Brew Your Own®

August 1997, Vol.3, No.8
Niche Publications Inc.

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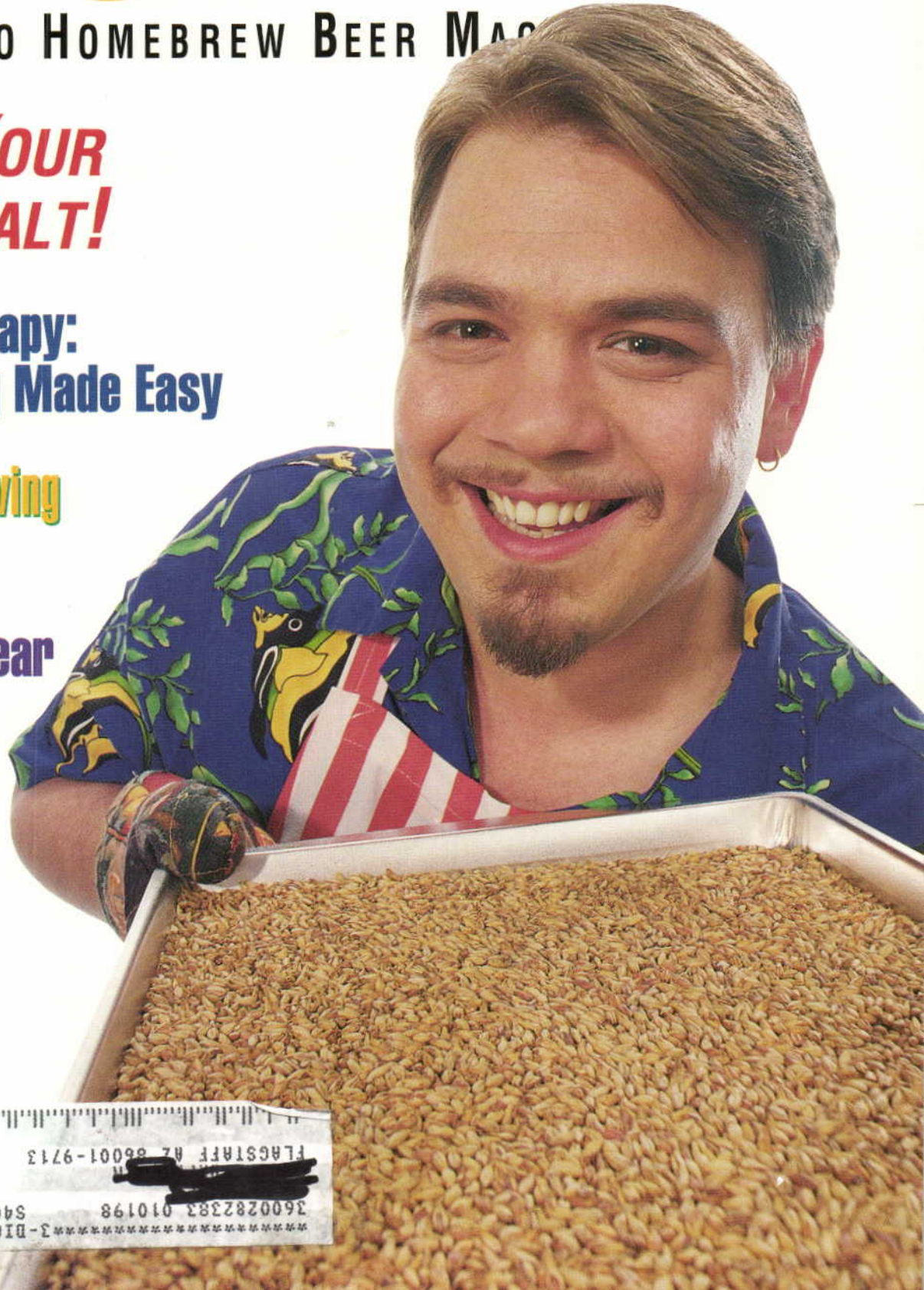

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"Pete"

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We're talking about an actual full page ad about yourself. Would it show you as an astronaut? A celebrated jazz musician? A world class fencing champion? Most of us are just trying to get through this thing (life) with a minimum amount of hassle and strife. And the truth is, most of us totally wimp out when it comes to being even remotely "interesting."

Don't get us wrong. We know some of you are absolutely brilliant. (We get letters from doctors and lawyers and computer programmers, saying that you love our beer, and jeez, thanks.) But what about the big picture? What's stopping us? Where is it written that we can't sign up for race car lessons tomorrow. Or enroll in a stunt man school.

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The point is, human beings are wonderful things. Just when you think you've figured 'em out. They surprise you. They go climb a big frozen mountain in a wheelchair. Or start an organic vegetable stand. Yeah. Your friends may think you've lost your marbles, but so what? Pete didn't make Wicked Ale for the "masses." He made it for "himself" (okay, himself *and* a few of his weird friends).

So think of these words as a call to arms. Sure, this is an ad for beer. And we'd be lying if we said we didn't dream of you savoring a couple of frosty pints of Pete's Wicked Ale while plotting your course. But the most important thing? Don't-give-in. We need people out there kicking mediocrity in its shiny little butt. Think about it. When was the last time someone whispered softly in your ear, "Hey, you know something? You're the most interesting person I've ever met." (Wow.)

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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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CIRCLE 8 ON READER SERVICE CARD

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Cover photo: Kent Lacin

BYO Wins Pulitzer Prize!

Did you ever read the book *All the President's Men*? It described reporters Bob Woodward and Carl Bernstein uncovering classified information, meeting with secret sources, and eventually blowing open the story of the century, the story that led to the resignation of the president.

I recently read another book that described that case and several others from an editor's point of view. It depicted editors as directing the action, taking risks, and making controversial stands, all in the name of the First Amendment.

It was very exciting and it got me thinking. Hey, I'm an editor. That could be me! The problem is there aren't very many Watergates in homebrewing. Really. I'm telling you, I considered this for a while, and there's nothing! Rather than getting discouraged, I decided to take matters into my own hands. I don't know if this is what Ben Bradlee would have done, but it's my approach to reporting scandals: I made them up. Here's my list of BYO Pulitzer Prize-winning material.

Wortwater: Shortly after the governor's wife invests in a homebrewing supply store, a mysterious figure places an order for 23,000 wort chillers.

Lautergate: Secret tapes reveal the President was behind the break in at Sierra Nevada Brewing Co. He is heard saying to unidentified aids, "I've got to have that bleeping pale ale recipe. Get me the bleeping recipe, you bleepers."

Brewpot Dome: National forest land in Wyoming is secretly leased to wealthy homebrewers, who bulldoze the trees and plant 3 million acres of Cluster hops.

Junk Beer Crisis: Investment king convinces unwary seniors to put their money in unsecured investments and promises huge returns. Investors are told the money will be used to finance Homebrew World, a nationwide string of amusement parks whose main attraction will be The Bittering Ground, a haunted house featuring decapitated hop heads.

Mash Tun-Contra Affair: A major working for the National Security Administration sells homebrew equipment to third-world countries, then directs the funds to anti-communist guerillas in the barley fields of Central America.

And finally: A remorseful TV evangelist, caught in a motel room with two brewpots and an extra-long brewing spoon, tearfully confesses, "I just couldn't help myself."

These, of course, are all long-term projects that we'll be working on for many months. In the meantime, check out the juicy material in this month's cover story, Make Your Own Malt (page 32). Innocent barley cracked, submerged, then left to suffer in a sweltering oven!

A Practical Guide to Filtration (page 38) exposes in a detailed, step-by-step manner how brewers strip beer of haze-producing particles — without benefit of a trial or even formal indictment.

And if that's not enough, Dry Hopping for Great Aroma reveals how all manner of hops are tied in a weighted mesh back and unceremoniously dropped to the bottom of the fermenter. This is done for the sole purpose of harvesting their aroma, and in the end the carcasses are simply discarded. It's horrible, and it's on page 24.

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Hot BYO 8/97

CIRCLE 25 ON READER SERVICE CARD

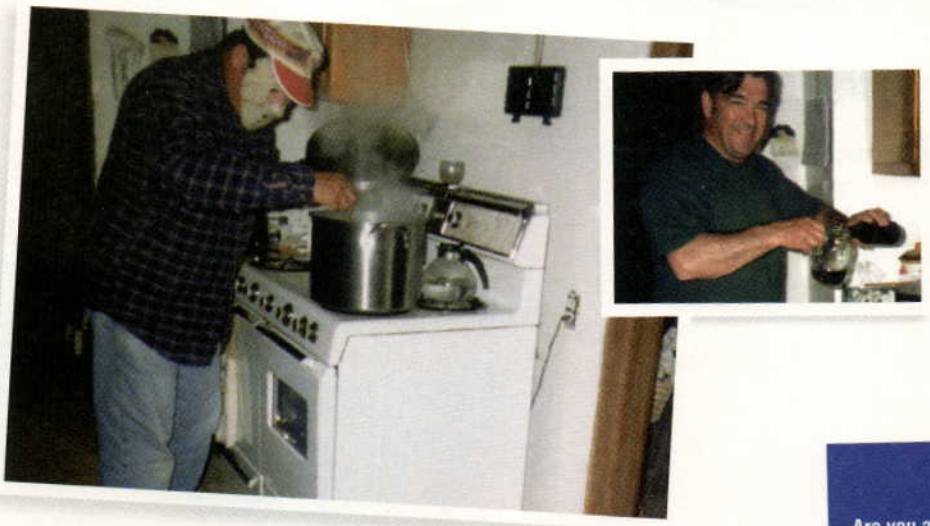
Brewing With an Engineer

Greg Costakis
Valparaiso, Ind.

I should have known brewing with an engineer would lead to this. Charlie Tilleman and I started brewing together nearly three year ago, doing simple stovetop extract brews in our kitchens. Naturally that led to propane cookers on the driveway and partial-mash brews in large stainless kettles. Little did I know that Charlie, a closet gadget freak, was haunting local scrap yards and acquiring all the scrap stainless he could get his hands on (and all that his wife would let him store in the garage).

A few evenings and weekends together produced this 10-gallon all-grain system, which we have been using for more than a year now. We've been surprisingly happy with its design and performance. But where equipment is concerned, Charlie is never one to let things rest. He's been talking about building a new and improved model with a recirculating infusion mash system and quick-connect fittings to allow easier cleaning. Anyone out there interested in a used home brewery? There's not enough room in Charlie's garage for two of them.

For Sale? Charlie (left) and Greg's 10-gallon all-grain system may soon be made obsolete.



Eeeeeeeeeeeeee! It's a frightening affair when Joseph J. "Jason" Presloid takes to the brewpot.

Night of the Wort Creature

On Halloween night 1996 I was preparing to brew another batch of beer. I wanted to brew a Czech pilsner. My wife had taken my youngest son to his friend's house in town to trick-or-treat. I stayed home to brew my beer and wait for any youngsters who would have the courage to walk up our long, dark wooded lane for a treat.

Having five boys I thought I could find something to wear for the occasion to give my wife a laugh when she returned home. I found a glow-in-the-dark Jason mask and an old skull cap. I put on an old flannel shirt, buttoned up to the neck, shirt tails out.

So there I was, stirring my wort in a 20-gallon stainless steel pot on the stove while standing in the middle of my low-lit kitchen. Then my dog started to bark. I looked toward the door and saw two young neighbor boys who just moved in a few weeks earlier. They were backing away from the door with their mouths wide open.

I removed the mask as I opened the door. They didn't say too much, just asked where my son was. I gave them their treats and went back to my brew. They were the only ones to come to the house that night.

Soon my wife and son came home. I told them about the boys and as we pictured the scene again, we all had a good laugh. It is very dark and scary coming up our lane at night. But then to find Jason stirring a pot of brew on Halloween night gave them a treat to talk about for years to come.

Joseph J. Presloid
Punxsutawney, Pa.

Brewing In Style!

Are you a homebrewer with an unusual job — clown, senator, used-car salesman? Tell us about it and send us a picture. There's a cool BYO T-shirt in it for you. Send your story to Pot Shots, c/o Brew Your Own, 216 F Street, Suite 160, Davis, CA 95616. Or send us e-mail at edit@byo.com. Be sure to include your mailing address!

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Pressed for Space

Dear Brew Your Own,

If you're short on space here's a gadget to help create smooth lagers.

All you need is: 10- to 12-ounce plastic, screw-top soda bottles, a 22-gallon plastic trash can, and a 30-gallon plastic trash can with a sealable lid. Cut the handles off the 22-gallon can and fit it inside the 30-gallon can so the smaller can is just barely submerged. This gives it a little extra insulation. Put the carboy of beer into the smaller can. Fill the soda bottles with water and freeze. Leave enough room for the water to expand as it becomes ice. Put five to six bottles, now filled with ice, around the carboy in the 22-gallon can. Change the soda bottles two to three times a day (four to five during active fermentation). This setup kept my lager between 48° and 52° F. Ambient temperature ranged between 65° and 72° F.

Kevin TenBrink
Salt Lake City, Utah

Safe Brewing

Dear BYO,

In "Out, Out Damn (Iodophor) Spot" (April '97 BYO) I am sure the author was relieved when his spills of iodophor disappeared after he cleaned them with Windex, which has ammonia-D.

