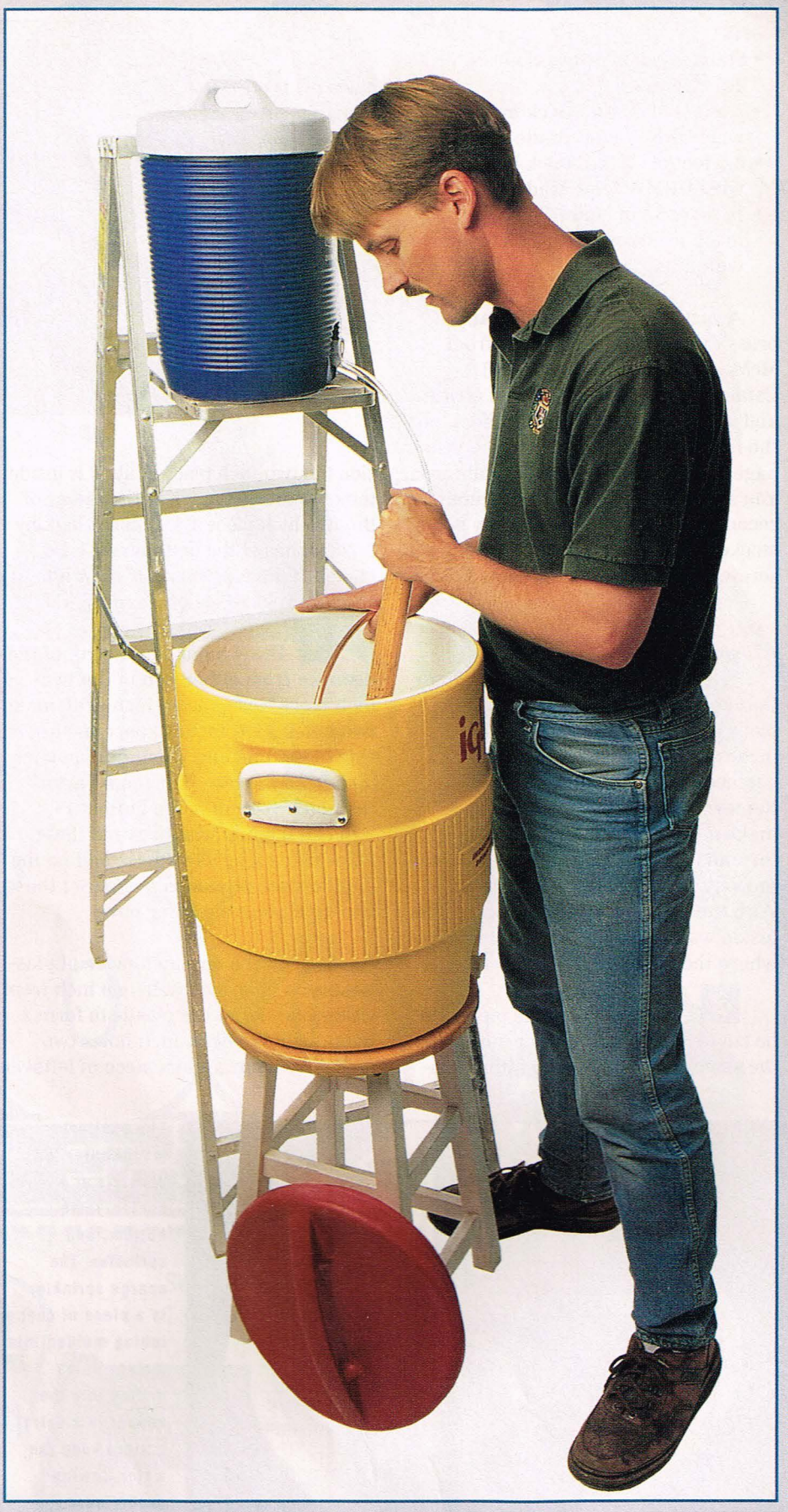
CIRCLE 34 ON READER SERVICE CARD

Build a Cool(er) Mash/Lauter Tun

by Dennis Diny

You finally got that 10-gallon round beverage cooler to make a mash/lauter tun, but now what? What type of false bottom works best? How do you hook everything up? What about sparging? After countless hours at the hardware and homebrew stores I have come up with this simple yet practical and cost-effective design.

The first and most important thing you must consider is the false bottom. Some false bottoms don't fit very tightly and let grain get by. Others may float when you dump in the grist if you mash in a separate vessel. My false bottom is made from stainless-steel mesh and food-grade plastic. It is sturdy, won't float or move when you stir, and has handles to make it easy to remove for quick cleaning. There are also no tubes or manifolds to get hooked on when you stir.

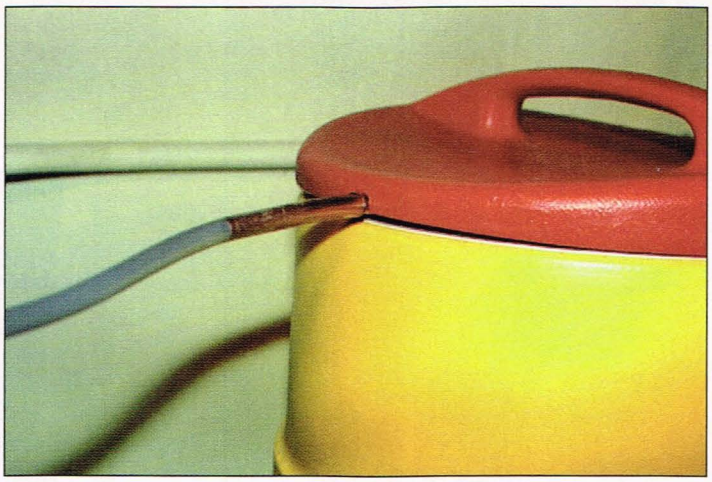


TODD HAMMOND

Parts

- Stainless steel or brass mesh, 1.5-ft. square
- 3.5 feet of 1/4 in. thick by 2 in. wide UHMW food-grade plastic
- 3.5 feet of 1/4 in. thick by 1 in. wide UHMW food-grade plastic
- 16 8-by-32 in. stainless steel machine screws, 1/2 inch long, with nuts

A variety of stainless steel and brass mesh can be purchased from McMaster-Carr (708-833-0300). Catalog No. 9230T72 is a good choice and sells for $3.63 per square foot. For the food-grade plastic, check the yellow pages for a plastics dealer in your area. You should be able to get the amount recommended for about $5. Any well-stocked hardware store will have the screws and nuts for a few cents apiece.



Gravity feeds the sparge water through vinyl tubing and into the sparge sprinkler wedged between the cooler/mash tun's lid and body. The lid keeps the sprinkler in place and helps maintain the temperature of the mash.

Step by Step

1 If you are using a 10-gallon Gott cooler, cut the two-inch-wide piece of plastic to a length of 39.25 inches. If you're using something else, you need to figure the right size. Remove the spigot from the cooler; make a loop with the plastic, letting the ends overlap; and push the loop all the way to the bottom of the cooler. With the plastic fitting snug against the inside wall of the cooler, mark the spot where the ends overlap and cut there.

2 The one-inch-wide piece can be cut to 37.5 inches long or marked in the same way as before by fitting it inside the two-inch piece while it is inside the cooler. Cut a notch in the center of the two-inch piece 1 1/2 inches high by 1 7/8 inches at the bottom and 1 1/4 inches at the top. This will allow it to fit over the spigot (See photo, page 37).

3 Draw a line one-fourth of the distance from either end of the two-inch piece. Using a 3/8-inch drill, make two holes 3 1/2 inches apart on either side of the line and about one-quarter inch from the top. (The open part of the notch you cut is the bottom.) Remove the material between these holes using a jig saw; these will be the handles (see photo, page 36). Set the two-inch piece aside for now.

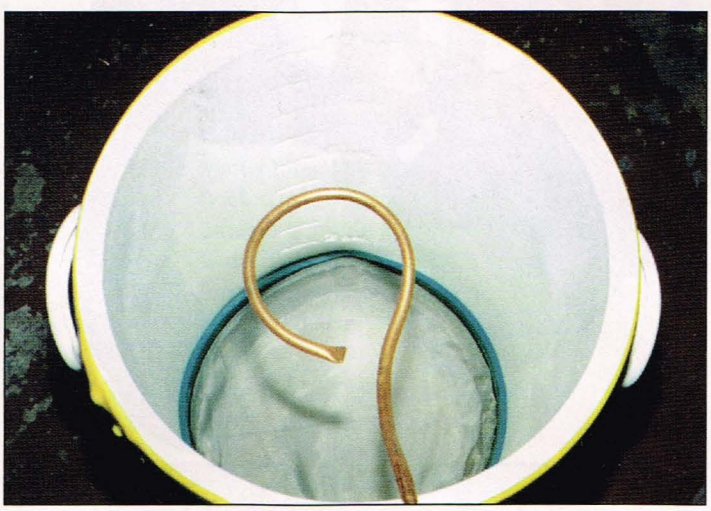
4 In the one-inch piece of plastic, drill a 9/64-inch hole one inch from either end. Bend the plastic to form a hoop. Drill two 9/64-inch holes two inches apart in a short piece of leftover plastic and temporarily fasten it to the inside of the hoop with two of the screws and nuts. This forms the inner frame of the false bottom and will be used to shape the mesh.

5 Place the frame on a flat surface, center the mesh over the frame, and press the center of the mesh down to the surface. Pressing down the center of the mesh allows the false bottom to rest on the inside bottom of the cooler when completed. This reduces the amount of foundation water needed and reduces the possibility of poking a hole in the mesh when stirring the grist.

6 Now start bending the mesh over the top and outside of the frame. You will probably need to trim the mesh before bending it down the outside. To do this, mark all the way around with a permanent marker so that none of the mesh inside the marked area will extend below the frame when folded over and along the outside. Remove the excess with tin snips. Finish forming the mesh and set aside until needed again.

7 Next, you need to put the two pieces of plastic together. Remove the scrap piece of plastic from the one-inch piece. Start at the notched area of the two-inch piece. Position an end of the one-inch piece so the top is flush with the top of the two-inch piece and centered on the notch. Drill a 9/64-inch hole through the existing hole in the one-inch piece through the two-inch piece.

8 Countersink the hole on the



The cool(er) mash/lauter tun consists of a cooler, false bottom, and sprinkler. The sparge sprinkler is a piece of copper tubing molded into a ring. Holes drilled into the copper in a spiral pattern keep the water flowing evenly over the mash.

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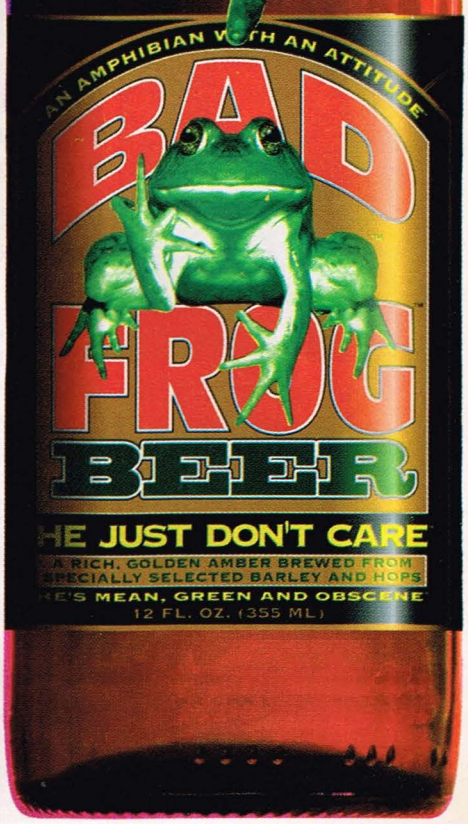

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The false bottom's framework features handles and a notch for the faucet. The mesh is held in place by countersunk screws that hold the inner plastic ring at an angle inside the outer ring.

outside of the two-inch piece so when a screw is placed through it the head does not extend beyond the surface. Use a screw and nut to hold these two pieces together. Bend the one-inch piece around so it meets itself and drill another hole like the first one, countersink it, and fasten with a screw and nut.