The author was right. A magical though not charmed chemical reaction did occur when he mixed ammonia with iodine. He created nitrogen tri-iodine, a contact explosive. In fact the black spot was the remnants of a minor ignition of chemicals.

Two other common chemicals that are dangerous when mixed are ammonia and bleach. When combined they create nitrogen tri-chloride.

In the commercial brewing industry we must provide labels warning people of the dangers of the chemicals they are using and what other chemicals they will react with. In the consumer market these are not required. So don't mix chemicals or cleaners.

Charlie Talley, Chief Chemist
Five Star Products and Services LLC
Denver, Colo.

Copper and Beer

Dear BYO,

"Build a Beer Engine" (May '97 BYO) was a great article. It really makes me want to build one. I'm perplexed, however, about Fogarty's comments regarding copper hardware and beer not mixing. Can I assume that brass doesn't contribute to oxidation of beer flavors? What about other uses of copper such as wort chillers? Is the wort in any way affected by copper?

Copper is fine for wort but not for beer. The low pH of beer dissolves copper, and the copper will lead to oxidation. Any copper introduced into wort will be quickly absorbed by yeast. As far as brass is concerned, it is fine.

Little Giant Pump

Dear BYO,

You were correct to caution against pumping boiling liquids in your mail response (June '97 BYO) to the letter on "Pump It Up" (April '97 BYO). But I have found a solution. I have been using a "Little Giant" pump I bought from Grainger more than a year ago (catalog number is 2P039-7 "Magnetic Drive Pump"). It has a fiberglass-reinforced, magnetically driven pump head and can withstand a temperature of 212° F. I do not put the discharge under high pressure in my operation. With my low flows there should be no problem.

I use a ceiling fan speed-control switch and keep flow rates down for both recirculation during mashing and transfer from the boil kettle and have never had a cavitation problem. (If the pump sounds like it is pumping marbles or small rocks, it is cavitating and should be stopped or slowed down until the sound disappears.)

The only problem is that the pump is not self-priming. That means that I must start the process with the pump inlet lower that the discharge valve of my boil kettle.

Ray Kruse
Santa Cruz, Calif.

The Ultimate Fruit Beer Story

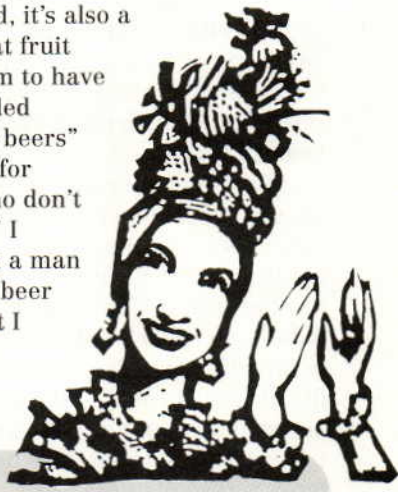
by Scott Russell

Despite the incredible growth in the craft brewing and home-brewing world over the last several years, would you believe there are still people out there who say they don't like beer?

Every once in a while I get a customer in my shop (almost always a man) with a desperate look on his face. He pleads with me to help him find a recipe for a beer his wife or girlfriend will like. She (again, it's usually a woman) doesn't like stouts (too heavy) or pale ales (too bitter) or wheat beers (they taste weird) or even light lagers (too...whatever).

The customer's usual plan is to do some kind of a fruit beer. He thinks that people who don't like beer might just like something fruity, more like wine or tropical drinks. Well, this is fine, I suppose, but it makes me think of two things. First, it's a shame that we can't expose these unfortunate non-beer types to the amazingly wide variety of flavors, from light to dark, from sweet to bitter, from rich to crisp, that beer can cover. Surely there must be something in there for everyone?

Second, it's also a shame that fruit beers seem to have been labeled "women's beers" or "beers for people who don't like beer." I mean, I'm a man and I like beer (a lot), but I also like



Tropical Punch Red Ale
(5 gallons, partial mash with fruit)

Ingredients:

- 2 lbs. toasted two-row pale malt
- 1 lb. crystal malt, 50° to 60° Lovibond
- 1 oz. roasted barley
- 1 lb. Munich malt
- 4 lbs. unhopped light dry malt
- 1 oz. Hallertauer Hersbrucker hop pellets (4% alpha acid), for 45 min.
- 1 oz. Tettnanger hop pellets (4% alpha acid), for 15 min.
- 10 to 14 g. Edme dry ale yeast
- 5 lbs. of tropical fruit
- 7/8 cup corn sugar for priming

Step by Step:

Heat 1.5 gals. of water to 163° F. Mix in pale, crystal, and Munich malt and roasted barley (all crushed). The mash should settle at 150° to 152° F. Hold 90 minutes, run off, and sparge with 1.5 gals. of water at 168° F. To the kettle add enough water to make 3 gals. and bring the wort to a simmer. Simmer for 60 minutes, then bring to a boil and add dry malt and Hallertauer pellets. Boil 30 minutes. Add Tettnanger pellets. Boil 15 more minutes. Remove from heat and top off with chilled, pre-boiled water to make 5.25 gals. in primary fermenter.

At 68° F pitch a fruity, dry ale yeast. I use Edme's. Ferment at 68° F until initial fermentation cycle is complete. Rack to a secondary fermenter onto 5 lbs. of (your choice — any combination is cool!) pineapple, mango, banana, guava, papaya, passionfruit, starfruit, kiwi, or orange. Secondary fermentation should last eight to 10 days, then re-rack to a third vessel to allow for clearing (a week or so should do it). Prime with corn sugar (add 1 or 2 oz. lactose if the beer seems too dry at this point). Bottle and age three to four weeks.

Alternatives and Options:

Obviously, the vast majority of alternatives in this recipe depend on your preferences for fruit. If it's fruit, you can use it. Just remember that the fruit will give a different element depending on how you use it. Fruit in the boil will give flavor but not much aroma. Fruit steeped in the cooling wort will contribute a little aroma but may or may not get adequately pasteurized. Fruit added to the primary will give good, fresh flavor (and will contribute fermentables, raising alcohol content slightly), but most of the aroma will bubble out with the CO_2.

My favorite technique, mentioned above, is to pasteurize the fruit (I freeze it for several weeks and then microwave it to thaw it, which also kills a lot of bacteria), then put it into the bottom of my secondary. A 6-gal. carboy for a 5-gal. batch allows room for the fruit and renewed fermentation activity — occasionally I even have to install a blowoff tube on the secondary if I'm using a lot of fruit. I then rack the more or less finished beer onto the fruit after initial fermentation subsides. I almost always then rack it again to get the beer off the fruit and allow it to clear. You can enhance or add to fruit flavors by adding fruit essences, extracts, or liqueurs with your priming sugar.

All-grain brewers: Simply add 6 lbs. of pale malt to the grain bill, increase the mash water to 3 gals. and the sparge water to 3.5 gals. Time and temperature remain the same. Simmer as above and boil to reduce to 5.25 gals., keeping in mind the hopping schedule suggested.

fruit beers. I'll admit it publicly, no problem. I appreciate the possible combinations; I enjoy the interplay of malt, hops and, yes, fruits. Almost all kinds of fruit. I've brewed beers with at least 20 different kinds of fruit at one time or another, and I'm not through yet.

The recipe you are about to read is true. Nothing has been changed, for there are no innocents to protect. No guilties, either, I guess. Just a nice, sweet, rich fruit beer. The ultimate fruit beer, if you will. The one that serves to divide the fruit beer lovers from all the others.

Different? Sure. But difference is a good thing. This recipe by the way came about not because of a desperate customer but rather because of a documentary film I watched on Tahiti and French Polynesia. I thought to myself, "I wonder what the beer is like there?" I couldn't imagine locally grown barley and hops down there, so I toyed with the idea that they must brew with something else.

One idea led to another, and with images of artist Paul Gauguin and writers Robert Louis Stevenson and Herman Melville dancing in my head (better than sugarplums, I think), I tried to come up with the recipe that would transcend the boundaries between that exotic paradise and the "real" world. I needed a beer that would stand up to fruit but not overshadow it. That would look appropriate to the aroma I intended it to have.

And then I remembered my childhood: A voice I hadn't heard in years said, "Hey, how 'bout a nice Hawaiian Punch?" Uh oh.

Reader Recipes

Foolish Heart Pale Ale
(5 gallons, all-grain)

As I read through Recipe Exchange, I came across the White Russian Imperial Pale Ale (June '97 BYO). And it reminded me of a beer I brewed in honor of Valentine's Day. The beer is quite refreshing any time of year. It has something in common with the White Russian: It contains a surprise alcoholic ingredient — peppermint schnapps. At the rate of 200 milliliters in a five-gallon batch, it complements the East Kent Goldings very nicely. It does not go well with food but is pretty good on its own.

Jason Goebel
Nitro, W.V.

Ingredients:

- 9 lbs. British pale malt
- 6 oz. crystal malt, 60° Lovibond
- 2.5 oz. East Kent Goldings hops, 1.5 oz. for 3 min., 1 oz. dry hop
- 200 ml. of peppermint schnapps
- Wyeast 1098

Step by Step:

Single-temperature infusion mash at 155° F for 1.5 hours. Sparge with 170° F water to 6 gals. or until runoff drops to a starting gravity of 1.010. Boil for 1.5 hours, adding East Kent

Goldings three minutes before the end of the boil (let it steep while the wort is chilled). After fermentation, add 1 oz. of East Kent Goldings and 200 ml. of peppermint schnapps. Bottle or keg after two weeks, condition for a couple of weeks.

Paul's Picnic Table Porter (5.5 gallons, all-grain)

This beer was named for the person who introduced me to homebrewing. It was crafted in honor of his retirement from the Air National Guard. Lightly hopped, this beer has a sweetness balanced by a hint of roasted bitterness. This beer does not meet the style guidelines for porter, but the name seemed to fit the occasion. It was a smashing success and even people who normally don't like dark beers were asking for more. The perfect sendoff for the man who got me hopelessly addicted to this wonderful hobby.

Richard Day
Aurora, Colo.

Ingredients:

- 9 lbs. two-row British malt
- 0.5 lb. crystal malt, 40° Lovibond
- 0.5 lb. dextrin
- 1/3 lb. chocolate malt
- 1/3 lb. black patent malt
- 1 lb. dark brown sugar
- 0.75 lb. light clover honey
- 1 oz. Willamette hops (4.7% alpha acid), for 60 min.
- 0.5 oz. Fuggle hops (3.6% alpha acid), for 2 min.
- 1 tsp. Irish moss
- 2 packages Edme dry ale yeast
- 3/4 cup corn sugar for priming

Step by Step:

In 2.5 gals. water mash the grains at 154° F for 60 minutes or until conversion. Sparge with 5 gals. of 170° F water to make 6 gals. of wort.

Add the brown sugar and honey to wort. Add Willamette hops and boil the wort for 45 minutes. Add Irish moss and boil for 13 more minutes. Add the Fuggle hops and boil two more minutes. Total boil is 60 minutes.

Rehydrate the yeast in 2 cups of boiled water cooled to 95° F. Let the yeast cool to 78° F before pitching. Cool wort to 78° F and siphon to fermenter. Add pre-boiled water if necessary to bring volume to 5.5 gals. Pitch the yeast.

Ferment for one week then rack to secondary. Ferment to completion and bottle with corn sugar. This beer seemed to be at its peak after about a month and a half. It may have gotten better if there had been any left.

Alternatives:

Extract brewers can substitute 5 lbs. light dried malt extract for the two-row malt. Steep all other grains in 2 gals. of 154° F water for 60 minutes. Strain the spent grains.

Add malt extract, brown sugar, and honey. Increase the Willamette hops to 1.25 oz. (4.7% alpha acid) and boil for the same 60 minutes.

OG = 1.061
FG = 1.014 ■

When Brewers Feel Bitter

Mr. Wizard

Many articles on brewing say that hops lose their flavor and aroma after an hour of boiling and retain only their bittering characteristics. However, many recipes still call for large quantities of low-acid-, flavor-, and aroma-type hops for bittering. Why not just use good quality bittering hops?

Eric Lindemann
Memphis

This is difficult to answer definitively because it depends on one's flavor preference. In short many brewers feel that certain hop varieties, particularly some of the lower-alpha hops, have a more pleasing bitter taste than others. These hops have a "soft" or "subtle" bitterness that isn't "harsh" and doesn't linger on the palate. These descriptions convey the bitter quality delivered by these hops, but the use of such fluffy terms (those in quotes) makes the more analytical brewer want to puke! I feel that certain hops produce beers with a more pleasing bitterness than others; I can't really describe the difference in bitterness, but I simply prefer certain types of bitter tastes more than others.

Over the centuries of using hops in beer, a group of hop varieties has risen to the top as "Noble" varieties. Most brewers simply view these varieties as those with the best aroma qualities and dismiss any role they may play in bitterness. The Noble hops include Hallertauer, Tettnanger, Saaz, Spalt, and Goldings, to name a few. While all of these varieties have excellent aroma qualities, they also tend to have low levels of co-humulone (between 20 percent and 30 percent of all alpha acids). Co-humulone, humulone, and adhumulone are the three principal sub-types of alpha acids. Because adhumulone is only roughly 10 percent to 15 percent of the total alpha-acid content in all hop varieties, the variation in co-humulone and humulone is viewed as a varietal indicator.

Many brewers not only seek low co-humulone hop varieties for aroma, but they also believe that the bitterness associated with humulone is more pleasing than the bitterness associated with co-humulone. Hence, some brewers use low-alpha, nice smelling hops for bittering even though the fine aroma will be lost in the boil.

Not all brewers share this view, and many brewers use high-alpha hops, regardless of the aroma, for bittering and fine aroma hops for late hopping. Their logic is like yours: Why pay the extra price for fine aroma when the only person who will smell it is the brewer? There are dozens of new high-alpha hop varieties to fill this need in the market. Chinook, Galena, Nugget, Columbus, Symphony, Super Styrian, Centennial, and Eroica are some examples of hop varieties ranging between 12 percent and 20 percent alpha; these guys are loaded in the sticky, yellow lupulin sacs that contain the bitter acids. There are probably more brewers in the world who prefer these varieties for bittering than who prefer low-alpha varieties for the same application.

The only way to develop a good feel for your position on the debate is to experiment. I have said many times that homebrewers are in a better position to try things and develop opinions based on experience than are many commercial brewers; the commercial brewer simply doesn't have the time to play! Do a series of brews and let your palate answer the question.

Mr. Wizard

At what point is wort to be aerated? Some books say to handle the wort with the utmost care so as not to splash it from the time it leaves the brewpot because it can cause oxidation and thus a cardboard taste. Now I have been told that one should aerate the cooled wort when transferring it from the brewpot to the fermenter by installing an aerator on the end of the transfer hose. I am told this aeration is necessary to ensure a good, clean, active fermentation. Which is correct?

Walt Oswald
Dayton, Ohio

Although seemingly confusing, the rule about oxygen or air and brewing is to avoid it in all operations except after cooling and before fermentation.

During mashing and lautering it is possible for certain enzymes (lipoxygenases) to catalyze the oxidation of lipids to yield stale flavors. Also, the oxidation of proteins during lautering can cause proteins to cross-link with one another and impede wort collection. During transfer of hot wort from the lauter tun to the kettle, oxygen will cause the wort to darken. Most brewers making darker beers are not too concerned about color pick-up, but those trying to make very pale beers are concerned.

The only place to intentionally add air or oxygen is during cooling. In the past some brewers would aerate the wort as it entered the wort cooler. This practice was used to help dissolve the oxygen as the wort flowed through the cooler. Because this practice leads to wort darkening, it has been discontinued by most brewers. Today, it is common to inject sterile air or oxygen

immediately after cooling.

If aeration of wort did not occur, there would be very little oxygen in the wort (boiling drives almost all dissolved gases from the wort) and the yeast would suffer.

To reproduce, a yeast cell must synthesize all of its basic components. Lipids and sterols are two classes of compounds that are needed to make more yeast cells. It just so happens that yeast require oxygen (in its molecular form of O_2) to synthesize these compounds. Most of the yeast growth occurs early in fermentation and this is why oxygen is needed. After this point they no longer have a use for oxygen.

Now the oxidation story begins to resurface. Oxidation of beer not only causes the formation of stale, paper-like flavors but also can cause the beer to darken and even get hazy. So you see, brewers have a love-hate relationship with oxygen where we hate it more often than we love it and hate the fact that we occasionally have to love it because it would be a lot easier to simply hate it!

Mr. Wizard

I've been brewing for about six months and have been able to brew some very nice darker ales. While brewing the lighter-style beers (Coors), how can I get rid of a yeasty taste? I boil my wort, use a primary and secondary fermentation process, and add clay finings and gelatin to the carboy. I use a quality dry yeast as well. Any suggestions?

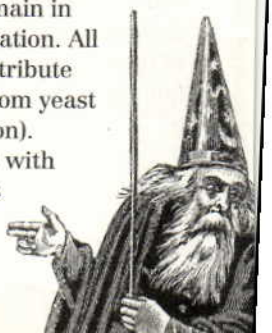
Jonathan Timinsky
Jasper, Wyo.

A generic suggestion to all brewers is become very comfortable with sensory evaluation of beer. This skill requires practice and can be used to accurately detect and describe the various aromas found in beer. Your question relates to this advice as you have put sensory evaluation to good use in picking up the yeasty off-flavor. This flavor is much more noticeable in light beers because these beers have very subtle flavors and have little chance of disguising this flavor note.

The best way to reduce yeastiness in beer is to minimize the amount of yeast carried forward into the bottle. This can be done by long, cold storage (which helps yeast to settle), the use of finings (such as isinglass or gelatin), or by filtering your beer. Since most homebrewers do not have access to a filter, finings and/or cold storage provide a good start.

Yeastiness does not always come from excess yeast in the package but can come from too many dead cells going into fermentation with the yeast pitch or too many cells being carried forward from primary fermentation into secondary fermentation. Less common, too many cells remain in solution during fermentation. All of these factors can contribute yeasty flavors to beer from yeast autolysis (self-destruction).

Suggestions to deal with these sorts of problems



are: 1) Use a good, highly viable pitching yeast. Fresh yeast will help minimize dead cells in the pitching yeast. 2) Try to avoid racking yeast into your secondary. An easy way to reduce the yeast cells in you secondary is to chill the primary for two days before racking. This will cause more yeast to settle from solution compared with letting the beer sit warm. 3) Avoid over-pitching. This problem is uncommon in commercial brewing and even less common in homebrewing. Adding too much yeast is hard to do, especially when using liquid yeast. Most brewers will ask themselves, "Should I really add *this* much yeast?" several times before committing an over-pitch violation.

Try these techniques and continue critically evaluating your own beer. The key to being an excellent brewer is, in part, to be an excellent beer taster. If tasting excellence and a good knowledge of brewing are combined, then you will succeed in brewing that wonderfully satisfying Coors Light!

Mr. Wizard

It's been seven years since I started dispensing my homebrew with a Cornelius keg system, and I've never been happier, until now. I've just come across a tank of "the mix" (nitrogen/carbon dioxide) and an old Murphy's faucet designed for dispensing with this mix. When I hooked it all up, however, we got foam up the ying yang that did not dissipate as it does with the fine products that are designed for this dispensing system. The regulator was set at 30 psi as it should have been. The beer was at 45° F. It had been pouring perfectly on straight CO_2 minutes before.

Is there something different that must be done in the conditioning? Is it possible that the terminal gravity was too high? Must I use unmalted barley in my grain bill? Pub owners have told me that other beers don't do well on this system unless they're designed for it. Why?

Tim Fleming
Pasadena, Calif.

I do love a good pint of mixed-gas beer dispensed from stout faucets. The rich creamy head, the smooth, full mouthfeel, and the amazing drinkability. Mmmm. I can taste it now. The key to your problem is that the mixed dispensing gas and the special faucet are only two of the three items needed to produce beers like Murphy's or Guinness. It just so happens that both of these beers are stouts, but any beer can be made to dispense like these, and there is no requirement for flaked barley as part of the recipe. The key is dissolving the proper amounts of N_2 and CO_2 into your beer. You must begin with the gas mix much earlier than dispense time to accomplish this goal.

When beer leaves primary fermentation it contains some dissolved carbon dioxide but far less than the amount needed to be considered carbonated. Priming sugar, kraeusening, and CO_2 injection are some of the commonly used methods to carbonate beer. Most carbonated beers contain about 2.6 volumes of carbon dioxide

per volume of beer. Explaining this odd way of carbonation is beyond the scope of the question, but I will guarantee that any beer with this much carbonation will foam like crazy when forced, at any pressure, through the tiny holes in your stout tap regardless of the dispense gas mix you choose. The fact that you used 30 psi only made the matter worse.

Beers that are designed to work with these taps are carbonated to very low levels — between 1.2 and 1.8 volumes of carbon dioxide per volume of beer. The other feature of these beers is dissolved nitrogen, typically at levels between 20 and 40 milligrams per liter. To dissolve these two gases into beer, it is important to begin with flat beer. The easiest way to get flat beer is to leave it alone after primary fermentation.

Rack the beer from the fermenter into your soda keg. Hook the beer keg to your mixed gas tank (75 percent nitrogen and 25 percent carbon dioxide), pressurize the keg to 30 psi, and cool the keg to about 40° F. Leave the gas connected to the keg for at least three days while periodically shaking to speed up the absorption of gas into beer. This process takes longer than just using carbon dioxide because nitrogen has a lower solubility than carbon dioxide and takes longer to absorb into solution.

If everything went right, your beer should now be properly prepared for dispensing through the stout tap. Simply hook the keg to your tap as you normally do and use the same gas mix at the same pressure to push the stout through the tap. If the beer flows too quickly from the tap, you should: 1) adjust the flow controller (if the tap has one) to reduce the flow rate; 2) add more beer line to the system; or 3) reduce the pressure on the keg. I do not like reducing the keg pressure because this system is designed to work at a high pressure, and reducing the keg pressure means the system is not properly installed.

After adjusting the flow rate, observe the foaming action of the beer. If the beer foam is very large and does reduce to a one-half-inch creamy head, you probably have over-carbonated. This could be caused by a faulty regulator that is delivering a higher pressure than it indicates or it could be from an improper gas mix. Not all gas mixes are what they claim. With a little tweaking you should be pouring a perfect pint and be a much happier brewer. Cheers! ■

Mr. Wizard's Address

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

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

Lautering Success Begins With the Mash

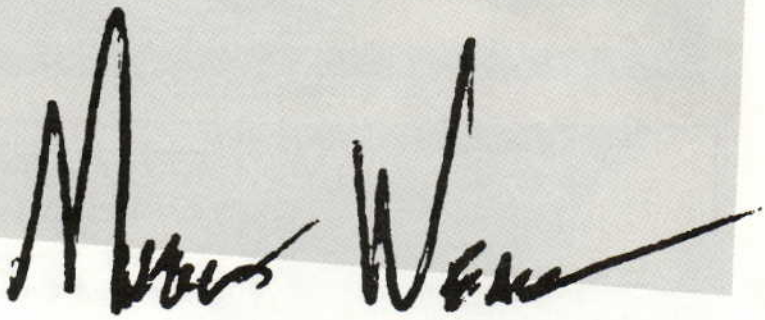
by Suzanne Berens

T. W. Fisher's/Coeur d'Alene

Brewer: Mikoli Weaver
Brewery: T.W. Fisher's "A Brewpub"/Coeur d'Alene Brewing Co., Coeur d'Alene, Idaho
Years of experience: 1.5
Education: BS in food and science biochemistry from Universtiy of Washington; degree from Instituto di Cucina e Science, Tuscany
House Beers: Centennial Pale Ale, Festival Nut Brown Ale, Huckleberry Ale, Cream Ale, Imperial Stout, Hefe-weizen

"To effectively sparge you need to effectively do what comes before that, including making sure you have a proper mash."

Brewer: Mikoli Weaver



To effectively lauter you need to effectively mash. Make sure you don't disturb the mash process. I have a combination mash/lauter tun, so my grain just sits in the same bed. Then I hook a sparge arm to it just like most homebrewers do.

Some people are forced to transfer to a separate vessel for lautering. I am not tremendously familiar with that method. I know sometimes you can have better extraction because of that, but I think recirculation sort of achieves the same thing, although not to the same extent. After all, you're taking the entire mash out and putting it somewhere. I would rather keep it in the same vessel so as not to disturb the grain but instead move the wort through it. Trying it both ways at home I found that leaving the grain in the same vessel reduces the chance of a stuck mash. Less chance of a stuck mash increases your extraction.

During the mash pay attention to your dilution so you have the same level every time. It helps with consistency all around. Especially useful in homebrewing is the ratio 1.25 quarts of water per pound of grain. It will depend on the size and shape of your mash tun, but generally it works well. Given that, you'll know exactly how much water you'll need to sparge on top.

Once you have applied the ratio of water to grain, consider temperature. I mash at 149° F. That temperature is too low to be considered the optimum for alpha-amylase conversion, but the beta-amylase is more active at that particular temperature. Even with a minimum of alpha activity, you can break down the more complex bonds. If you have a long chain of starch with branches in the molecule (amylopectin) the alpha-amylase will break this large piece into smaller pieces by attacking from the middle. Beta-amylase, which

The Tips

- **Maintain a consistent level of water to grain each time you mash. Use 1.25 quarts per pound as a starting point.**
- **Sparge with plenty of water on top of the grain bed to avoid channeling.**
- **Don't be afraid to recirculate your wort. It helps keep the lipid content down.**
- **For highly modified malts mash at a slightly higher temperature than normal. This helps break down the carbohydrates, which makes for more effective sparging.**

attacks from the ends, can now produce fermentable sugars out of the smaller starch pieces. So because the beta thrive in lower temperatures than alphas, I mash a little lower than most people would. I find I get better conversion that way.

Now if your malt is highly modified, it is sometimes necessary to mash a little higher because it is ready to be broken down into carbohydrates; the enzyme that does that works best at high temperatures. Domestic two-row at 149° F works, plus or minus a degree. That should go about an hour to 1.25 hours. When the starch test is negative, start to sparge with 170° to 172° F water.