9 Now bend the two-inch piece around the one-inch piece so the bottoms are flush on the opposite side from the notch. You can temporarily hold it in place with one or two C clamps. Notice that the one-inch piece slants from front to back. This is normal.

10 Continue drilling evenly spaced holes, about 2 1/2 to 2 3/4 inches apart, from the notch toward the ends of the two-inch piece, and countersink them. There should be 16 holes in all including the two originals, eight on each side of the notch going toward the opposite side (See photo above).

11 After all the holes are drilled, take the assembly apart and reassemble everything with the mesh. Start at the notch again and use an ice pick to line up the two starting holes and pierce the mesh. Continue around in this fashion with the ice pick and screws. When all the screws and nuts are installed, tighten everything up. Don't worry if it is not perfectly round; that's another reason for leaving slack in the mesh. It will form to the inside of the cooler if it was cut correctly.

On with the Flow

The spigot that comes with the cooler is useless for lautering. I have replaced mine with an inexpensive good-grade plastic bottling bucket spigot that I got from my local homebrew supplier. He gets them from G. W. Kent, catalog number 2806. You can get this or a similar product from your homebrew retailer. (G.W. Kent doesn't sell retail.) The old spigot can be removed quite easily by loosening the plastic nut on the inside. Just make the hole a little larger; the new spigot will fit right in place.

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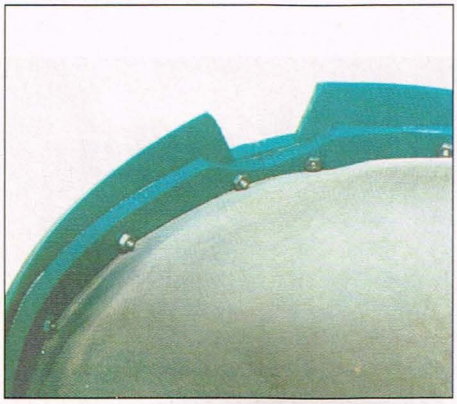
Be careful when enlarging the hole. Use a sharp, thin knife and remove just enough plastic from the top side of the hole so the new spigot fits. The hole should be about one inch in diameter. There is just enough room from the bottom for the plastic nut to fit on the inside of the cooler, so don't remove any plastic from the bottom part of the hole.

Place the false bottom in the cooler to see how it fits. The inner part of the frame will probably have to be trimmed in the area of the notch so it fits around the spigot (See photo below).



The false bottom is made by sandwiching mesh between two looped pieces of plastic. The notch fits over the faucet, allowing the bottom to sit flat on the cooler floor.

Rinse Cycle

Making a sparging sprinkler from a short piece of copper tubing is very easy. I used a 23-inch-long piece of three-eighths-inch OD copper tubing left over from my wort chiller. Crimp one end shut with pliers. Starting at the crimped end, bend it in a circular shape. I bent mine around a 4.25-inch-diameter paint can. Finish with an offset bend so the tubing is level when resting on the edge of the cooler (see photo, page 34). You can cut a notch in the lid of the cooler or melt a notch with a soldering iron so the sparge sprinkler just fits (see photo, page 34). This will keep it in place when sparging. Now drill a series of 5/64-inch holes in the tubing, about three-quarters of an inch apart, angled out from the bottom of the loop.

The last thing is making your new system work. Put the false bottom in the cooler. Add one or two quarts of foundation water at the desired temperature. Combine the crushed grain and water to reach your desired strike temperature, and mash for the correct amount of time.

Set the cooler on a chair. Place the sparge water container on a shelf or countertop that is higher than the cooler. Connect the sparge sprinkler to the sparge water container with a length of 3/8-inch ID (inner diameter) vinyl tubing. Place the sparge sprinkler above the mash and replace the lid on the cooler to hold it in place.

Adjust the vinyl tubing so that the sparge sprinkler is level. Connect another piece of vinyl tubing to the spigot on the round cooler and run it into a food-grade bucket or brew pot. Turn on the spigot to start the runoff from the mash. Then turn on the sparge water. Now all you have to do is monitor the flow rates to make sure nothing overflows.

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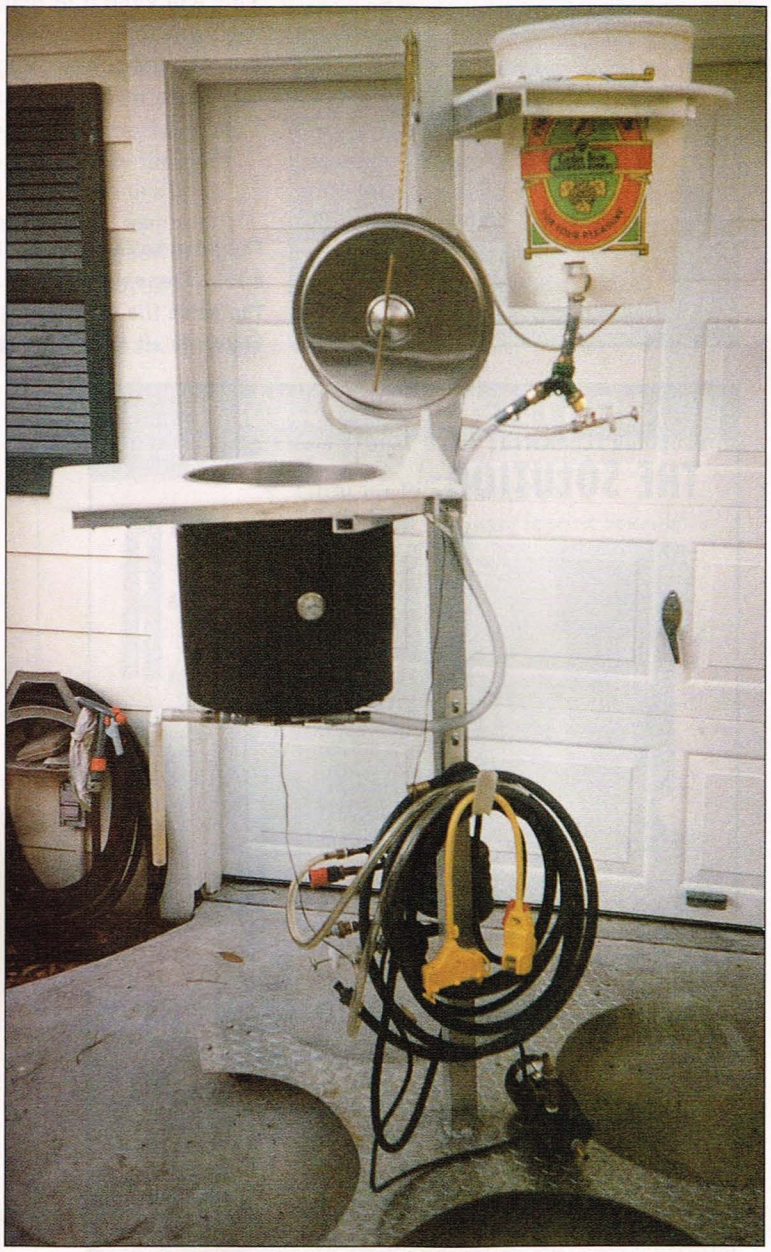
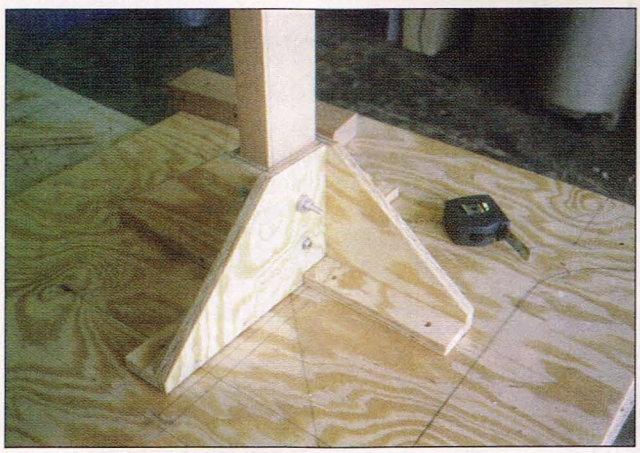


When putting together the base, pre-drill all the holes and make sure the main post is centered.



BREW CACTUS on wheels

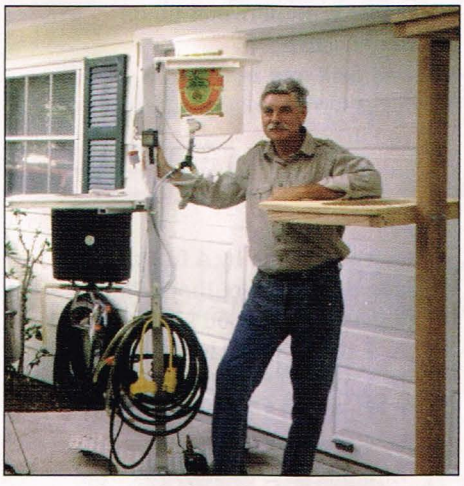
by Richard T. Curtin

I finally decided to take the plunge from extract brewing to all-grain. My procrastination until now was fueled by many reasons, real and imagined. The imagined were thoughts like "Wow I can really screw this up!" One of the real problems was the limited space in our old kitchen, designed in the 1950s for retirees to heat up a bowl of soup.

I got over the imagined problem by watching one of the first brews take form in a local microbrewery. The brewmaster let me have a carboy of wort, a wonderful dark brown ale, from his first batch to take home and have my way with. I boiled it, added a ton of hops, pitched my yeast, and had very nice results with the finished product. Okay, so I knew I could do it. Now all I needed was space.

My wife was opposed to enlarging the kitchen. My favorite tool is a hammer, and I figured a sledge would definitely open up some space. She thought not, so I opted for Plan B, which was to find some kind of stand to contain the bulkiest elements of the grain brewing process, namely the sparging bucket and mash-lauter vessel.

Once again I conferred with my friend the brewmaster for any suggestions. "I have just the thing, " he said. He showed me the equipment in his garage where he develops his recipes for the brewery. I was impressed with the gravity-feed system, especially the stand holding the pots.



Carpenter Scott Henderson stands between his creation and the metal model. Builders can customize the wood version with shelves for tools such as a heat exchanger and hooks for a hose rack.

Before assembling the pieces, use a template and a jig saw to make cut-outs on the base. The cut-outs will make the stand lighter and easier to store.

One of the most practical points of this stand was the fact it was mounted on casters. You could wheel it to the sink for water or move it to the boiling kettle. I liked the idea that you could roll it outside and hose it off for quick, painless cleanup. He had drawn up the plans for the stand and named it "The Brew Cactus." I wanted one just like it, but his was made mostly of stainless steel and aluminum, and I had a limited budget. He suggested I contact Scott Henderson. Scott is a fellow homebrewer, a friend, and last but not least a carpenter.