Make sure you have plenty of water on top of what you're sparging. That way you won't create as many channels. I try to keep a good two to three inches of water on top to maintain a good filter all the way around. Don't be afraid — at home especially — to recirculate your wort through the grain bed. Let it sit another 15 minutes to establish a little more of a filter bed. Recirculation can help keep your lipid content down as the last of the wort comes. Lipids inhibit foam retention later on and somewhat in fermentation. Recirculation is almost like establishing a drain of rock and sand — one layer of heavy rock, then smaller and smaller particles on top. Turn that upside down and that's what your mash looks like.

If I do a half batch, it's not necessary to underlet because there is no danger of having a stuck mash. But if I'm brewing a stout, it's necessary to underlet with a little hot water. At home I can't see that would be too necessary if you recirculate really well. ■

Rye-vival: Brewing With the Black Sheep

by Alex Fodor

Rye, the most distinctive of grains, conjures up strong reactions. Some beer enthusiasts prefer their rye bread with pastrami and a dollop of mustard while others prefer it on someone else's plate. One could expect no less from a personality-packed dark, pungent grain that grows where other grains simply whither.

Rye can be equally stubborn in the brewhouse, where it is added to the mash in the form of malted or flaked rye. Huskless, like wheat, and high in gummy beta-glucans, rye tends to slow mash runoff.

Although clearly the black sheep of brewing when compared with barley or wheat, rye has maintained some traditional strongholds in the brewing world. The juniper-tinged Finnish brew, Sahti, composed of up to 10 percent rye malt, remains a popular beer for both homebrewers and commercial producers in its native country. Hailing from the rye bread basket of eastern Europe is kvass, the Russian beer made from fermented rye bread. This low-alcohol drink is mild enough to be consumed by the whole family and derives its effervescence from its continuing fermentation at the time of consumption.

A handful of more conventional beers also boast a portion of rye in their recipes. The German beer from Schierlinger brewery called Roggen (German for rye) derives its distinctive character from a whopping 60 percent malted rye, the remainder consisting of equal amounts pale two-row malt and crystal malt. The reddish-brown brew has bitterness of 16 IBU, a color of 16° Lovibond, an alcohol content of 3.9 percent by weight, and an original gravity of 1.048. Hefe-weizen yeast adds a spicy phenolic flavor to this cloudy, bottle-conditioned brew. Michael Jackson describes the rye character of Schierlinger Roggen as "a definite minty, bittersweet spiciness."

A double-decoction mash ends in an unusual lauter designed to tame the ornery rye malt. Rotating knives break up a purposely thin lauter bed while positive CO_2 pressure increases the flow rate through the otherwise tardy grains. Two additions of German Perle hops are made but contribute little noticeable aroma to the beer. Schierlinger Roggen is available in North America through importer B. United International.

Another widely available rye beer started as part of Redhook Ale Brewery's Blue Line experimental beer series. It was so well received that the brewery added the line to its standard offerings. Redhook takes a subtler approach to brewing with rye than its fellow rye brewers in Germany. Jim Galiardi, brewmaster at Redhook's Fremont brewery, warns against using too much rye.

"It's a fine balance between too little and too much," says Galiardi. "If you go overboard, the rye flavor will overpower the beer."

He also points out that flaked rye contributes a stronger grassy rye flavor than the malted grain. Redhook rye is a refreshing medium-bodied brew with a hint of rye, a subtle hop aroma, and a yeasty fruitiness. It is an unfiltered golden-colored ale with a crisp, assertive hop bitterness. The approximate grain bill has 10 percent flaked rye, 4 percent wheat malt, and 5 percent Munich malt, with pale two-row filling out the difference. The beer has a bitterness of 35 IBU, a color of

6° Lovibond, an alcohol content of 4.4 percent by weight, an original gravity around 1.052, and a finishing gravity of about 1.012.

The hops used include Mt. Hood for bittering and Hersbrucker for aroma. The yeast used should contribute a mild fruitiness with little or no diacetyl character. Redhook adapted its brewing process for the rye beer by including an 89.6° F beta-glucan rest and thereby cut a few hours off of the lauter time.

Although rye does contribute a certain recognizable character to beer, defining a style might be a little presumptuous. Clearly every rye beer discussed has a very different flavor profile. The rye beer style might be best described as any beer that contains a significant portion of rye. The rest is open to interpretation.

Homebrewing With Rye

Rye extracts are hard to find. Consequently the following beers all require some sort of mashing process. Because the Roggen has 60 percent malted rye, your only option for a clone is an all-grain recipe. To make the lauter easier, it is a good idea to allow a 10- to 15-minute beta-glucan rest at 90° F. Adding a filter aid such as rice hulls, barley husks, or oat husks at a rate of one small handful per pound of rye will also ensure a smooth lauter.

Sehr gut Roggenbier
(5 gallons, all-grain)

The following beer is a lightly hopped amber rye beer reminiscent of Schierlinger Roggen. Hefe-weizen-style yeast adds a distinctive aroma. Try a double decoction at the mash temperatures given.

Ingredients:

- 5 lbs. rye malt
- 1.6 lbs. crystal malt, 40° Lovibond
- 1.6 lbs. two-row lager malt
- 0.6 oz. Perle hops (10% alpha acid), 0.3 oz. for 60 min., 0.3 oz. for 30 min.
- 1 pint of liquid hefe-weizen yeast culture (Wyeast 3068 or 3056)

Step by Step:

Mash grains into 3 gals. of water. Raise temperature to 90° F and hold for 15 minutes. Raise temperature 2 degrees per minute for 30 minutes until mash is at 150° F. Hold for 60 minutes. Sparge to collect 7 gals. of wort.

Boil for 30 minutes and add 0.3 oz. hops. Boil 30 more minutes and add second 0.3 oz. hops. Boil 30 more minutes. Total boil time is 90 minutes. Aerate and cool to 65° F. Add yeast.

Ferment at 65° F until finished. Rack and age at 55° F for two weeks. Keg or bottle beer unfiltered.

OG = 1.048
FG = 1.012

Miss American Rye
(5 gallons, all-grain)

This beer is inspired by Redhook Rye. If you can't find Hersbrucker

hops, try Hallertauer. Have fun with it; the rye's the limit.

Ingredients:

- 6.75 lbs. two-row lager malt
- 0.75 lb. Munich malt
- 1 lb. rye flakes
- 1.5 lb. wheat malt
- 1.9 oz. Mt. Hood (5% alpha acid), 1 oz. for 60 min., 0.9 oz. for 30 min.
- 1.5 oz. Hersbrucker (4% alpha acid), 1 oz. for 15 min., 0.5 oz. at finish
- 1 pint ale yeast culture

Step by Step:

Mash grains into 3 gals. of water. Raise temperature to 90° F and hold for 15 minutes. Raise temperature 2 degrees per minute for 30 minutes until mash is at 150° F. Hold for 60 minutes. Sparge to collect 7 gals. of wort.

Boil for 30 minutes and add 1 oz. Mt. Hood hops. Boil 30 minutes and add 0.9 oz. Mt. Hood. Boil 15 more minutes and add 1 oz. Hersbrucker hops. Boil 15 more minutes. Total boil time is 90 minutes. Add 0.5 oz. Hersbrucker hops just before cooling. Aerate and cool to 65° F. Add ale yeast and ferment at 65° F until finished.

Age at 50° to 55° F for two weeks. Keg or bottle unfiltered.

OG = 1.052
FG = 1.012

Miss American Rye
(5 gallons, extract and grains)

Because there is less pale malt in the partial mash than in the all-grain, six-row malt is used to increase the total enzyme content.

Ingredients:

- 3 lbs. six-row lager malt
- 0.75 lb. Munich malt
- 1 lb. rye flakes
- 0.5 lb. wheat malt
- 3 lbs. liquid pale malt extract
- 1.9 oz. Mt. Hood (5% alpha acid), 1 oz. for 60 min, 0.9 oz. for 30 min.
- 1.5 oz. Hersbrucker (4% alpha acid), 1 oz. for 15 min., 0.5 oz. at finish
- 1 pint ale yeast culture

Step by Step:

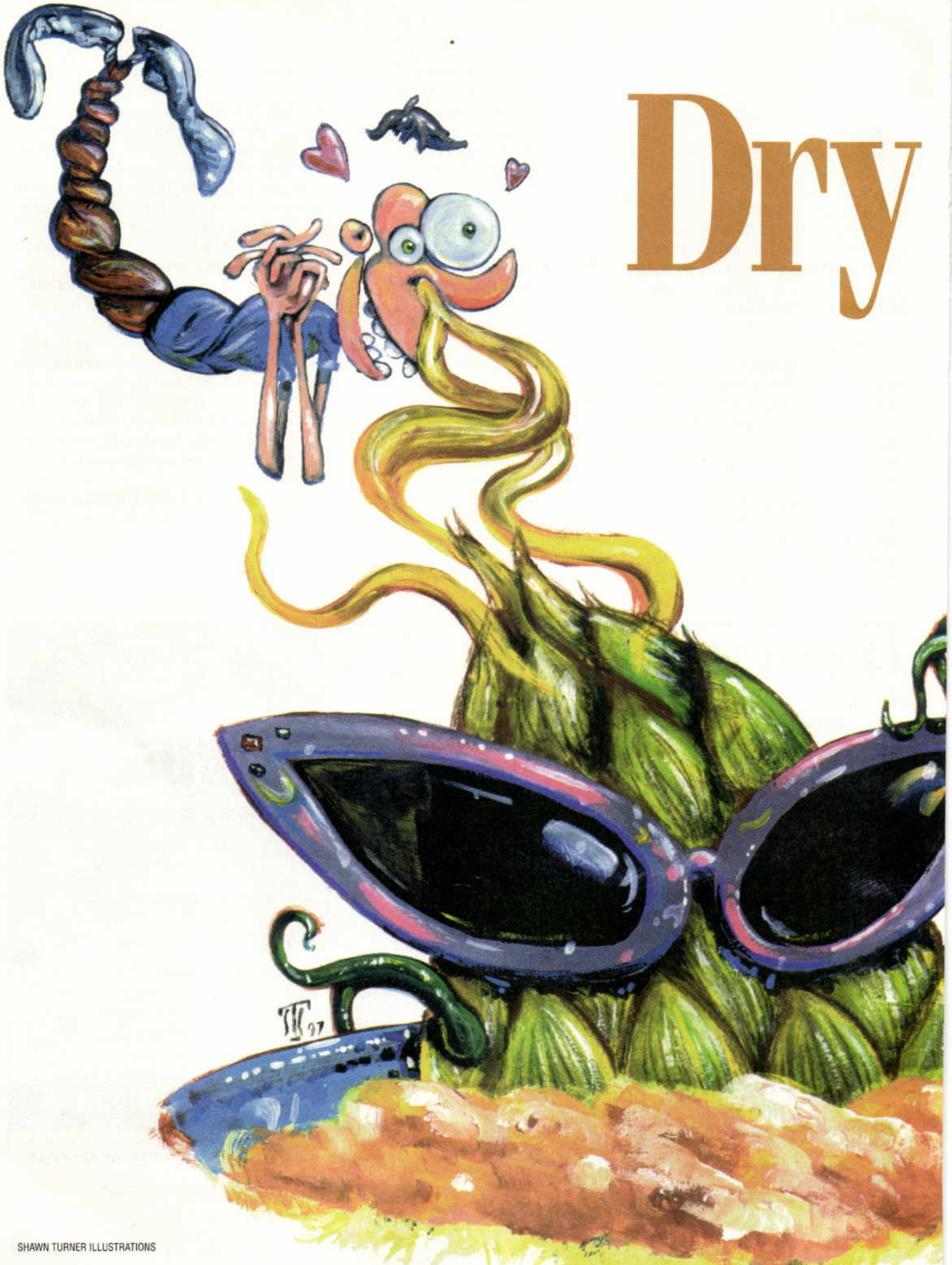
Mash grains into 2 gals. of water. Raise temperature to 90° F and hold for 15 minutes. Raise temperature 2 degrees per minute for 30 minutes until mash is at 150° F. Hold for 60 minutes. Sparge to collect 4 gals. of wort.

Add an additional 3 gals. of water to the kettle to make a total of 7 gals. Stir in the liquid extract while heating the mixture to a boil. Boil for 30 minutes and add 1 oz. Mt. Hood hops. Boil 30 more minutes and add 0.9 oz. Mt. Hood. Boil 15 more minutes and add 1 oz. Hersbrucker hops. Boil 15 minutes more. Total boil time is 90 minutes. Add 0.5 oz. Hersbrucker just before cooling. Aerate and cool to 65° F. Add ale yeast and ferment at 65° F until finished.

Age at 50° to 55° F for two weeks. Keg or bottle unfiltered.

OG = 1.052
FG = 1.012 ■

Dry



SHAWN TURNER ILLUSTRATIONS

Hopping for Great Aroma

by Mark Garetz

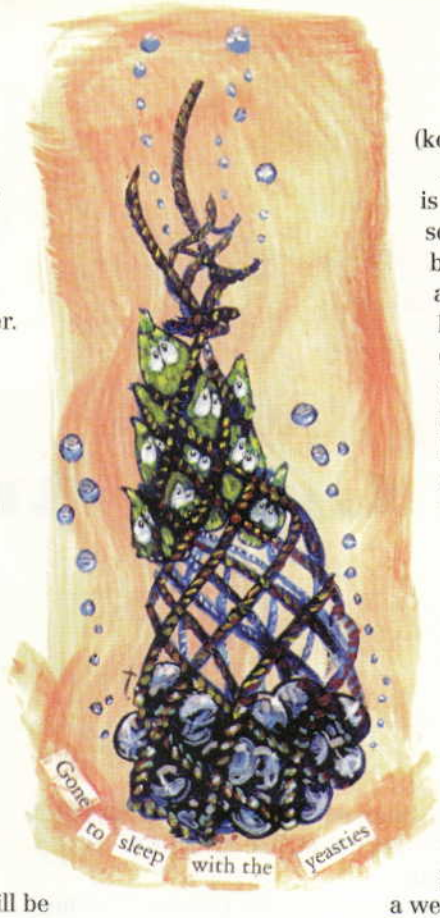
If you want your beer's hop nose to knock your socks off, maybe it's time to try dry hopping.

Dry hopping is the process of adding hops to beer at some point in the process well after fermentation has begun. Dry hopping imparts a fresh hop aroma to the beer without adding any bitterness. It also adds a unique taste character.

Adding hops later in the process preserves the flavor and aroma from the hops' oils. These are distinct from the alpha acids that give the beer its bitterness. The oils add no bitterness, just flavor and aroma. During the boiling process, nearly all of the hop oils evaporate; the longer the boil time the more oils are lost. The hops put in at the beginning of the boil for bittering lose almost all of their oils. Those added near the end of the boil don't lose as much oil but still lose quite a bit. And the heat of the boil induces chemical changes in the oils, so even those that are left lack the aroma of fresh hops.

So if we want to add hops to impart a fresh hop aroma to the beer, when is the best time to do it? Traditionally, dry hopping was done in the serving cask. A charge of fresh hops would be added to the cask right before the bung was hammered in. If you keg your beer, you can add the hops to the keg. This gives the beer the

best and freshest aroma. But what if you bottle? It makes sense to take a step backward in the process and add the hops to the fermenter. But there is a right time and a wrong time to do it.



The Right Time

The right time to add the hops to the fermenter is just as the fermentation starts to slow down. This is usually apparent by the head (or kraeusen) starting to diminish, which usually coincides with a decreased bubbling in the airlock. Typically this will be three to four days after fermentation has begun. If you use a single-stage fermenter, just add the hops. If you use a secondary fermenter, rack the beer now and add the dry hops to the secondary.

The wrong time to add the hops is at the very beginning of fermentation, or close to it. Hops are not a sterile product and putting them in too early can cause a contamination in your beer.

If you wait for the right time, several factors are at work in your favor. The beer's pH will have fallen to the point where the organisms on the hops can't survive, and the alcohol now present also serves to kill them. You also have a healthy yeast population in your beer, and this yeast will tend to starve out the other organisms. There is no risk of contamination from dry hopping if you do it at the right time.

The final good reason for waiting is that during the initial stages of fermentation large quantities of CO_2 are being generated, and this will scrub the hop aroma right out of your beer.

Pellets or Whole Hops?

How you dry hop depends on what type of hops you are using (pellets or whole), and where you are dry hopping (keg or fermenter).

As far as dry hopping is concerned, there are some major differences between using pellets and whole hops. Pellets initially float on the surface but eventually settle to the bottom. Whole hops float on the surface nearly all the time.

The hop oils are contained in the hops' lupulin glands. These have been ruptured in pellets but are largely intact in whole hops. All of the hop oils are available to get into the beer almost immediately with pellets and may take a week or two to get a decent amount of oils released when using whole hops.

One note about pellets: Sometimes adding pellets can appear to kick fermentation into a higher gear for a while. While this is sometimes a consequence of rousing the yeast when stirring in the pellets, it is most likely just CO_2 being released. The pellet particles become thousands of bubble nucleation points and cause lots of CO_2 to come out of solution. So be prepared for this!

Fermenter or Keg?

Let's take the fermenter case first. If you add pellets to the fermenter, eventually they will sink to the bottom. The hop oils will be released into the beer in a few days, usually by the time the hops have settled out. All that you have to do is carefully rack the beer off the yeast and hop sediment. A rule of thumb is to leave the pellet hops in the beer for at least a week before bottling. This gives them time to settle and time for the aroma to become infused.

If you use whole hops in the fermenter, they will mostly stay on the surface. This makes it easy to rack out from under them — they will float down on the surface of the beer as you transfer. But the disadvantage is that a good portion of the hops' surface area is sticking up in the headspace and in that position they're not imparting anything to the beer.

The solution is to put the hops in a mesh bag and then weight the bag so that it sinks. Marbles are a popular item to use as a weight. But it takes a good handful of them, not just a few. Whatever you use, make sure it can be sanitized and won't react with the beer. Don't use lead fishing weights! You will want to leave whole hops in the beer for at least two weeks.

If you are adding hops to the keg, you'll definitely want to contain them somehow. If you're using pellets, a bag-and-weight system is a great idea. Otherwise you're going to keep sucking pellet particles through the dip tube and they'll surely clog the keg connectors. If you are using whole hops, you can use almost any fine mesh bag, but don't pack the hops too tight. You want the beer to mingle with the hops. As with using the bag in the fermenter, you'll want to weight it somehow. Or a handy tip is to wedge the bag between the keg wall and the dip tube, as near to the bottom as possible.

If you use pellets, you'll notice that the hop aroma and flavor in the beer can be overpowering at first. Because the lupulin glands are burst, all the oil goes into the beer at once. Just be patient and it will mellow out. On the other hand since the beer is usually cold, the hop oils are released very slowly from whole hops when they're in the keg. This acts like a time release effect and keeps the aroma level reasonably constant over time.

How Hoppy?

Like almost everything in brewing, how much hops to use when dry hopping depends on a lot of factors. How hoppy do you want the beer to be? What kind of hops are you using? What is their oil content? Where are

you dry hopping? How much time do you have? What is the temperature?

You'll have to determine on your own how hoppy you like your beer. Some hops have a more potent or distinctive aroma than others. This relates in part to the amount of oil they contain but also relates to a particular variety's aroma profile. For example Cascade usually has reasonably high oil levels and has a very distinctive, citrusy aroma that comes through even when the oils are lower. (Oil levels in the hops start out high near harvest time and get lower as the hops age.) East Kent Goldings, on the other hand, typically has lower oils to start with and a mellow aroma that has a hard time competing with the other beer flavors. To put this in perspective, it would be common to use 1.5 ounces of Cascade in a five-gallon batch, while you might need three to four ounces of East Kent Goldings to get the same degree of hoppiness (although the aroma and effect would be different).

As for what varieties you can use, there are no rules, so feel free to experiment (you might just invent a new style!). The most popular hop for dry hopping in the United States is Cascade. But you can use any hop with decent aroma. The newer high-alpha hops are being used a lot these days, with Centennial and Columbus heading the list. Smell the hop while it's fresh. If you can imagine that aroma in your beer, go for it! You might also experiment with mixing varieties.

Temperature also plays a role in the quality and strength of the hop aroma. Warmer temperatures extract more oils than colder temperatures — this is particularly evident with whole hops. In a fermenter a rule of thumb is to dry hop near 70° F.

So it's hard to answer the question of how much to use. If you are a hophead, always use more hops than less if there is a question. Fritz Maytag, owner of Anchor Brewing Co., once said that if you're going to err when it comes to dry hopping, always err on the high side. You want folks to know the beer's been dry hopped and not have to search really hard for that flavor. Start out with an ounce to 1.5 ounces in a five-gallon batch and adjust from there.

Just remember that the hops with which you dry hop must be absolutely the freshest possible. Any off-flavors you smell in your hops will end up in your beer. So if your hops smell cheesy or like an old gym sock (both signs of oxidation), toss them — in the trash that is, not in your beer!

Mark Garetz is the author of the book Using Hops, The Complete Guide to Hops for the Craft Brewer *and is the owner of HopTech Homebrewing Supplies and HopTown Brewing Co.*

MICRO-MALTSTER

Preserving the Tradition of Floor Malting

by Kiana Dicker

Thick leather belts rhythmically rattle sturdy, dust laden, story-striding machinery into action. Iron clogs clatter. Ancient pulleys wheeze. There is a sweet smell in the air. The atmosphere is Victorian.

This is not a working museum but Tuckers Maltings in Newton Abbot, Devon, England. Here barley is transmuted into malt in age-old fashion. The Tucker family, with roots as seed merchants and maltsters stretching back locally into the 1600s, established the malthouse at the turn of the century and still runs it today in the traditional way.

Malt is partially germinated barley baked into a crunchy sugar. It is the key to successful beer brewing, a subject close to the Englishman's heart. Malt gives beer not only color and flavor but also alcoholic content. In days past pubs brewed their own beer and every community had a malthouse. Now, with brewing dominated by commercialism, there are only a handful of traditional malthouses left in Britain. Tuckers is the only one open to the public. And although malt is also used in whiskey, cookies, and candies, Tuckers' malt is sold only to breweries.

Managing Director Richard Wheeler claims the secret to a good beer is "best quality malt. It gives the minimum of problems and more beer per unit. It might cost more, but it produces more. We survive, touch wood," says the master maltster tapping his chair leg, "on producing quality."

And Tuckers is not only surviving but thriving on the double businesses of supplying some 30 small breweries, including the brewery that produces Thomas Hardy's Ale, and running public tours.

Opening the Doors

In the late 1980s Wheeler decided to open the maltings to the public. At that time the malt business was failing but tourism was booming. A handsome profit could have been netted by selling the elegant Victorian building to developers. But the management

SOAK THE RAW BARLEY

Grain soaked in a large vat (cistern) for 40 hours or more.

Water is changed periodically to avoid stagnation.

May aerate by spraying water continuously while the grain soaks.

After soaking, grain is 45 percent water.

KIANA DICKER PHOTOS


TUCKERS
MALTINGS
GUIDED TOURS

at Tuckers felt a responsibility not only to perpetuating a traditional industry with a history dating to the ancient Egyptians but also to staff, many of whom have fathers, grandfathers, and great-grandfathers who worked for the company. Wheeler, a distant relative of the Tuckers, has been with the company for more than 30 years, as was his father before him. There is also a long lineage of pest control officers; these rat catchers are furry, purr, lap milk, and love to be stroked by visitors.

Before opening to the public, the building had to be updated and thoroughly cleaned out. Making the building safe enough for the fire officer was a nightmare, as was removing almost 100 years of dirt and debris that crowded corners of unused areas. A treasure trove of old documents and antiquated machinery also came to light and are currently on exhibit.

With the changes women joined the workforce at Tuckers for the first time; eight tour guides were added to the existing staff of seven maltsters, reduced from a pre-war workforce of 40.

Grain is laid down on the 140-foot germinating floor at a depth of six to nine inches and left to germinate for several days.

On Tour

The Tuckers tour combines historic displays of what a malthouse would have been like in centuries past and a thorough study of the malting process, including chances to taste the grain in different stages of malting. Tour guide Pat Walker, whose favorite tipple is Ringwood's Old Thumper brewed with Tuckers malt, has difficulty getting the children in her group past the Discovery Center with its 56-pound pulleys to yank and an assortment of games and hands-on malting displays.

But the tour also highlights the giant storage bins containing 50 tons apiece of barley. In the bins the barley is dried to 12 percent moisture to stop germination and mildew. Beyond the bins is a cavernous, wooden-floored room peopled by period-dressed mannequins executing malting tasks. There is opportunity to taste different malts from the pale and sweet for light beers through the ambers to the dark, longer- and hotter-baked malt for stout.

Next stop is a canvas belt carrying the grain to a wooden screener. The bill of receipt for £95 ($150) worth of malt from 1900 hangs on the wall. A network of wheezing belts and huffing motors sifts five tons of barley an hour. The machines select the juicy grains that head for a 12-hour soak in the steeping tank at 55° F. The grains are then drained for another 12 hours and the process repeats itself for 2.5 days.

Through the gloom visitors stumble on ancient, uneven floors then descend and climb a never-ending web of well-worn wooden stairs. Although electric light has replaced the old gas mantle, it is still a dim place and mysterious shadowy forms loom — sometimes a display model, sometimes a maltster. The workers shyly grin and shuffle under the attention of the tourists.

The most popular tour stop is the actual floor malting room. An explosion of camera flashes lights up the work. Twelve tons of honeyed malt needs to be turned every three hours to stop it from matting into a carpet on the 140-foot germinating floor. Children giggle as they try their hands at pulling the giant wooden rake. Everyone tastes the

ALLOW BARLEY TO GERMINATE

Water drained and barley is removed from the cistern.

"Couching" may occur here. The grain is piled and allowed to germinate before being spread.

Barley is spread across the floor, creating a "grain bed," three to 12 inches thick.

Grain is turned often, germinating as long as 10 days at 50° to 60°F.

MODERN MALTING

Most malthouses built in the last 50 years are pneumatic. The main difference between pneumatic malting and floor malting is that pneumatic malting is a mechanical process that takes place in a controlled environment.

- Soaked grain is placed in sealed drums or tanks.
- Temperature-regulated air is circulated through the tank.
- Drum or tank is rotated and warm air is pumped in while old air and carbon dioxide are pumped out.

sweet stuff that has been laid down for four or five days to allow the starches to convert to maltose, a fermentable sugar.