Laying the Plans

Talk about a small world. As it turns out Scott used to help build stages and ticket booths for the "Beer and Steer," a precursor to the Great

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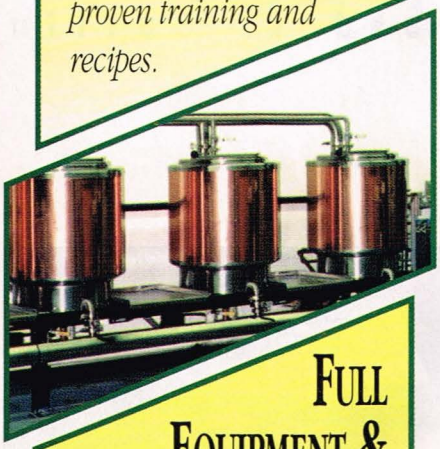

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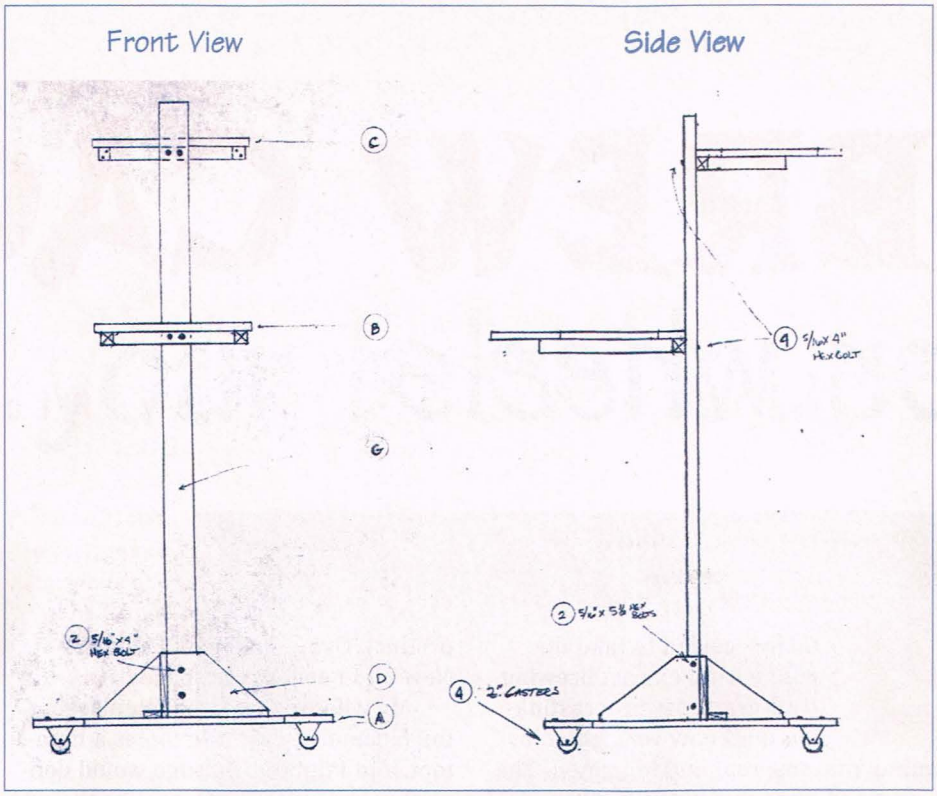
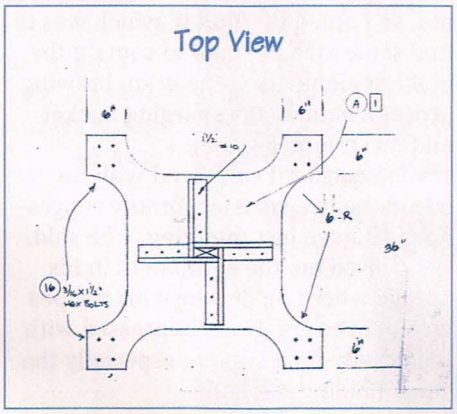


BLUEPRINTS BY SCOTT HENDERSON



American Beer Festival. I asked Scott if it was feasible for a man with limited tool experience (other than hammers) to build this stand inexpensively out of wood and with limited danger to himself and others. Scott took one look at the Brew Cactus, drew a few figures on a piece of paper and said, "No problem. We can build this." I liked that phrase: No problem.

Over the course of the next week we retired to his workshop for a few hours at a time and, with the help of some homebrews, built the Brew Cactus for less than $100. The shelves can be cut to accommodate whatever equipment you choose for your system. And as you can see from the photographs of the original, you can add on anything that fits your needs, such as a heat exchanger and a hose rack. Another thing that makes this stand handy is how easily it can be taken apart and put back together. This is helpful for storage or if you're moving.

The actual building of the stand was not difficult. If you know someone who's handy in the workshop, definitely enlist some aid. A few homebrews can impart all the help you need. Don't worry — if I can do this, anyone can.

Tools

- Jig saw with plywood blade
- Circular saw
- Hand drill and bits
- Socket wrench set or adjustable wrench

Parts

Wood:

- One 3/4 in. thick by 4 ft. by 8 ft. BC grade or better Southern Pine or Douglas Fir plywood sheet cut to:
  - A. 1 piece 36 in. by 36 in.
  - B. 1 piece 18 in. by 24 in.
  - C. 1 piece 18 in. by 18 in.
  - D. 4 pieces 8 in. by 12 in.
  - E. 2 pieces 2 in. by 9 3/4 in.
  - F. 2 pieces 2 in. by 7 3/4 in.
- G. One 76-in. piece of 1 1/2 in. by 3

1/2 in. oak or 76-in. Southern Pine or Douglas Fir two-by-four, No. 2 grade or better. Oak is harder and can be stronger than the less expensive and easier to find Southern Pine or Douglas Fir. Any one of the three species will work.

- 80-in. piece of Southern Pine or Douglas Fir two-by-two, No. 2 grade or better. Cut wood to size:
  H. 2 pieces 1 1/2 by 17 in.
  I. 2 pieces 1 1/2 by 17 1/2 in.
  J. 2 pieces 1 1/2 by 11 in.

Hardware:

- 4 each 2 in. casters (wheels)
- 2 each 5/16 in. by 5 1/2 in. hex-head machine bolt
- 6 each 5/16 in. by 4 in. hex-head machine bolt
- 16 each 3/16 in. by 1 1/2 in. hex-head machine bolt
- 16 each 5/16 in. washer
- 8 each 5/16 in. hex nut
- 32 each 3/16 in. washer
- 16 each 3/16 in. hex nut
- 50 each 1 1/2 in. No. 10 flat-head wood screws

Construction

1. From the parts list cut all wood pieces to the proper size. Match the letters of the parts with the letters in the drawings (page 40).

2. Cut the legs (D) off at an angle (see Side View drawing p. 42) and attach the pieces together (D, E, and F), making sure the main post fits in the middle (you can even temporarily assemble it with the beam) and predrilling holes.

3. Assemble the base making sure that you properly center the legs. We used a small piece of the two-by-four to act as a guide while we centered the legs. When you're happy with the position, predrill your holes.

4. Using a jig saw, make the cutouts on the base. While these cutouts are not necessary, it does make the stand easier to store and use — you won't knock your ankles on the base when you are using the buckets or hanging equipment. We made a template out of a 24-inch by six-inch board with six-inch radius arcs for two corners. (Photo p. 39, Top View drawing at left)

5. Assemble the shelves. Cut the center hole with a jigsaw to accommodate your particular pieces of equipment. We used a 12-inch circumference. Drill a hole in the area to be cut out to get your jigsaw blade started. Predrill your screw holes. We also rounded our shelves with six-inch radius cuts, but this is not necessary.

6. Predrill the holes in the main post (G) to attach to the legs on your base. Predrill holes for the shelves. Attach the main beam to the base. Attach the shelves.

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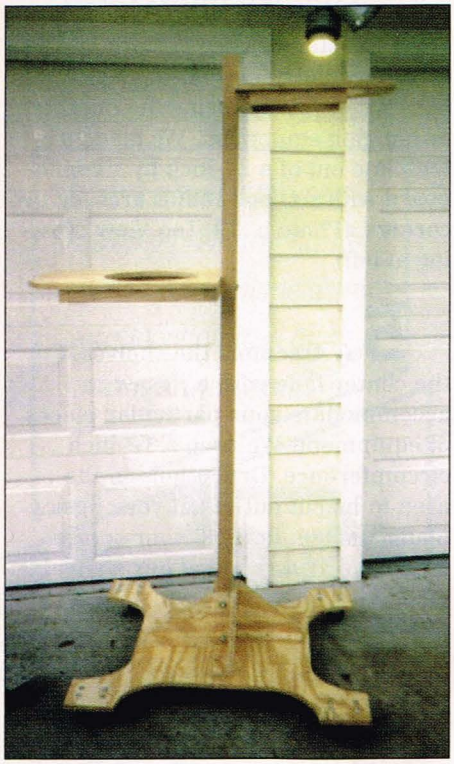
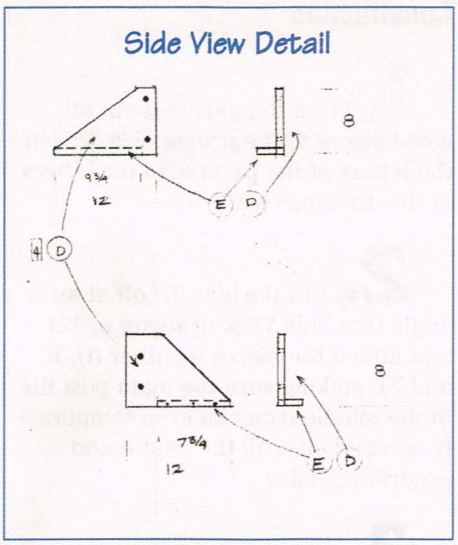
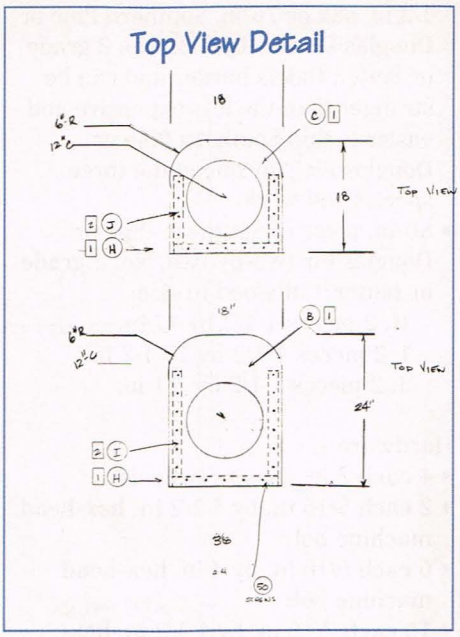


The brew cactus gains strength and stability from the legs and two-inch wide strips of plywood that support the shelves.





7 Finally, attach the casters.

Time to Brew

Your brew cactus is now assembled. Have a beer and decide what kind of finish you want on the wood. You will be getting the stand wet, so it's important that it's sealed. We plan to stain it and use a polyurethane finish.

Thanks go to Michael Bryant of Dunedin Brewery for letting me work with his original plans and Scott Henderson for his coaching and drawing expertise.

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CIRCLE 25 ON READER SERVICE CARD

Micro Dream: The Equipment Arrives!

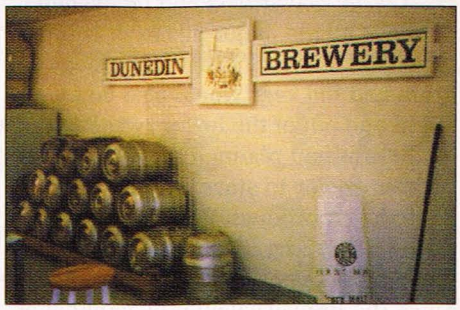
by Richard T. Curtin

This is the second installment in a three-part series on homebrewer Michael Bryant's effort to open a microbrewery in Dunedin, Fla.