Below, in the "stoke hole" furnace of the kiln, one shudders at the reality of working conditions in olden days marked by long, hot hours shoveling coal, inhaling dust and fumes, and by boy chimney sweeps. Today the railway sidings that brought the coal to the maltings are idle, although the mainline train to London still whistles by at high speed. The kiln is now powered by gas, which replaced oil after the price increases of the 1970s.

When the germinated barley shoot, known as green malt, is almost as long as the grain, it is time to head for the kiln. The grain bakes for two days at 150° to 195° F. Screened again to remove the "malt comes," which is the chaff removed from the dried malt. Now the malt — which looks very much like the barley from the start of the process but tastes much crunchier and sweeter — is ready to be cleaned and bagged.

The Current Malthouse

Today the small-brewery business is booming and tourism is failing, although Tuckers still gets 12,000 visitors trooping through its doors each year. "We're still doing what we do best: making quality malt," says Wheeler. "But we like having visitors. With people watching, it keeps us on our toes. Our maltsters are proud of their work and I encourage them to stop and have a chat."

Visitors can sample beer-inspired, malt-intense cooking in the John Barleycorn Restaurant, but they demanded a taste of the finished product. Three years ago John Lawton and his wife set up the Teignworthy Brewery at Tuckers Maltings. Their beers have garnered many awards and now the tour ends with a glass of their Edwin Tucker's Devonshire Prize Ale.

Although power shovels have replaced spades and malt goes out in 50-kilogram bags, not 1.5 hundredweight burlap sacks, Tuckers Maltings is rooted in heritage and history, producing a malt for real beer that belies the metal germinating drums and sugar additives of modern commercialism.

"It's a good company to work for," Walker says. "Even though conditions in the past were not pleasant to contemplate, they still took care of their workers as best as they knew how. It's family run and traditional — we don't even have computers."

You can find Tuckers Maltings at Edwin Tucker and Sons Ltd., Teign Road, Newton Abbott, Devon TQ12 4AA, United Kingdom. You'll know when you're there by the barley grains lining the gutters at the side of the road. The maltings are open to the public daily from Easter through October. Every April some 30 members of the Society of Independent Brewers stage a four-day beer festival at Tuckers Maltings.

Period-dressed mannequins, based on real maltsters from the past, recreate the atmosphere of the original maltings.

KILN DRY THE BARLEY TO STOP GERMINATION

Kilning stops the natural growth process and stabilizes enzymes. Also adds color and flavor. Takes three to five days.

Grain is dried in a kiln at 90° to 100° F for two days. Higher drying temperatures produce darker malts.

Grain is spread on a perforated floor at a bed depth of nine to 12 inches. 180°to 220° F air is pumped through the floor and malt is turned to ensure even color.

Drying reduces malt moisture from 40 percent to 5 percent.

PHOTO COURTESY OF BRIESS MALTING CO.

MAKE YOUR OWN MALT

by William Starr Moake

TODD HAMMOND

If you want to take your homebrew one step closer to 100 percent homemade, become a maltster.

A maltster sprouts whole grain and adds a little heat to create the malts used in brewing. If you have a kitchen oven and large baking pan and can read a thermometer, then you possess all the equipment and skills required to make your own malt from scratch.

Barley by Any Other Name

This takes you another step toward putting the "home" in homebrewing. It will also save you a little money. It's important, however, when buying whole barley to make sure it hasn't been treated with pesticides or other chemicals that can make you sick.

Whole barley means the grain with the husk on. Pearled barley

and other kinds of de-husked barley cannot be used because the husk plays a vital role in the lautering process of mash brewing.

Likely sources for whole barley are country stores that cater to ranchers and pet shops that sell bird seed. If you are lucky enough to live in a region where these grains are grown, you might find a real bargain by going directly to the farmer to buy a few bushels at harvest time in August and September. Before buying a large amount, test one pound to make sure it is viable seed capable of germinating. (At least 90 percent of the grains should sprout when you follow the procedure outlined below.) If it isn't viable, try another supplier or a different brand.

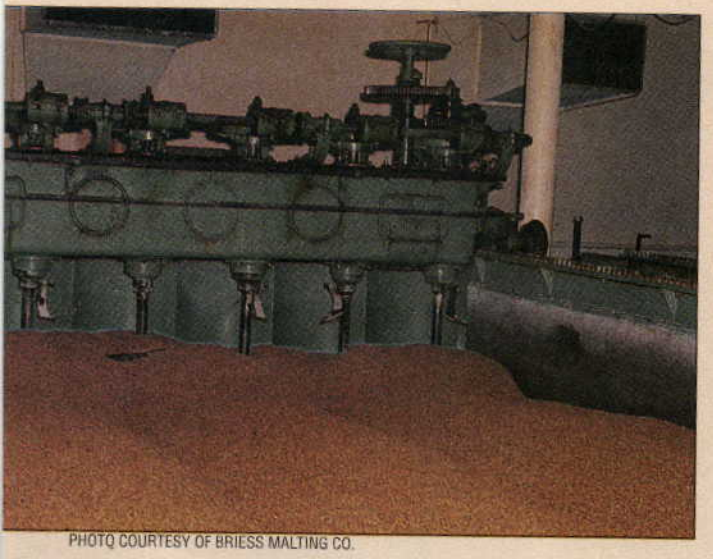


PHOTO COURTESY OF BRIESS MALTING CO.

Malt like the professionals do only simpler: with a kitchen oven, a large baking pan, and a thermometer.

You can also malt adjunct grains such as wheat and corn. Soft wheat berries are much better for homebrewing than hard wheat and can be found in health-food stores. Look for whole corn in pet shops and cattle-feed stores. Again, germinate a small amount before buying in bulk. Malted wheat can be used for up to 50 percent of the grain bill with good results, but malted corn will produce a disagreeable cidery flavor if it exceeds 20 percent.

Just remember that all grains are not created equal when it comes to homebrewing. Experiment with different varieties to see which one produces the best-tasting beer, and then stick with that grain.

How to Germinate

Raw barley will be your main ingredient. Until you get malting down pat (your potential extraction rate will improve with practice), use two pounds of whole barley for every gallon of all-barley malt homebrew you intend to make. Later you can alter the amount based on the specific gravity you wish to achieve.

Begin by thoroughly washing the barley in clean water to remove the chaff, which will mostly float to the surface. Drain and place in a covered container with enough water to reach two inches above the grain.

Let the grain soak for eight hours, then drain and let stand for eight hours without water. After a final soaking of eight hours, the tips of the barley grain should begin to show whitish bulges. These are emerging roots.

The steeping regimen is the same for soft wheat berries and whole corn as it is for barley. Grains should never be soaked for longer than eight hours without a rest because the kernels might "drown" (die from lack of oxygen) and never sprout.

After steeping, spread grain over paper towels in a large baking pan and place inside a black trash bag sealed air tight to hold in the moisture and keep out dust.

At room temperature barley can take as little as four days and as long as six days to sprout to the proper size. The key factor is to stop germination when the main shoot (not the hair-like rootlets), called the acrospire, is three-fourths to one length of the grain. This produces fully modified barley malt that can be mashed with only a short protein rest and can help to avoid sluggish fermentation and hazy beer.

Because wheat and corn need less modification than barley, a sprouting time of three days is usually sufficient.

Wet germinated barley contains about 50 percent more weight in absorbed water. This means your original test pound should now weigh about 24 ounces.

Kilning

Green malt is converted into pale malt or crystal (caramel) malt by drying it at different temperatures.

To make pale malt place the large baking pan of green malt over a heat source of 100° to 125° F for 24 hours or until the malt contains 12 percent moisture (18 ounces for the original test pound). The heat source can be an oven with only the pilot light on or the top of a gas refrigerator.

Final drying takes place in your oven at a temperature of 140° to 160° F. To maintain this temperature range use your floating thermometer and turn on the oven for brief periods until the moisture content is reduced near 2 percent to 6 percent. The malt will weigh the original amount (16 ounces in the case of the test pound). The weight of the moisture in the malt is compensated by the absence of debris such as husk dirt that was washed off the grains during soaking. Turn the malt every half hour, and dry the malt slowly, raising the temperature over time to protect the starch-converting enzymes.

Malted wheat and corn should be dried entirely at the lower temperature of 100° to 125° F.

The finished barley malt should be crunchy to the bite and taste slightly sweet. If it is rock hard and the interior glassy in appearance, don't use it because something went wrong in the germination. Try another batch and be more careful the second time around.

To make crystal malt place green malt on a cookie sheet in a 212° F oven for one hour or until the grains turn golden brown. Crystal malt imparts sweetness and brown color to homebrew without the burnt flavor characteristic of roasted malts.

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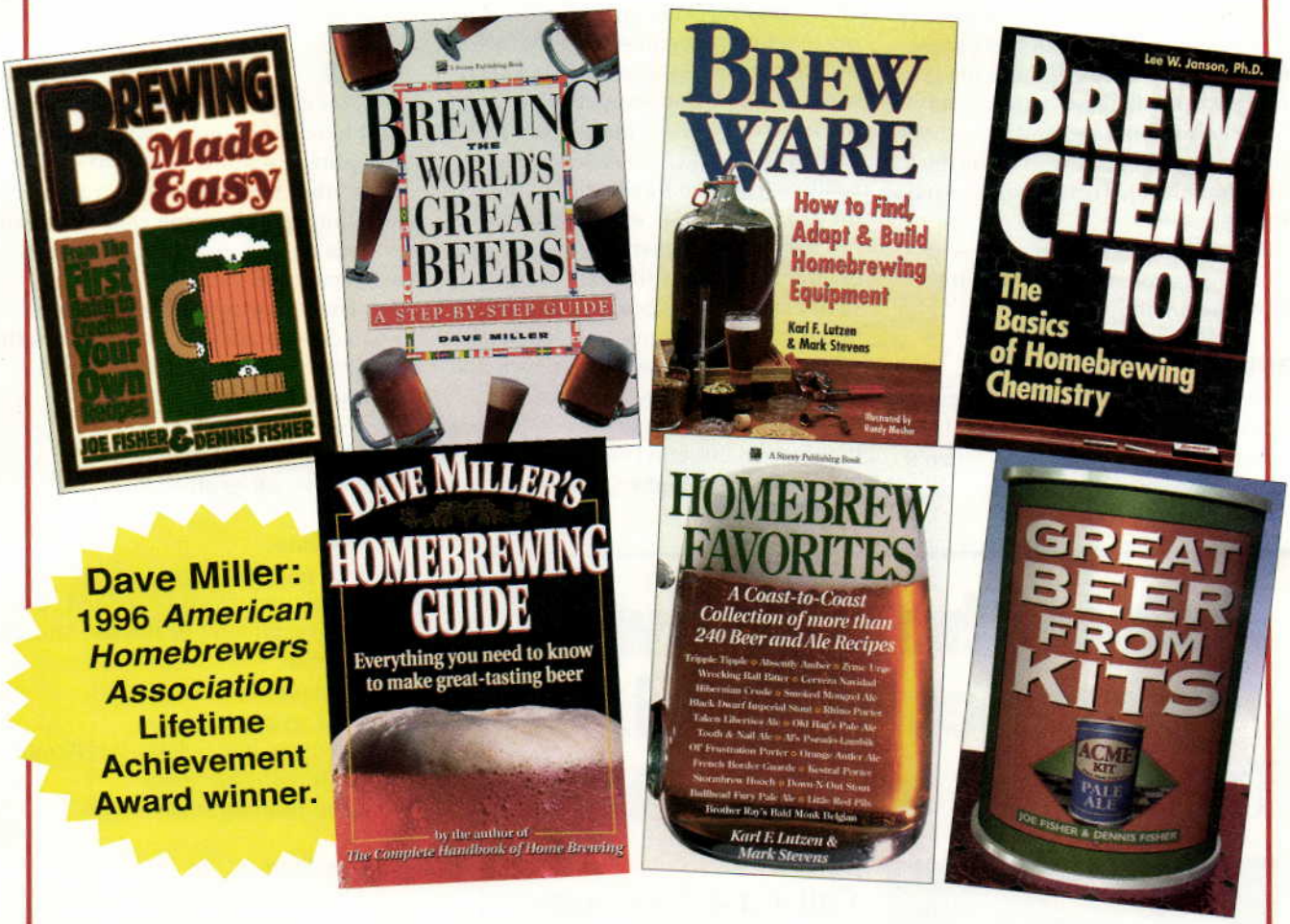

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Other Specialty Malts

Besides crystal malt, you can also make the other specialty malts needed for porter, stout, and other styles of dark homebrew. The starting point is your homemade pale barley malt.

To create a reasonable facsimile of Munich malt, simply toast pale malt in a 350° F oven 10 minutes for ounces and 20 to 30 minutes for pounds.

Unfortunately, dark roasted grain must be made outdoors as this process releases a horrendous amount of smoke. Wrap pale malt or unmalted barley in aluminum foil and place over a barbecue grill until the grain is dark brown (not black). Turn often to avoid charring.

Malted wheat and corn are used without being roasted to lighten the body of the homebrew.

Drawbacks

Starting with raw barley, you can produced quite good specialty malts. But there are some drawbacks when it comes to homemade pale malt.

For one thing it is lower in enzymes than store-bought pale malt. That means, as a rule of thumb, you have to use one-third more in recipes to obtain the same starting gravity.

For another thing a lot more trub or unfermentable sediment may be produced with homemade pale malt. The extra trub can be ignored or removed by various techniques, but either way it results in a lower mashing efficiency. Because of those factors, try a longer protein rest and a longer mash at a low-end temperature to get the most out of your homemade pale malt. You should also remove the rootlets from the finished malt because they can contribute excess protein.

Last but not least is the problem of dimethyl sulfide (DMS). Certain varieties of feedlot barley produce too much of this compound, which smells and tastes like cooked sweet corn and detracts from the flavor of the homebrew. The precursor compounds that lead to dimethyl sulfide can be eliminated by a higher temperature at final kilning, but this is a dicey proposition as it can also kill the enzymes.

An extra-long and vigorous wort boil of 1.5 to two hours can help reduce the amount of dimethyl sulfide in the final product. If you still end up with a noticeable flavor of sweet corn, try pushing the kilning temperature a little higher or buy a different variety of barley.

Recipe

You can use any recipe for your first batch of homebrew made from homemade malt as long as you remember to increase the grain bill by one-third; if the recipe calls for three pounds of pale malt, use four pounds of homemade.

The following is a recipe for an English-style ale that incorporates the different types of homemade malt outlined in this article.

English Ale
(2 gallons, all-grain)

Ingredients

- 50 oz. pale malt
- 7 oz. malted wheat or malted corn
- 6 oz. crystal malt or toasted Munich-style malt
- 1 oz. dark-roasted malt
- 1/2 tsp. gypsum
- 8 g. Fuggle hop pellets, for 90 min.
- Dry Muntons ale yeast
- 1/3 cup priming sugar

Step by Step

Mash into 6 qts. water at 127° F, then allow 45-minute protein rest at 122° F. Raise the temperature to 151° F and maintain for 90 minutes. Mash out at 167° F and sparge with 6 qts. 170° F water.

Add hops and boil for 90 minutes. Cool to room temperature, aerate, and pitch yeast. When fermentation is complete, bottle with priming sugar and age two weeks before sampling.

If the alcohol content of your first few batches is a little on the low side, don't get discouraged. It will go up as you get better at malting.

And you will have the satisfaction of knowing that, short of planting your own barley and hops, your beer is truly homemade.

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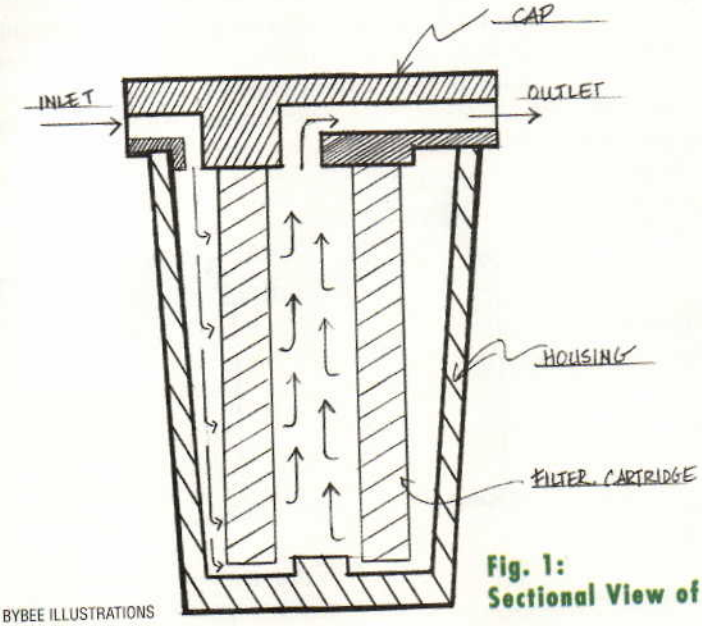
BUD PEEN

PRACTICAL GUIDE TO FILTRATION

by Kirk Fleming

One of the first differences beginning brewers may notice between their creations and commercial beer is clarity — or a lack thereof. I can remember when I'd sometimes run across a slightly cloudy beer and be completely convinced it was spoiled. Of course this was long before I started brewing beer or knew much about it. The haze I'd find in the occasional commercial beer could have been normal or due to contamination; I wouldn't have known the difference.

Now, with the widespread availability of ale on tap, it's common all across the country to find beer that is served less than crystal clear. At a local brewpub (home of what I feel is the best IPA on this earth) the opaque hefe-weizen is one of its most popular beers. In fact



KRISTINE BYBEE ILLUSTRATIONS

Fig. 1: Sectional View of Cartridge Filter

extremely clear or "brilliant" beer is almost a sure sign of filtration and often cause for some negative comments among beer drinkers I know.

Still, there's a huge difference between the appearance of a commercial, stripped lager and that hazy homebrew that refuses to clear on its own. Many brewers would prefer something just a little cleaner looking and would prefer not to wait for months for the last particles to settle out on their own. It's especially satisfying to serve a glass of your own beer that has the color, head, aroma, and clarity of a fine commercially brewed product.

Like every other aspect of amateur brewing, the popularity of the craft has opened up a market niche for filtering equipment — a niche that many enterprising manufacturers and suppliers have been only too happy to fill. If you've thought filtering might be something you'd like to try, there is plenty of filtering equipment available from which to choose. But before getting into equipment, let's talk about haze.

KIRK FLEMING PHOTOS

Fig. 2: Filter Cartridge Varieties

Types of Beer Haze

Any particles of material that stay suspended in the beer and make it less clear than desired can be called haze. There are two broad types of beer haze: haze due to living things (biological), and haze due to everything else (non-biological). Most brewers would probably want to distinguish between biological haze due to bacterial or wild-yeast contamination and that due to brewer's yeast.

Filtration is not the answer to bacterial contamination in beer. The proper fix is better brewing practices. Generally, contaminations will show up with a number of other symptoms — haze will be the least of your problems. For the all-grain brewer one such telltale symptom is the fermentation that never seems to end. An incredible acidity and a gravity that hits 1.000 and continues to drop are sure signs of a long lost batch. Cloudiness isn't an issue.

Likewise, filtration is not really the solution for removing extraordinary amounts of brewer's yeast. With good aeration of the freshly pitched wort, a fermentation allowed to complete, and careful handling of your beer during racking, enough yeast should settle out of the beer to leave it only very slightly hazy. Some yeasts, such as the British ale yeasts from Wyeast Laboratories for example, settle out quickly and very completely, leaving exceptionally clear ale even without fining agents.

That brings us to non-biological hazes. This group is further divided into two major categories: chill haze and permanent haze. If clear, finished beer reveals a haze when chilled to near 32° F but appears clear when allowed to warm to room temperature, the beer is said to have a chill haze. If the uncontaminated beer is hazy at all temperatures, it's said to have permanent haze.

The bulk of these hazes are caused by proteins and tannins. Hazes are formed as proteins and tannins join and get large enough to become visible. It's also possible for amateur brewers to experience starch haze due to incomplete mashing of all-grain recipes or due to the use of more adjuncts than can be converted during the mash.

Filters and Filtering

The concept of filtering is a purely mechanical one and very simple: build a screen with holes in it too small to allow the passage of the particles you don't want in the final product. Then build this screen large enough that as the holes are blocked by particles, enough passageways remain to allow the flow of the liquid you're trying to filter.

Filtering billions of microscopic particles from beer with filters small enough to be practical requires pressure. The beer has to be forced through the filter material under enough pressure to ensure that as the

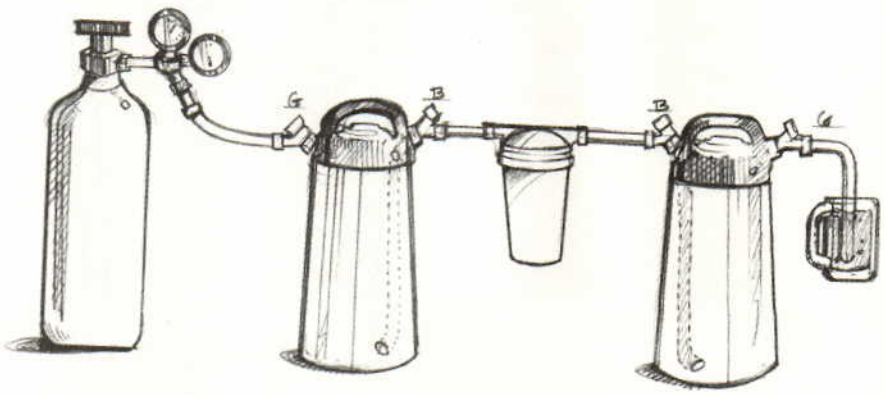


Fig. 3: Filter System Assembly

passageways are plugged, new passageways are found. Therefore, any practical filtration of beer requires the use of pressure to drive the beer through the filter material. The only practical solution for amateur brewers is a complete CO_2 kegging system. The bottom line is this: If you want filtered beer, you'll need to invest in a kegging system.

Filters all share some basic design features. Beer enters an inlet, is forced to pass through some sort of filter material, and exits an outlet. The filter material may be an integral part of the filter housing or may be a removable cartridge. Filters commonly sold for household drinking water use are exactly the same used for filtering beer. Polypropylene is the most common filter material, available in three styles: wound, spun, and pleated.

Filters are most often rated by the average size of the particles they will filter, with the size given in microns. Filters intended to keep out rust particles for household water systems may be rated "nominal 20 microns" for example, while those intended to filter out bacteria may be rated "nominal 0.4 microns."

Fig. 4: Filter Housing Cap

A pleated filter is basically a sheet of very finely spun plastic that is folded, or pleated, much like an auto air cleaner. The pleating increases the surface area of the filter (more passageways) while keeping the overall size of the filter to a minimum. The liquid to be filtered is forced from the outside of the pleated cylinder to the center, then out through the filter housing outlet (Figure 1, page 39).

A wound filter looks like nothing fancier than a spool of white cord. The plastic fibers are first made into a heavy cord about two millimeters in diameter, then the cord is wound onto a perforated plastic, cylindrical spool. The liquid to be filtered is forced to pass from the outside of the winding to the inside, through the perforated

cylindrical spool, then out through the filter housing (Figure 1). Wound filters are usually available only in a 20-micron rating and are useless for filtering anything but trub from your beer.

Spun filters look a little like stiff foam packing material and are usually available with a five-micron rating. The cartridges have the same overall dimensions of the pleated and wound filters, and load the same way into the filter housing.

An important aspect of these filters is their rated efficiency. The efficiency rating of a filter reflects the percentage of passed particles smaller than the filter's micron rating. For example for a 0.5 micron pleated filter rated 99.8 percent efficient (a $35 to $50 filter cartridge), only 0.2 percent of the particles it allows to pass through will be larger than 0.5 microns.

Although the spun filters available at plumbing or building materials stores are rated "nominal five microns," usually they don't have efficiency ratings shown.

Ceramic materials are also used for household filtration systems, particularly those that are intended to remove bacteria. These filters are too fine for beer filtration use because they remove particles so small that color and flavor are degraded. Such extremes of filtration are used in the commercial megabreweries, since neither substantial color nor overwhelming flavor are desired properties of the super-light lagers.

If you want to experiment with the variety of filter cartridges available, then choose a filter system that supports replaceable filter cartridges. After looking around at the products available, you'll discover that many cartridges work in several popular canisters. By choosing a system that's well supported by a local store or other supplier, you can decide for yourself if a 0.5 micron filter affects taste or if a one-micron filter leaves your beer clear enough.

Filters suitable for beer are available from many sources, including your favorite homebrew supply shop, many mail-order shops, and even the local home improvement or plumbing shop. Most of the filters sold for homebrewers are in fact just "under-sink" or "whole-home" filter canisters with replaceable cartridges. These systems are built to be plumbed into your household plumbing with standard pipe fittings and can be easily set up with hose barb fittings for both inlets and outlets. Three filters are shown in Figure 2 (page 40). Two have re-usable, replaceable cartridges, while the third is a low-cost unit with a non-replaceable filter that can be re-used.

An advantage of selecting a filter from your homebrew supply shop or a homebrew mail-order house is that it will come with all the fittings you need to connect the filter to your CO_2 and keg system, and the supplier will sell a filter that is appropriate for beer filtration. On the other hand if you decide to do it yourself down at the building materials store, find out which cartridges are routinely available.

Preparing the Filter Assembly

As always, everything that comes into contact with the beer should be sanitized, and you always want to avoid aeration. With a CO_2 kegging setup, it's fairly easy to meet both requirements. These procedures apply to the canister-type filters available at plumbing shops, hardware stores, and at all the nationwide home improvement chains.

First, filter housing caps generally have inlets and outlets threaded for standard 3/8-inch threaded pipe (3/8-inch NPT), and often come with plastic adapters for 1/4-inch copper water supply lines for under-sink use and for filtering icemaker water supplies. A convenient way to set up these filters is to buy brass adapters with male 3/8-inch NPT on one side and male 1/4-inch copper flare on the other. The 1/4-inch male flare fitting is the same as that found on the quick-disconnect fittings used in home kegging systems. Using two pieces of 3/16-inch vinyl tubing (the kind used for kegging systems) with all ends fitted with 1/4-inch swivel nuts, you'll have a very flexible setup. Figure 3 shows the parts and order of assembly. Use 1/2-inch white Teflon plumber's tape wrapped tightly two to three turns over the threads on the adapters. The final assembly is shown if Figure 4.