In reflective moments, when he's not occupied negotiating with contractors, filling out government forms, installing equipment, or performing any of a thousand other tasks required to put his new microbrewery on line, Michael Bryant shakes his head about the project and calls it "crazy."

"If I had done more investigation before I got my mind set, I would not have done this," says Bryant. It's not that he regrets embarking on this effort to open a seven-barrel microbrewery in his home town, Dunedin, Fla. It's just that even as an experienced businessman — he owns a small restaurant construction company— starting a brewery can seem overwhelming.

The mash tun and kettle at Dunedin Brewery. After some serious number crunching, Bryant settled on a seven-barrel brewhouse rather than his original plan for a homemade 1.5-barrel system.



Empty kegs await the first seven-barrel batch of beer. Michael Bryant spent $45,000 and a year of his time to reach this point.

"When you get a model business plan and start plugging in the numbers, it can convince you not to try. The first thing is to look at how much the license is going to cost — $3,000. Divided by 12 months, that is how much money I have to make a month just to cover that. That means I have to get this much beer out. That means bigger equipment.

"Two to three days into the business plan you decide you have to sell stock. Uh oh, you have to go public to pay the attorney to deal with the stock. It depends on all these other people now. It gets so complicated."

Bryant's original plan was to equip his brewery with a tiny 1.5-barrel brewing system. "I wanted to build my own equipment originally," he says. "I was capable of building a 1.5-barrel brewhouse."

But some long hours working over the business plan convinced him he needed a seven-barrel brewhouse — still small but too large to build himself.

"In the microbrewery business they say that the minimum size brewery you should be buying is 30 to 50 barrels," he says. "We stayed small so we could stay in control and happy. We're absolutely crazy, but we're doing it."

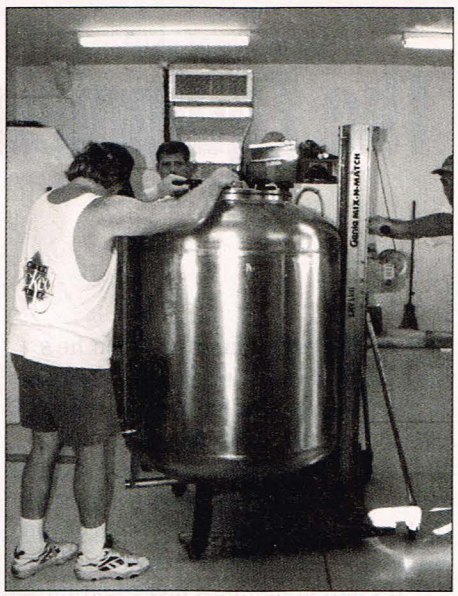
Brewery for Rent

Before purchasing equipment, the first step was to find a location. The Dunedin Brewery couldn't fit in Bryant's garage. The perfect space had to meet two major requirements: size and accessibility. The square footage had to be large enough for the brewhouse, fermenters, grain mill, and all the other equipment.

A large doorway would be needed to move all the major pieces of equipment into the work area. Large bags of grain and full kegs would also be moving in and out of the brewery regularly.

Bryant had planned for a large walk-in cooler to store materials and his finished product. Each batch produces seven barrels of beer, the equivalent of 14 kegs (15.5 gallons each). Since the brewery would be capable of producing two batches back to back, a large storage space for full and empty kegs was a definite priority.

Adequate plumbing and electrical services also needed to be addressed. Bryant leased a building site in a small industrial park not far from his contracting company's offices in downtown Dunedin. The 1,100-square-foot facility met all the necessary requirements, including a large roll-up garage door. In addition the space was located in an industrial building on the only square block of the city that was correctly zoned for a brewery.



The need to occasionally hire help for some of the heavy-lifting tasks was "the biggest avoidable expense."

Construction

After the site was selected, Bryant drew up a set of plans, including a full set of blueprints, to begin construction. Area building codes require that outside contractors had to be hired for the electrical and plumbing. The rest of the construction, from painting the floor to building the walk-in cooler, was finished by Bryant and his homebrewing friends, who volunteered many hours.

If you are opening a microbrewery, it pays to do as much of the work as possible yourself, according to Bryant. "The biggest avoidable expenses came when I had to hire someone to do physical work I was too busy to take on," he says.

Bryant was able to realize some savings by installing his 10-by-20-foot walk-in cooler himself. One of his friends knew the distributor of a type

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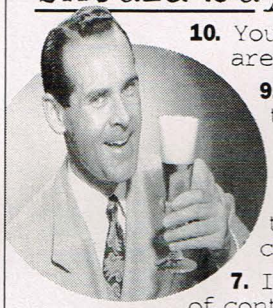

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of snap-in Styrofoam insulated panels. After the outer wall of the cooler was built, these panels just had to be cut to size and placed on the interior walls and ceiling. Bryant purchased a conventional outer door, and the cooler was built at a savings of $4,000.

Tools of the Trade

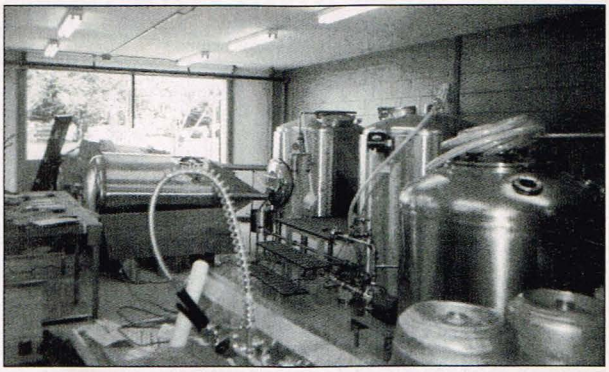
Next, it was time to buy brewing equipment. Bryant planned to build a small 1.5-barrel system. He was familiar with the 1.5-barrel brewing through his work as a brewer's assistant to Norman Dixon, then the brewmaster at the Brooker Creek Grill in Palm Harbor, Fla. Bryant also wanted the experience that came with matching and installing the brewing system's components.

"I wanted to keep the design as simple as possible. I like things really simple, to the point where you can tell someone who doesn't know what in the world is going on to 'turn the valve on the pipe that leads from the vessel on the right,' and the person can just go over and figure it out. Very simple industrial psychology," says Bryant.

Before purchasing equipment Bryant researched what was available by studying various literature aimed at homebrewers. "Homebrew magazines have all kinds of solutions to difficult problems," says Bryant. "After all, most homebrewers are inventors at heart." He also gained a working knowledge of equipment as a brewer's assistant to Dixon. Dixon, currently brewmaster at Maumee Bay Brewing Co. in Toledo, Ohio, helped Bryant with advice and support through the entire process.

Bigger Is Better?

Bryant drew the equipment he wanted and went to the Institute for Brewing Studies trade show in Austin, Texas, to research the equipment available and get information about different suppliers. "I made a catalog with the dimensions of the components and looked at different ways of putting it together," he says. "I knew how I wanted to do it, but I wanted to see if maybe there was a reason why other people were doing it another way. I melded all the facts together and drew up a little 1.5-barrel system."



Delivery day: Bryant spent two months researching equipment and prices before reaching this point.

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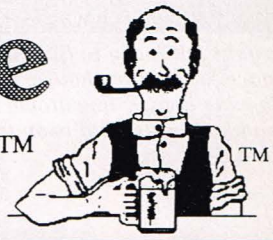

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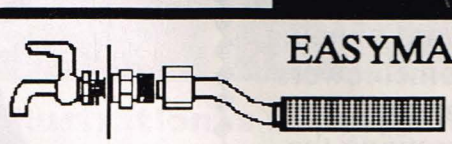

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Bryant felt lucky to find an industrial site with plenty of space for his brewhouse, fermenters, and keg storage. The site is near downtown Dunedin, has easy access for loading trucks, and is on the only block in town zoned for a brewery.

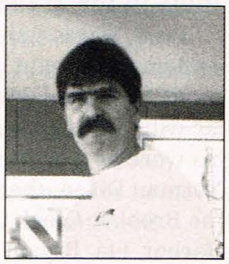
started sending it out to people who advertised that they could custom build equipment," he says. "I found out that it cost about as much to build the equipment as to buy it."

In the meantime Bryant decided that a seven-barrel system would be a better investment, allowing him to brew more to support his overhead and opening up the opportunity to contract brew.

It took two months to research and purchase the equipment. Additional purchases included three water heaters to provide mash water and sparge water, various hoses, fittings, utensils, and laboratory equipment.

He bought his system from Cross Distributing. "They were willing to customize their equipment to my needs," he said. "I think it's better to put your own system together to fit your needs instead of purchasing a predesigned, all-inclusive turn-key system. If you need more, you can always expand on it at a later date."

When everything finally arrived at the Dunedin site, Bryant hooked it all up himself. "Doing the work yourself saves you money," he says. "It takes you longer, but you learn by doing it. If you pay somebody to do it all, you haven't learned anything. When something goes wrong with the system later on, you won't be able to fix it. You'll have to call someone to come out, and they will charge $75 to $150 minimum just to show up."



Thanks to hard work and perserverance, Michael Bryant's brewery is nearly ready.

The core equipment in his system included the requisite brew kettle, a grain auger, mash tun, heat exchanger with brewing pump, glycol cooling system, clean-in-place (CIP) unit, and two fermenters.

"I took that little system and

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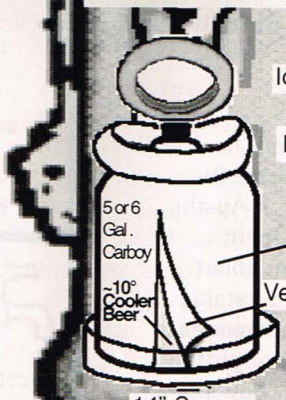

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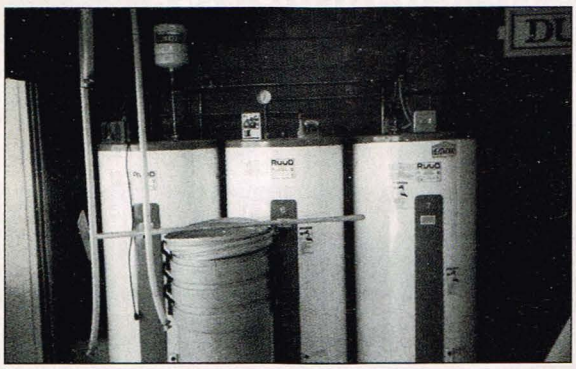


Three hot water tanks provide the sparge and mash water.

Solutions

Bryant got a particularly good deal on the two fermenters he purchased. They were originally manufactured in Hungary to be distributed by Cross and were actually used as design samples. He paid used prices for equipment that was never really used.

There was a problem, however. When the fermenters were delivered, he discovered an internal hairline crack in the outlet valve of one. Although Cross offered to replace the tank, Bryant decided to leave the equipment in place and fix it himself. After many hours of trial and error, he found the leak and contacted a local repair shop to weld a sleeve in place, which fixed the problem.

"Problems in this business usually lead to solutions for other problems," he maintains. "Because of a small leak I now have access to master repair technicians right down the street. If I have any more trouble, I can contact them at a moment's notice and get service right away."

A few other bugs had to be worked out of the system. The thermostat in the glycol tank, for instance, was not cooling properly and was finally diagnosed as having a broken wire caused during shipping. It turned out to be a small, easily remedied problem but one that required a few hours of head scratching to figure out.

Almost Ready

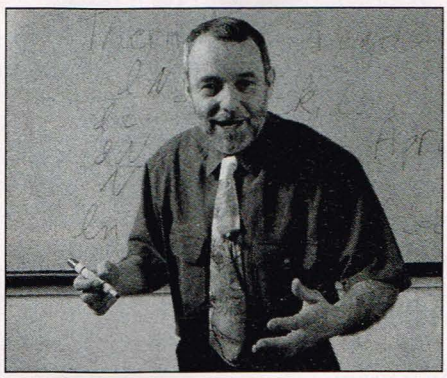
Another mundane but necessary hurdle Bryant has had to contend with is meeting government safety regulations, which require the installation of a first aid kit, fire extinguishers, and an emergency eyewash.

"It's the little things that get you," Bryant says. "Add-ons that most people wouldn't think about."

With just short of a year of his time and $45,000 invested in research, location, renovations, and equipment, Bryant knows that it's too late to turn back. "The brewery is like a cross between building a restaurant and a hot rod," he says. "The basics are there, but you also have to find pieces of things and put them together to build exactly what you want."

Next month: The first beer ■

A GREAT RECIPE IS NOT ENOUGH.



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CIRCLE 60 ON READER SERVICE CARD

Step Up to Temperature Program Mashing

by Kirk Fleming

Try this hybrid technique that's a favorite with commercial brewers. It combines the ease of single infusion with the control of decoction.

Temperature program mashing developed because brewers sought a simpler, less expensive alternative to decoction mashing that still retained many of decoction's benefits.

In decoction mashing the brewer separates portions of the mash and heats them to increase the temperature of the entire mash. This increases enzyme activity and gives the brewer more control over body, alcohol content, and other characteristics of the finished beer than a single infusion mash provides.

When most brewers refer to an infusion mash, they mean a single-temperature mash done to convert grain starch to sugar. Such a mash uses a single steep temperature between 150° F and 158° F, held for about 60 minutes.

A temperature program mash involves simply increasing the temperature of the entire mash in a series of steps, without separating and heating portions of the mash.

The Temperature Program Advantage

- **Provides more control over the mash and the final beer than single-step infusion mashing.**
- **Doesn't require separating the mash into different vessels as decoction mashing does.**
- **The low-temperature (100° F) acid rest helps acidify alkaline water and breaks down gums that can lead to stuck mash when using under-modified malts.**
- **Protein rest (122° F) aids breakdown of complex proteins into simpler proteins and amino acids, which helps prevent beer haze.**
- **Sacchrification (starch conversion) rest provides high degree of control over wort fermentability and thus the beer's final gravity, alcohol content, and mouthfeel.**

Steeping or Mashing?

The way brewers use the word "infusion" may be a little confusing. Webster's 1922 dictionary offers two definitions that apply to brewing. First, infusion is a process involving the pouring in or addition of a liquid (water) to some other substance (grain) to extract "the virtues" (sugar). Second, infusion is the steeping of some substance in liquid (the mash) without boiling.

Most brewers use the term infusion only for a single-temperature mash, some use it for mashes where temperature is raised through the addition of hot water, and others use it to mean any mash that isn't a decoction. These differences aren't critical, but it is important to know the difference between steeping and mashing.

Although steeping grain in hot water is by definition an infusion, that doesn't mean it's necessarily a mash. The dictionary definitions don't reveal much about mashing malted grain, with no mention of the protein breakdown or the conversion of starch to sugar.

When barley is processed by the maltster, enzymes in the grain break down the protein "wall" surrounding starch granules. This breakdown is called modification and is allowed to continue until nearly complete.

The makeup of protein in most

malted grains used for brewing has been modified so the starch content is easily dissolved in the mash. If you steep the crushed grain in hot water at almost any temperature, all the "virtues" of the malt will dissolve. Unfortunately, without careful control of the mash temperature, all you'll get is dissolved starches and not the sugar you're after. This is where enzymes come into the picture.

Our Friends, the Enzymes

The conversion of starch to sugar is a chemical process in which long chains of molecules are separated into shorter ones. Even when all the right materials are present, sometimes chemical reactions just don't happen. In many cases energy has to be supplied to get things going. In others, the presence of a substance called a catalyst will start the reaction.

Substances that accelerate reactions but don't participate in them are called catalysts. You've heard of catalytic converters — they're part of your car's exhaust system. When hot exhaust gases pass through a container of platinum catalyst, smog-causing pollutants react with other exhaust gases and are broken down into less harmful pollutants. The converter may last the lifetime of the car — the catalyst it contains doesn't go anywhere, doesn't react chemically, and doesn't get used up. Think of enzymes as catalytic converters — that's what they are!

There are three major enzyme types of interest for brewers doing step mashes. Since each of these enzymes works best within a very narrow range of temperatures, trying to make each of the three happy during a mash program results in a three-temperature step mash.

Proteases, a group of a dozen or so enzymes that work best at an average of 122° F, assist in the breakdown of proteins into simpler proteins and amino acids. This enhances the beer's clarity and adds important yeast nutrients. At 140° F beta amylase helps break down starch and dextrins into fermentable (maltose) sugars. Finally, at 158° F alpha amylase helps the breakdown of starch into smaller dextrins, most of which are not fermentable.

The amylases, together called diastase, give the brewer a source of control over beer body and dryness. One way to get this control is to mash at a compromise temperature somewhere between 140° F and 158° F to balance the activity of beta and alpha enzymes. Mashing closer to 140° F will give a dryer, light-bodied beer, while mashing closer to 158° F will give a fuller, sweeter, lower-alcohol beer.

A second method is to perform two rests, one at 140° F and the other at 158° F, but to proportion the time spent between the two.

Balancing beta and alpha activity with a single, well-selected saccharification rest (to convert starches into fermentable sugars) is an easier way to go when starting temperature program mashing.

In addition to having favorite temperatures, enzymes enjoy working in a fairly narrow range of wort acidity. The 95° F rest, called an acid rest, can be handy for brewers making very pale beers with alkaline water that would otherwise produce mashes with too low a pH. At 90° to 115° F two other enzymes, phosphatase and beta glucanase, work to increase the acidity of the pale malt mashes and to break down gums found in under-modified grains such as flaked barley and traditional lager malt.

If much dark grain is used, then an acid rest is probably not needed since dark grains, in general, help to acidify the mash. (Also, a simple way to increase the acidity is to add calcium sulfate to the mash.)

Why Temperature Program?

Temperature program mashing is also called upward step, multi-step, or simply step infusion mashing. A total mash duration of 60 to 120 minutes is

Maybe Bock

(4 gallons)

Ingredients:

- 7.5 lbs. pilsner malt
- 3 lbs. Munich light malt
- 0.75 lbs. crystal malt, 60° Lovibond
- 0.5 oz. Chinook hops (12.5% alpha acid), for 90 min.
- 1 oz. Tettnanger hops, (4.4% alpha), for 0 min.
- Wyeast #2308, Munich lager

Acid/glucan rest: 100° F 15 min.
Protein rest: 122° F 20 min.
Sacch. rest: 153° F 40 min.

OG = 1.078

Step by Step:

The total grain bill is 11.25 lbs., and so the final mash should contain 11.25 * 1.5 = 17 qts. of total added water, approximately. Based on experience, an initial rest can be manageable using about 6.5 qts. of water or less. It was a very hot day and the grain was at about 85° F, so 6.5 qts. of water at 105° F produced a rest of 101° F.

1. Add 7 qts. of 105° F water to achieve a 101° F rest.

2. When mash temperature is 99° F, add 2 qts. of boiling water for a 122° F rest. Add up to one more cup if needed to maintain temperature.

3. When mash temperature is 118° F, add 7 qts. of boiling water for a 153° F rest, and add up to one more quart for temperature maintenance.

For additional notes, see Half Moon Bay recipe.

divided into two or more periods in which the mash temperature is raised and held during each successive period. For example a 15 to 20 minute acid rest at 100° F is followed by a 30 minute protein rest at 122° F and finally the saccharification rest (for starch conversion) at 153° F for 40 minutes.

This process will take longer than the sum of the rests because it takes time to raise the mash temperature from one rest to another. Until you've done it a few times, you'll miss your target rest temperatures and have to make adjustments. Plan for two hours (at least) for your first three-temperature step mash. That's not total brew time, of course.

Temperature program is an alternative to decoction mashing but shares some of the benefits. The low-temperature (100° F) rest can be used to somewhat acidify alkaline water and is also useful for breaking down gums that can lead to slow or stuck lauters when using under-modified malts.

The protein rest is probably less important for most pale malts available now but is still important if you're using a large percentage of wheat in your recipe.

Finally, the use of one or two saccharification rests provides a high degree of control over wort fermentability, resulting beer body, and alcohol content.

If you're just starting into all-grain or just beginning with new equipment, you'll soon discover that temperature control can be difficult and may seem impossible. Be patient, and please remember: Good, drinkable, satisfying beer can be made even if you miss every rest temperature by several degrees and hold the rests for half or twice as long as called for.

There are two ways to increase mash temperature. Commercial brewers apply heat to the vessel, usually through steam jackets, while stirring. This is difficult and requires a certain level of experience because too much heat will cause the mash to overshoot the temperature. The other method, which is not usually used in commercial breweries, is to use additions of hot water to raise the overall mash temperature. This is more predictable because there are calculations that detail how much boiling water to add to different temperature mashes to achieve the desired temperature.

A Bit of Equipment

As you'd expect, there's a wide variety of equipment that can be used to do temperature program mashes. Popular options include the dual food-grade plastic bucket system, the picnic cooler with false bottom (see page 32), or the bucket-and-grain-bag technique.

Although you could probably collect most of the essential hardware and put together a system for nothing, one low-cost way to try an infusion mash is to buy a nylon sparge bag at your local homebrew supply shop. Combine the sparge bag with a standard five-gallon, food-grade plastic bottling bucket and adjustable spigot, and you have nearly everything needed for a mash. Just buy a two-foot length of vinyl tubing to fit over the bottling bucket spigot, and you're in business.

The type of nylon sparge bag needed is 6.5-gallon type, sewn into a cylindrical shape with a flat bottom. Usually the side of the bag is a very fine nylon mesh, and the flat, circular bottom is a much coarser material. These bags should cost less than $10 each, and you'll need just one.

Open the nylon sparge bag out into the five-gallon bottling bucket, doing your best to fit the bag down into the bucket with no big folds or wrinkles. The bag should be about four inches taller than the bucket; fold this extra length down over the bucket rim. Close the valve on the spigot, and check for

Half Moon Bay

(4 gallons)

Ingredients:

- 6 lbs. pilsner malt
- 14 oz. Munich light malt
- 1.25 oz. Northern Brewer hops (6.4% acid alpha), for 90 min.
- 1 oz. Saaz hops (3% alpha), add at end of boil, cover pot for 5 min.

Acid/glucan rest: 95° F, 15 min
Protein rest: 122° F, 20 min
Sacch. rest: 155° F, 45 min

OG = 1.048

Step by Step:

1. Add 4 qts. water at 100° F for 96° F.
2. When mash temp = 94° F, add 2 qts. boiling water for 124° F.
3. When mash temp = 120° F, add 5 qts. boiling for 156° F.

The total added water for this recipe should remain under 11 qts.

Notes:

These infusions assume your water boils at 212° F and that you're using the bottling bucket mash tun. The infusion volumes given are approximate and assume the mash temperature has dropped to the indicated temperatures at about the proper rest duration.

If your mash tun is an insulated cooler, you'll need to add less water because at the recommended rest duration mash temperature will have dropped less than for the bottling bucket mash tun. You should do the infusions when the rest duration is over. If you are at high altitudes (say above 4,500 ft.), then you'll need to add a little more water for rests two and three.

system leaks using a pan full of hot water. Dump out the hot water.

In addition to the bottling bucket with spigot and the sparge bag, you'll also need the following:

- A six-gallon or larger kettle for the final boil
- A three-gallon pot or some other source of about two gallons of sparge water
- A one- to two-quart measuring cup to transfer boiling water to the mash
- A pan to use for mash recirculation
- A good, trustworthy thermometer

Step by Upward Step

The basic idea of temperature program mashing is to add energy to the mash. One way to do this is to use additions of boiling water to successively raise the mash temperature to desired rests. There are three complications:

1. The temperature of the mash continuously drops during the rest.

2. Each addition of boiling water makes the mash harder to raise to the next rest temperature.

3. The final rest must be achieved with a mash that contains no more than 1.5 quarts of water per pound of grain, approximately. If the mash is too thin, hot enzymes are less stable and the enzymatic reaction is significantly slower. Therefore, there is more chance to denature enzymes (strip them of their usefulness).

The first of these problems is controlled by using a well-insulated mash

5 Tips for Better Multi-Temperature Mashing

1. Stir thoroughly prior to temperature readings, especially if you aren't using an insulated mash tun.

2. Use an insulated picnic or water cooler, if possible, to control temperature drops during the mash.

3. Start out with as little water as possible during the first and second rests, leaving yourself a margin for the additional water needed to raise the mash to the higher saccharification rest.

4. Never add cool or cold water to the mash to correct for overshooting the target temperature. If the overshoot is severe, cool the mash using frozen gel bags or freezer bags filled with ice cubes.

5. Plan the entire mash process in advance using pencil and paper. Look over your calculations carefully, and check to see you haven't violated Tips 1 and 2.

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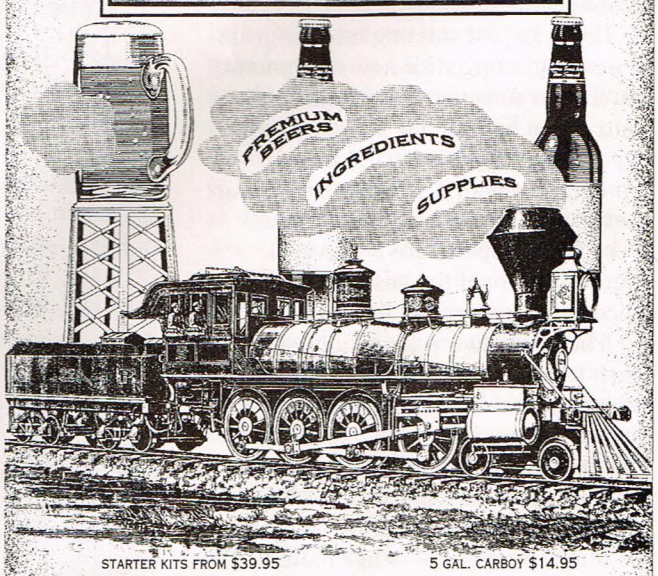

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tun, the most popular being the Rubbermaid "Gott" water cooler. The bottling bucket insulates much better than a metal pot but still loses heat quite rapidly. Still, if you already have the bucket, less than $10 puts you in business to get your feet wet, so to speak.

The second and third problems are controlled by using the minimum amount of water possible for the first infusions, saving the bulk of the water for when it's needed most: to raise the mash to the saccharification (third) rest temperature. Calculating the water needed for an infusion isn't too hard to do. You'll be amazed at how soon you'll be hitting those rest temperatures!

Calculating Water Additions

There are two basic physics things to keep in mind when you do your calculations and when you start making adjustments to your results. First, the energy needed to raise the temperature of water is about three times greater than that needed to raise grain temperature the same amount. Second, a lot more energy is needed to raise the temperature of 20 quarts of mash than is needed for 10 quarts.

Second, you'd like your final rest to include about 1.5 quarts of water for every pound of grain, and as a rough rule of thumb for a three-step mash, the first rest should be done with about 0.6 to 0.7 quarts water per pound of grain. These are just starting points to make initial calculations easier, not golden numbers.

Two formulas are needed: one is used to compute a number that tells us how much energy is necessary to raise the mash temperature, and the other is used figure out how much water to add to the mash to get a final rest temperature. The number obtained from the first formula has to be re-computed after each addition of water and gets a little bigger with each addition. This just means the temperature of the mash gets a little harder to raise after each infusion — it contains more water and proportionately less grain.

With pocket calculator in hand, here we go...

1. Multiply the total grain bill weight by 0.6 to find the number of quarts of 105° F water to add for the first rest.

Example: Grain bill weight GW = 13 lbs.

13 * 0.6 = 7.8 qts.

Round to the nearest half quart; in this case, 8 quarts.

2. Compute the weight of the water added by multiplying the number of quarts by 2.08 (one quart of water weighs 2.08 pounds).

Example:

8 qts. * 2.08 lbs./qt. = 16.6 lbs.

3. Put the eight quarts of 105° F water into the pre-heated, empty mash tun, then add all the grain and mix well. Record the temperature.

4. Compute the heat capacity of

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the mash. Multiply the grain weight by 0.33, add the result to the weight of the water in the mash, then divide the result by the total mash weight.

Example:

$$\frac{(0.33 * \text{grain weight}) + \text{water weight}}{\text{mash weight}}$$

or

$$\frac{(0.33*13 + 16.6)}{(13 + 16.6)} = 0.71$$

This number is the heat capacity of the mash, relative to that of water, which is 1.0. We'll use this number to figure out how much boiling water will have to be added to raise this mash to the next rest temperature.

5. The formula to compute the amount of water to add to get the mash temperature up to the next rest (122° F) is:

$$(\text{mash heat capacity})* (\text{mash weight})* \frac{(\text{next rest temp} - \text{current temp})}{(\text{water boiling point} - \text{next rest temp})}$$

Example:

$$\frac{0.71(13 + 16.6)(122 - 100)}{(212 - 122)} = 5.1 \text{ lbs. (not quarts!)}$$

Note: Make sure to stir the mash and measure its temperature before doing this calculation. The temperature will drop over the duration of the rest, especially in an uninsulated mash tun.

6. Convert the weight of the water to quarts by dividing by 2.08 lbs./qt.

Example: **5.1/2.08 = 2.5 qts.**

7. Add the 2.5 quarts of boiling water, stir thoroughly, and measure the mash temperature. Cover your mash tun, and record the reading.

This entire process has to be repeated for the next rest. Remember, the mash now contains more water than it initially did, so it will take more energy to raise its temperature. You'll have to calculate its heat capacity again using the formula in Step 4.

Example:

$$\frac{(0.33 * \text{grain weight}) + \text{water weight})}{\text{mash weight}}$$

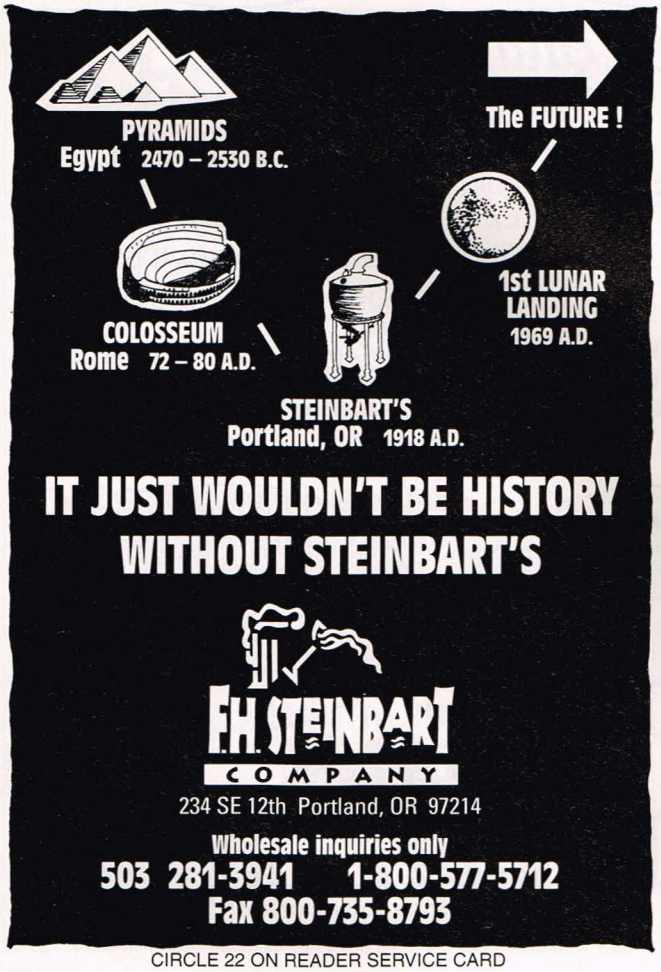
or

$$\frac{(0.33*13 + 16.6 + 5.1)}{(13 + 16.6 + 5.1)} = 0.75$$

◆

After only one or two brews...what may have seemed like major mysteries will be revealed.

◆



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8. After a 20 to 30 minute rest, stir the mash thoroughly and take a temperature reading. Say the new mash temperature is 119° F. Record the duration of the rest and this new temperature. Then repeat Step 5 to compute the amount of boiling water needed to raise to the final rest temperature of 153° F.

Example:

$$\frac{0.75(13 + 16.6 + 5.1)(153 - 119)}{(212 - 153)}$$

= 15 lbs. (not quarts!)

Convert those pounds to quarts: 15/2.08 = 7.2, or about 7 quarts.

9. Add about seven quarts of boiling water to the mash, stir well, and cover. Let rest quietly for a total of 40 minutes, checking the temperature at the 20 minute mark.

Notice that the total addition of water to this mash was:

Rest One: **8** quarts

Rest Two: **2.5** quarts

Rest Three: **7** quarts

Total: **17.5** quarts

For 1.5 quarts per pound we'd need about 19.5 quarts of water, so this program leaves room for the addition of 2 quarts of boiling water about halfway through the long conversion rest to maintain temperature, if needed.

Into the Kettle

Brewers debate the benefits of the mash-out, the process where a final infusion is added to the mash to raise the temperature into the 170° F range to deactivate any further enzyme activity. You can certainly do a mash-out, or you can simply begin the sparge using 170° to 180° F water.

Attach a length of vinyl tubing to the bottling bucket spigot and set the mash tun up so it can be drained into your kettle. Be very careful to situate everything so the wort draining from the mash tun doesn't splash into the kettle.

Gently pull up on the sparge bag just enough to ensure its sides are not wrinkled or pulled down into the bucket. Once the bag seems to be conforming to the shape of the plastic bucket, slowly drain the wort into a two- to three-quart saucepan, returning the wort gently and without aeration to the top of the grain bed.

Repeat several times to try to clarify the wort. After it looks like most of the fine flour has been filtered from the wort, begin a slow, controlled sparge while draining the mash tun into the kettle. Equalize the rate at which you drain the wort into the kettle with the rate you add water to the mash tun. Collect about five to 5.5 gallons into the kettle, and begin your 60 to 120 minute boil.

With a little advanced planning and a very minimum of equipment, you can be enjoying temperature program mashing in no time. After only one or two brews you'll gain confidence in your ability to hit target rest temperatures; what may have seemed like major mysteries will be revealed. ■

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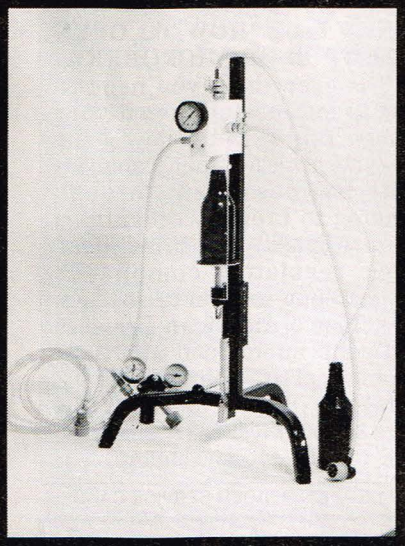

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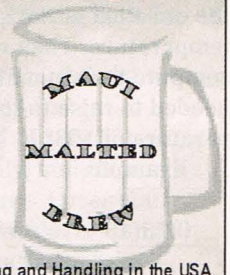

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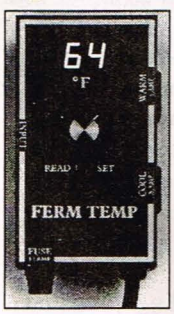

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Spotting Homebrew Buys

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Advanced recipes are printed on both the kit and unhopped extract cans. The kits are available in styles such as Original Draught and Red Ale, and the unhopped extracts come in Light, Amber, Dark, Wheat.

Available at your local homebrew retailer.

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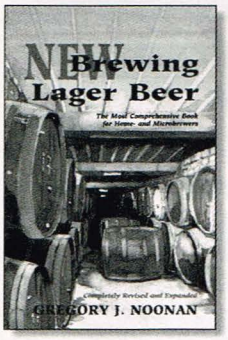
The homebrew classic *Brewing Lager Beer* is now new and improved. Brewmaster Greg Noonan, owner of the Vermont Pub and Brewery in Burlington, Vt., revised his book, which includes more than 100 pages of new material.



Available in bookstores or call (303) 447-0816 to order.

Homebrewers Win Big!

The results of the Boston Beer Co.'s World Homebrew Contest have been announced and three lucky entrants are going to have their beer sold in stores under the name Longshot!

The brews were tasted by more than 65 judges, and the standouts were American Pale Ale by James Simpson of Ridgewood, N.Y., Bavarian Black Beer by Jeffrey Griswold of Victoria, British Columbia, and Hazelnut Brown Ale by Doug Parker of Leesburg, Fla.

Wear Your Favorite Micro

Salt River Brew Wear has assembled a collection of great brew tees and baseball caps from across the country — from The Hair of the Dog Brewery in Oregon to The Penn Brewery in Pittsburgh.

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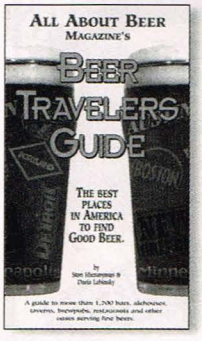
Booking Around the Country

You may have a favorite bar in your own town, but what do you do when you visit Uncle Moe in Chattanooga? Make sure to pack *The Beer Traveler's Guide*, written by the beer travelers themselves, Daria Labinsky and Stan Hieronymus. This husband-and-wife team, who publish the Beer Travelers newsletter, toured the country and compiled a comprehensive list of the best America has to offer.



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Brewpot of Dreams

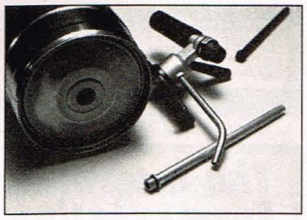
Polar Ware has come up with a stainless steel pot designed to house a ball valve and an optional thermometer.

The pot has a 10-gallon capacity and brass ball valve, as well as a perforated false bottom with "feet" to keep the grains from settling at the bottom of the pot. It may look similar to the soup pot that sits on the stove in a restaurant, but this is a whole different kettle of fish (isinglass, to be exact).

Call 1-800-237-3655 to order.

Get Metal

If you serve your brew from a German mini-keg, you probably wish those blasted plastic tubes came in metal. Well, now they do. Northern Brewer makes the Party Star Deluxe tapper, which is connected with a rubber seal on top of the mini-keg.



The lightweight aluminum tubing performs the same function as plastic without the hassle of breaking.

If you have $17.50 to spend, call 1-800-681-2739 to order.

Boxed In

The June Brewer's Log indicated that Brew King's all-malt Wortworks extract comes in a can. In fact it is packaged in an aseptic bag-in-a-box for freshness and easy pouring. ■

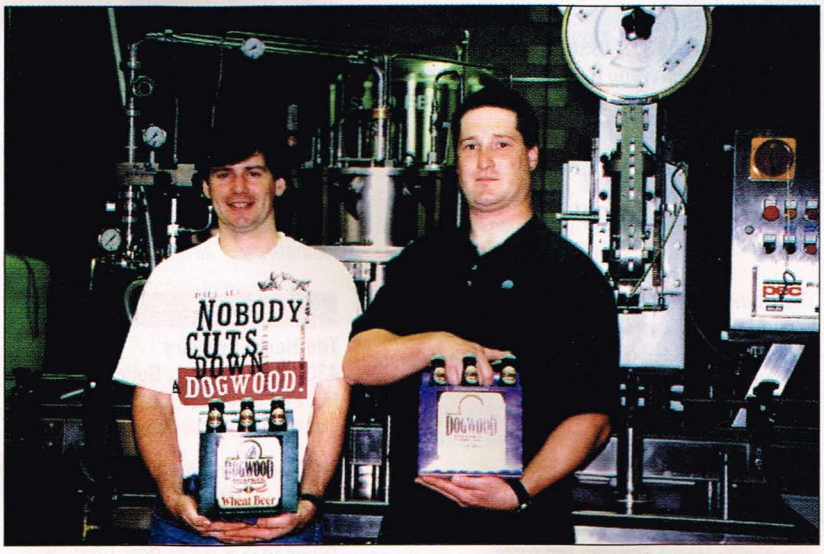
Dogwood Blooms as Atlanta Booms

by Steve Johnson

Atlanta is currently undergoing two types of hullabaloos. One is the preparation for the World Olympics, the other is preparation for what I call "The Beer Olympics." The first will come and go in just two weeks, the second will stay around for decades — and hopefully much longer.

Only two years ago, the Atlanta area had no locally made craft beer. Since then, four craft breweries and six brewpubs have opened and several more are under construction.

Being a Johnny-come-lately in the craft beer movement, what took 10 years to happen on the West Coast is being compressed into only a couple of years in Atlanta.



Dogwood Brewing Co.'s brewer Joe Schaar and owner Crawford Moran are tapping into Atlanta's fast-growing craft beer market with their pale ale and Bavarian krystal-weizen-style wheat beer.

In the middle of the Atlanta ferment is Dogwood Brewing, owned and operated by Crawford Moran. Born and raised in Atlanta, Moran graduated from the University of Georgia in nearby Athens. During his senior year a bar named The Globe opened with an excellent range of imported and craft-made beers on tap. The Globe became one of Moran's regular hangouts. While he was in graduate school, Moran began brewing in his apartment. One thing led to another, and before graduation he had already completed a business plan for a microbrewery in Atlanta.

The other half of the equation at Dogwood is brewer Joe Schaar. Schaar, like Moran, began making beer while in college. After obtaining a degree in electrical engineering, he went to work for a large engineering firm in the Atlanta area but soon became frustrated with the corporate environment.

Schaar's eyes were opened one day while drinking his homebrew with a friend. Schaar said he wished he could make beer for a living. His friend responded with "Why don't you?" Schaar began investigating. He volunteered at a brewpub that was opening in Indiana and then at a microbrewery in Atlanta. After that he took a 10-week diploma course at the Siebel Institute of Technology in Chicago. "If you know the science of it, you can make good beer," he said.

Dogwood Brewing Co. uses a turnkey system. Moran said he started out talking to just about all the equipment manufacturers and eventually narrowed it down to two companies importing equipment from Europe: Bohemian Brewery Importers for the brewhouse and fermenters and Prospero for the bottling line.

Moran and Schaar were quoted a

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14-week delivery time on the brewing equipment, but it ended up taking more than twice that long. Substantial down payments had to be made for both systems. Moran remembers walking into his 12,000-square-foot warehouse, which he was paying rent on, seeing it empty, and shouting "Oh, my God!" The bottling line was also behind schedule, but it didn't matter since there was no beer to bottle anyway.

Once the equipment finally arrived, installation went fairly smoothly. Still, there were licenses to get and things needed to be inspected once, twice, and sometimes three times.

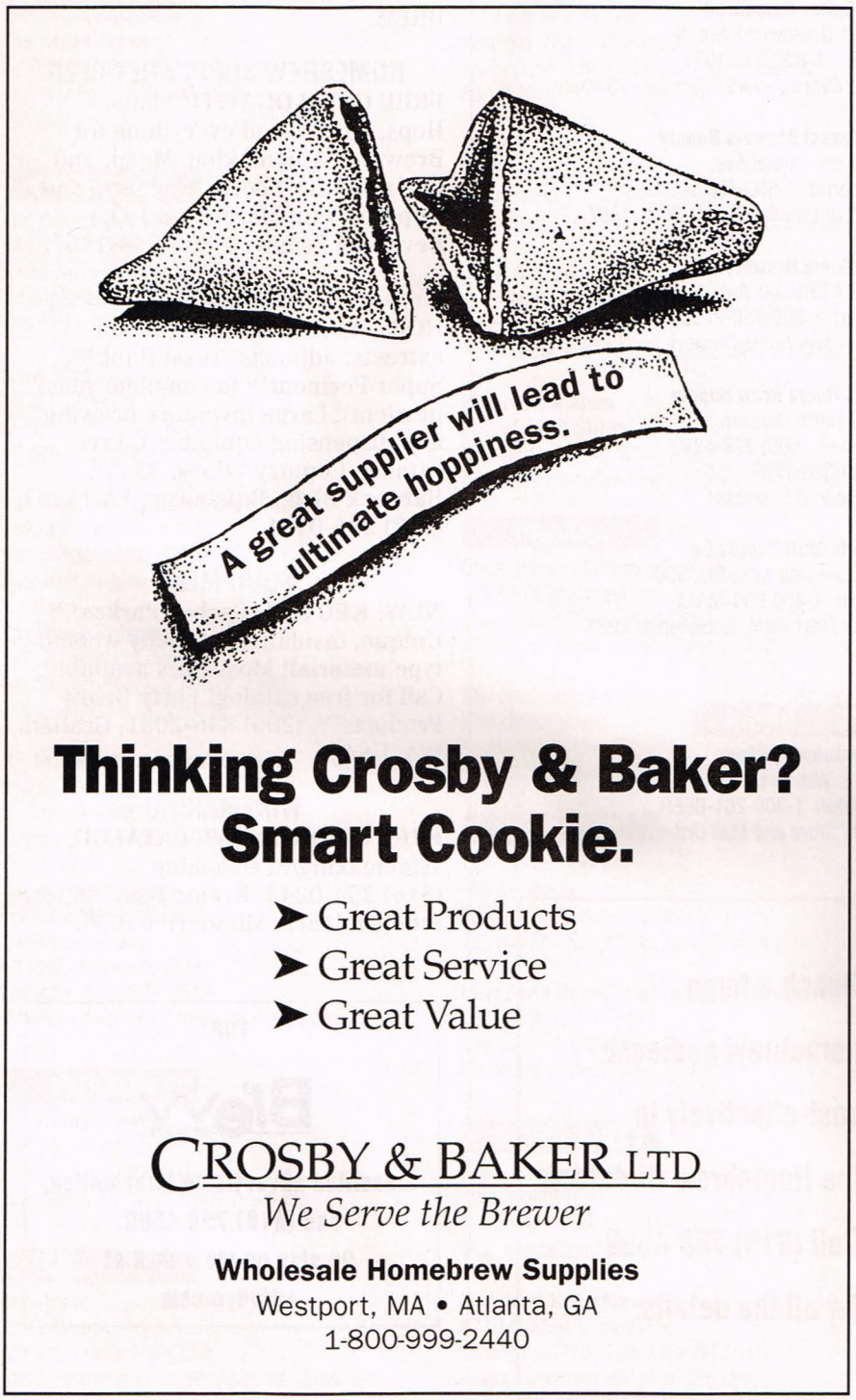
Representatives from Bohemian were on site for about two weeks to check everything out and to show them how to use the equipment. The system consists of an activated carbon filter, a hot liquor tank, a dual-powered roller mill, a 20-barrel brewhouse with a mash-lauter tun and a steam-fired brewkettle whirlpool, a heat exchanger, four 40-barrel fermenters, a 40-barrel bright beer tank, and diatomaceous earth and plate-and-frame filters.

According to Schaar, Atlanta water is probably the best brewing water in the country. What makes it so great is its incredibly low residual alkalinity — it's very, very soft water. He says it has about 20 residual alkalinity, whereas the famous water from Burton-on-Trent, in England, is more like 270. Schaar says they treat the water with calcium sulfate (gypsum). Of their two beers, they raise the alkalinity a little higher on the pale ale than on the wheat beer.

As for the bottling line, Moran said it works pretty well despite some problems. It is capable of bottling 3,000 bottles an hour using a counter-pressure filler and features an inverted bottle rinser and a bottle labeler. They are currently bottling at about 32° F and 16 psi. The filler had a couple of stuck valves, so they ordered replacement parts. The technicians from Prospero were on site to install the bottling line and came back at their own expense to fix problems. The labeler is the most finicky part of the apparatus. "I have never heard anyone rave about their bottling line — it's not a matter of having no problems but of how *few* problems you have," said Moran.

The biggest job in retrofitting the building was tearing up the floor to install drains. They did not remove the entire floor to give it a slope, but they did install a lot of drains. They also had to upgrade the electrical system. Because the building was air conditioned they decided not to install a cold room, assuming they could get quick pick up of the beer by the distributor before it warmed up.

To raise capital for the brewery, "I made a list of people I knew who had more money than I did and could afford an investment," said Moran. "I started making calls and got referrals and still more referrals. I eventually attracted about 10 investors. The investors didn't have to be convinced by a market study. They were familiar with the Atlanta



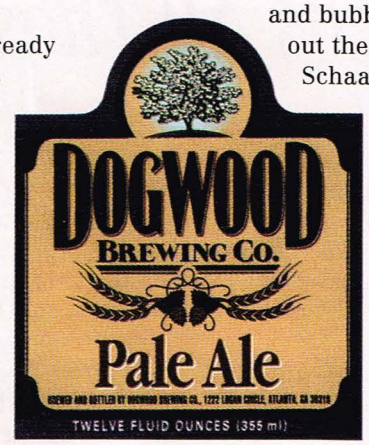
market and its potential."

Even with two competitors already out there, Moran remains confident in the brewery's potential. "The Atlanta market is right at the bottom of the bell curve. Actually, having two existing breweries makes it easier to convince new accounts to take you on. We're already looking to expand and the first beer hasn't gone out the door yet. If we add more fermenters, we could probably do about 12,000 barrels a year."

While finding new accounts might not be a problem, finding a distributor is more difficult. Moran thinks most distributors see any change as a threat, and craft beer is certainly a change.

When the Georgia brewpub law was written, distributors pushed a clause that made it illegal for beer produced in brewpubs to be distributed. So with the stroke of a pen, the distributors cut themselves right out of the most dynamic sector of the contemporary beer market.

However, Moran thinks he has found an excellent distributor. When he asked retailers who they liked and why, he kept hearing the same name: Empire Distributors. Empire has several good things to offer Dogwood. Since they already have the Samuel Adams account, they know a lot about handling craft beer. They distribute throughout the state and are primarily a wine and liquor wholesaler. Moran hopes that with only six or seven beer brands, Empire will give much of its attention to Dogwood beers.



Moran is also working with a large local ad agency to generate promotional ideas and build awareness of the brand.

And what about the beers? Both of them, Dogwood Pale Ale and Dogwood Wheat Beer, debuted at the Second Annual Atlanta Brew Fest. The pale ale had a nice balance between the sweetness of the malt and the hop bitterness.

The wheat is in the Bavarian krystal weizen style, complete with a moderate amount of clove, banana, and bubble gum esters. To bring out these characteristics, Schaar uses a genuine Bavarian yeast strain.

Next time you're in the Atlanta area, be sure to seek out these two beers. You might also like to tour the brewery. Dogwood Brewing is located on the north side of Atlanta, just off of Chattahoochee Avenue and about one mile from the intersection of I-75 and Howell Mill Road. For an appointment and directions, give them a call at (404) 367-0500. ■

Steve Johnson lives in Clemson, S.C, and is author of three brewery guidebooks: On Tap: a Field Guide to North American Brewpubs and Craft Breweries, On Tap New England, *and* On Tap Northern California.

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Who Needs All Those Gadgets?

by Sal Emma

Some guys love gadgets.

Yes, *guys*. There is something about a guy who cooks — or a guy who brews — that causes him to accumulate a mind-boggling array of small machines.

Some are metal, some plastic, some wood. Many combine parts of a variety of materials.

All are designed for one common purpose: to be sold in enormous quantities to the millions of men who fancy themselves gourmet chefs when in proximity to stoves, pots, and pans. (To be fair to both sexes, we must admit the existence of at least a few women gadget buyers in that big market, too. But that's another subject.) Now, the fact remains that some of these men are indeed gourmet chefs. But I submit that those who are gourmet chefs would be anyway, even without the polystyrene and stainless gizmos they hold so dear to their hearts.

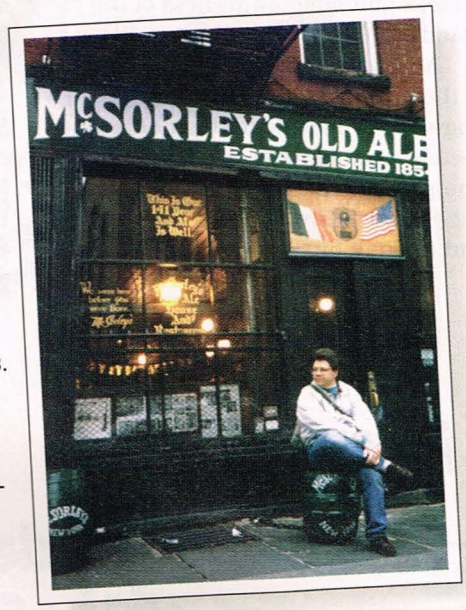
Let's face it. Does the world really need 150 different types of garlic presses when the broad side of a wide knife crushes garlic as fast as any gadget? And the knife, mind you, doesn't have a zillion tiny holes, impossible to clean without perfect vision and the rock-steady hand of a surgeon.

I know of which I speak. I was one of those gadget-happy gourmet guys, once. As a younger man, shortly after I left my mother's kitchen to begin disrupting my wife's, I was a gadget collector. Many have survived the years and remain, largely unused, in the kitchen junk drawer. A cherry pitter, a strawberry huller, a grilled-cheese sandwich press, three different kinds of potato peeler, chopstick stands, oven stones, bun warmers, lemon zesters, a ginger grater. I could continue the list, but you get the picture.

But over the years a funny thing happened. Most of the gadgets have been all but retired. Those years of experience have made me a better cook, and I find my desire to use the little infernal machines dulls as my kitchen skills sharpen.

It's a sort of maturity that comes over the cook, I suppose, that allows him, eventually, to distinguish between mere gadgets and real tools.

Homebrewing, for me, is an extension of cooking. Since my graduation from gadget school preceded my foray into the world of homebrewing, I find I bring the same aversion to gadgets to my brew closet. My most advanced piece of machinery is my Corona grain mill. Beyond that, my brewery sports a big pot, a few buckets, a carboy, and some vinyl hose.



Sal Emma, gadgetless and proud, is a regular contributor to BYO.

My mash tun is an old donut-shop bucket fitted with an "easy masher," which I fashioned from 25 cents worth of junk: a hose clamp, a scrap of window screen, and a piece of dental floss. I have a simple copper immersion wort chiller.

I strain wort with a scrap of old (but clean) nylon stocking. I don't have a diesel-powered wort pump or a propylene glycol-powered wort chiller. My capper cost nine bucks at the junk store. I found my soda kegs in the trash.

That's not to say I don't suffer a momentary relapse of gadgetitis on occasion. One day during a visit to the homebrew store, that old desire for a nifty gadget got the best of me. I bought an automatic sparging device.

Used it once. I'll never use it again. I batch sparge now. Part of what keeps me out of the gadget game goes even deeper than a simple aversion to collecting junk. It is respect for the history and culture we bring to our homes when we brew. Think about it: civilization's oldest fermented food. Older than wine, maybe even older than bread.

Did the ancient Sumerians have RIMS pumps? Did the famous ale brewers of ancient England have brewing computers? Did the decoction brewmasters of old Bohemia and Germany have fermentation exhaust filters? No. In fact, they didn't even have thermometers, which is the reason they invented decoction mashing in the first place.

Am I right? Of course not. There is no right and wrong in the homebrew hobby, just whatever works best for you.

I know some of you are hooked on your solar-panel, 200 horsepower, copper-radiator carboy coolers and wouldn't trade them for the world. Hey, that's great. More power to you. As a reformed gadgeteer, I remember how much fun it can be to collect them — and get them to work.

But I'm out of that game. Anybody want to buy a slightly used rotating sparge arm? ■

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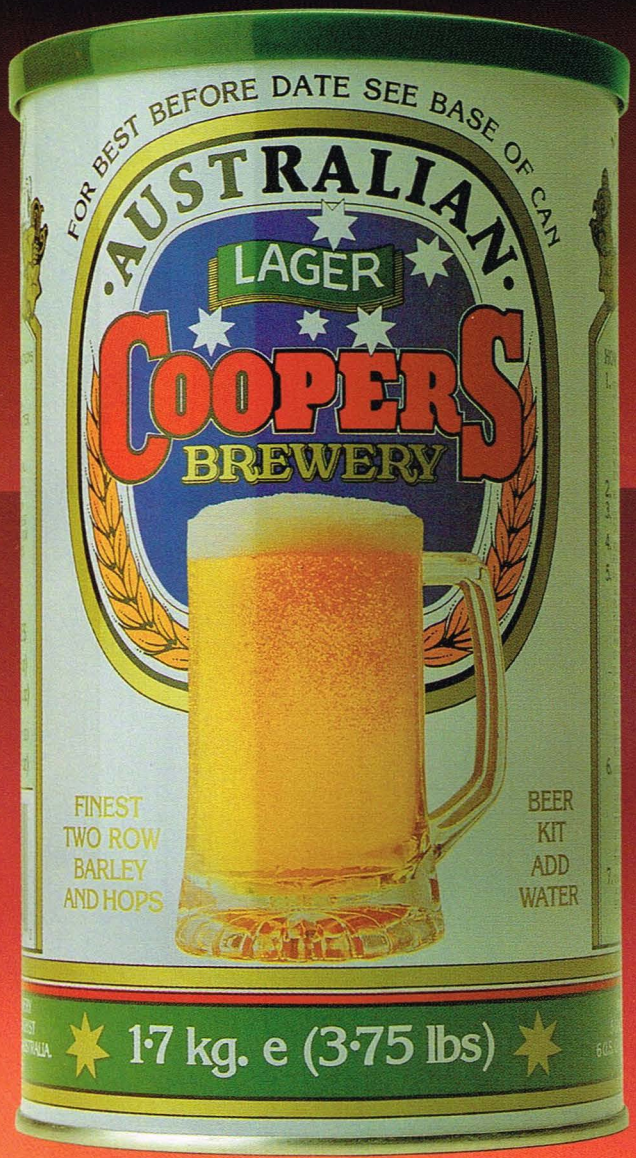

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