Now it's time to assemble the filter and hoses and conduct a pressure test using CO_2 pressure. First, connect a 1/4-inch swivel nut to the pressure tubing attached to your gas regulator using either a hose clamp or a crimp-on clamp. Then, with the filter cartridge removed, fill the lower filter housing with water and thread the cap into the housing, ensuring that the rubber washer or o-ring seal is in place and lightly lubricated with Keg-Lube or similar non-petroleum lubricant. By filling the housing with water, you can safely pressure test the assembly — if a failure occurs, parts won't be launched like missiles by a huge incease in gas volume.

Keeping the filter upright, connect the CO_2 tank gas line to one of the 1/4-inch male flare fittings on the filter housing cap (it doesn't matter which one), and connect the 3/16-inch vinyl hose to the other filter cap flare fittings. Cap the end of this hose with either a picnic faucet or a quick-disconnect fitting. Tighten all joints lightly with a wrench.

Keeping the filter upright, immerse the entire assembly and all joints in a large bucket of water. Make sure the regulator screw is backed out of the regulator (it should jiggle slightly if it isn't applying pressure to the regulator), then open up the CO_2 tank. Proceed slowly and cautiously when pressurizing. Begin applying pressure to the system by threading in the regulator screw, starting at 5 psi, then 10 psi, and finally 15 to 30 psi. During this process, tighten joints moderately to stop bubbles. If you have a lot of leakage at the adapter fittings, you may have to pull the fittings and redo them with more wraps of Teflon, then reassemble and try it again.

Prior to using a new filter cartridge, assemble it in the housing and flush it with water for 10 to 15 minutes or per the manufacturer's instructions. You can do this in the kitchen by using the same setup used for a chiller coil. With a garden hose adapter threaded into the spout on the kitchen sink, connect a three-foot length of washing machine water-supply hose. The hose is modified by cutting one end off. That end fits snugly over the 1/4-inch male flare

fitting on the filter housing cap; it's held on securely with a hose clamp. Make sure to connect the flush water source to the *in* side of the filter assembly. Backflush when you've finished filtering the same way but with the hose connected to the *out* side of the filter.

After testing, you have a setup that can be used to filter beer and, with an appropriate shut-off valve and activated charcoal cartridge, one that can normally function as an under-sink or icemaker filter too. With a little imagination you can now see how funds from the household maintenance budget can be diverted, or rather "leveraged," for other purposes.

Fig. 5:
Filtered and Unfiltered Samples

Closed-System Filtration

The goal is to transfer unfiltered beer from one keg, through the filter, and into the final dispense keg without aeration or contamination. This is the kind of beer-handling challenge that makes home kegging systems such a joy. The setup is shown in Figure 3.

If you haven't already done it, sanitize a Cornelius keg as you normally would, transfer the beer from your fermenter into this keg, then purge with CO_2 and seal the keg. Sanitize a second Cornelius canister, and purge and seal it as well. Finally, sanitize the filter assembly and the two transfer hoses used to connect the filter to the two Cornelius kegs. This can be done easily by filling the housing with sanitizer, installing the filter cartridge, and assembling the filter and hoses. After an appropriate soak time drain the filter assembly out through the hoses, then connect all equipment as shown in Figure 3. The airlock tube can be your picnic faucet tubing with the faucet held open with a rubber band. Put this tube into the airlock first, then attach the quick-disconnect to the dispense keg.

After all equipment is connected, begin applying pressure slowly to the system while monitoring for leaks. Minor leaks are just an inconvenience; you can tighten things up as the transfer proceeds. Hold the filter housing upside down. As the source keg empties gas will flow into the assembly, forcing the remaining beer through the filter. When the transfer is complete, remove the quick-disconnect at the airlock side of the system first, then the quick-disconnect at the inlet to the dispense tank.

Finally, remove the gas-in disconnect at the source keg and attach it to the gas-in side of the dispense tank. Pressurize the dispense tank as you normally would and start chilling. Figure 5 shows the results for a variety of filter types and ratings.

Procedures are basically the same for non-cartridge filters such as the one shown in Figure 2. You can also add adapter fittings to this filter as suggested for the cartridge units. That way, the hoses you've terminated with swivel nuts can be used elsewhere when the filter is not in use.

Filter Care

Filter manufacturers make all sorts of claims about filter lifetimes and the amount of beer that can be filtered with a single cartridge. It's almost impossible to predict these numbers, since there's no way of knowing how much junk is in the beer being filtered or how the filters are being cleaned between uses. A used filter allowed to dry out completely can become useless quickly depending on your water supply and other factors such as mold growth.

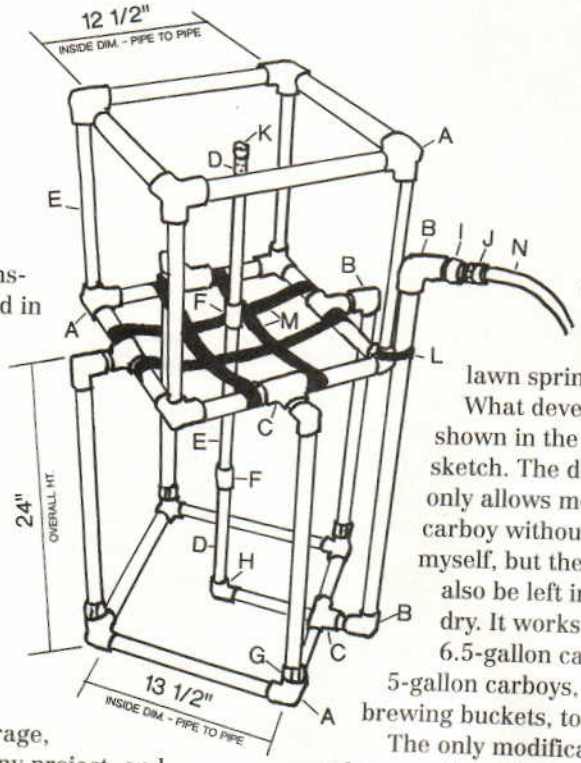
One way to extend the useful lifetime of a filter is to backflush it after use. A backflush of warm water and completely dissolved TSP, followed by a complete cold-water rinse, can help tremendously. But you won't get out all of the particles embedded in the filter material. In time you may find you have to use extremely high pressure to get any reasonable beer flow. At that point it's time to get a new cartridge.

The Choice Is Yours

If you already own a kegging setup or are planning to get one, filtration is a convenient process that will only make your equipment investment more versatile and slightly more expensive. Still, you'll have to be the one to decide if the extra clarity is worth the effort and investment. One thing is certain: Because of the variety of equipment offered by hardware stores, mail-order companies, and homebrew supply shops, setting up a filtration system is easier than ever.

For an excellent summary of how hazes are formed and what brewing practices increase or decrease beer haze, see Dr. Gillian Grafton's "Beer Hazes" on the Internet at http://sun1.bham.ac.uk/graftong/haze.htm.

CARBOY CLEANING *Made Easy*



One of my two Kiwi sons-in-law, Luke, got me started in homebrewing when he and my daughter were here for an extended visit. When they returned to New Zealand, I found that it was nearly impossible for me to properly rinse and drain my carboy by myself. At the very least the procedure always resulted in my getting soaked from chest to foot.

Out of desperation I reviewed the junk in my garage, which is the usual start of any project, and came across a cache of PVC irrigation pipe and fittings left over from several lawn sprinkler projects.

What developed is shown in the adjacent sketch. The design not only allows me to rinse the carboy without drenching myself, but the carboy can also be left in place to air dry. It works with 6.5-gallon carboys, 5-gallon carboys, and plastic brewing buckets, too.

The only modification I subsequently made to my original design allowed me to use the setup as a

by Perry Rutherford

Parts List
(All parts are PVC, unless otherwise noted)

Plan Symbol	Qty	Description
A	12	90-degree side outlet reducing elbows (3/4-inch slip x 3/4-inch slip x 1/2-inch female pipe thread on side outlet)
B	6	90-degree elbows (3/4-inch slip x 3/4-inch slip)
C	5	Tees (3/4-inch slip x 3/4-inch slip x 3/4-inch slip)
D	2	10-inch pipe nipples (1/2-inch male pipe threads, both ends — typically gray)
E	5	12-inch pipe nipples (1/2-inch male pipe threads, both ends — typically gray)
F	2	Couplings (1/2-inch female pipe threads, both ends). See note below.
G	4	Reducing adapters (3/4-inch slip x 1/2-inch male pipe thread)
H	1	90-degree reducing elbow (3/4-inch slip x 1/2-inch female pipe thread)
I	1	Adapter (3/4-inch slip x 3/4-inch male pipe thread)
J	1	Brass hose swivel (3/4-inch female pipe thread x 3/4-inch female hose thread)
K	1	Brass 360-degree shrub head (1/2-inch female pipe thread)
L	1	2-inch diameter (#24) stainless steel hose clamp
M	2	Yards of 1-inch wide polypropylene webbing strap (fabric store)
N	1	Standard garden hose (not included in cost estimate)
No ID	8	1/2-inch long, #10, zinc plated or stainless steel, pan head screws with flat washers
No ID	3	10-foot sections of white, 3/4-inch, schedule 40 irrigation pipe
	1	Small can PVC cement (clear color preferable)

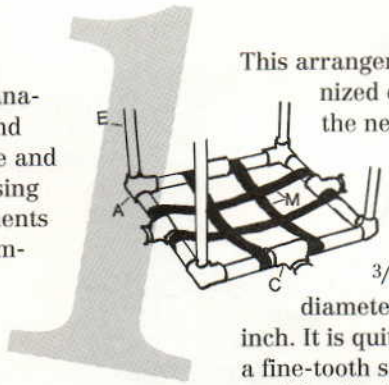
bottler as well as carboy rinser. I extended the bottom section to 24 inches in height from the original 12 inches. By removing the top two pipe nipples of the sprinkler riser, I can place my bottling bucket in the framework and get it high enough above the kitchen table to provide sufficient head pressure for siphoning, even with 22-ounce bottles. This is a real step up from my former system of placing the bucket on the table and sitting cross-legged on the floor to fill the bottles.

Because I already had most of the materials for the rinser in my garage, it cost me almost nothing to build. I recently checked prices at my local discount hardware and other stores and found that the total materials cost, starting from scratch, would be just under $39, excluding tax.

The bottom line is that the rinser works so well for me that if it were to somehow disappear, I would build another just like it before brewing my next batch.

Before You Begin

First, a few explanations, precautions, and suggestions. The pipe and fittings you will be using are common components of residential and commercial irrigation systems and are available in home improvement and hardware stores.



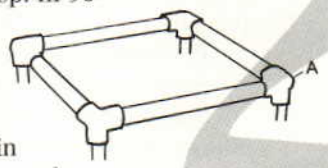
The most difficult items to find may be the PVC couplings that connect the pipe nipples that make up the vertical water supply assembly in the middle of the rinser. If you locate the PVC style with lateral ridges along the sides, you will need to file the ridges off the top one (easy job) so that it will fit through the neck of the carboy. If you absolutely can not find PVC couplings, make up the assembly with a 24-inch PVC pipe nipple on the top joined with a galvanized steel pipe coupling to an eight-inch PVC pipe nipple on the bottom. This arrangement will keep the galvanized coupling well away from the neck of the carboy. Adjust the quantities of items D and E accordingly.

Schedule 40 pipe has an inside diameter of 3/4 inch and an outside diameter of just more than one inch. It is quite soft and easily cut with a fine-tooth saw or PVC pipe cutter.

The slip fittings into which the pipe sections will be installed with cement are tapered slightly on the inside to a diameter that is actually less than that of the outside of the pipe. The cement softens, or melts, the outside of the pipe and the inside of the fitting, allowing the pipe to be fully and snugly seated all the way into the fitting. The corollary to this is that if you try to test assemble the components by forcing them together tightly before final assembly, you may never get them apart again.

The slip joints into which the pipe

sections will be installed are typically one inch deep. In 90-degree tees and elbows the pipe ends will be less than 1/16 inch apart. Keep this in mind in case you need to make any adjustments during assembly.



The tee and elbow fittings typically have very smooth sides and will lay flat on your workbench or other assembly surface. This will allow you to easily align the components during assembly. If they have protrusions left over from the mold, turn them so the smooth sides are down on your work surface during assembly.

When using the cement, keep in mind that once a cemented pipe end is inserted into a fitting, the joint will set up in a matter of seconds.

Follow the instructions and cautions on the cement can. Although this stuff is a marvel of modern technology, it is highly volatile and flammable. Don't even think about using it indoors or getting it near an open flame. Also, you might want to pick up some surgical-type latex gloves from the paint department — the cement is difficult to get off your hands and will give you some serious misery if it gets in an open wound. Wear expendable clothes. Close the can between cementing procedures.

You will need a smooth, flat, and firm work surface at least two feet by two feet in size. A workbench or patio table will work well. When cementing, cover your worksurface with several sheets of newspaper, and change them frequently. There will be inevitable drips — lots of them.

Before applying cement, loosely lay out on your worksurface the components to be joined together. This will help you get the cement in the correct openings. If you should perchance apply the cement to the wrong pipe end or fitting opening, don't be concerned. Just let it dry. You'll be able to apply more cement later and make the connection.

Because you will be assembling some of the cemented components without the opportunity to properly twist the pipe into the fitting to fully seat it, use the rubber mallet or short section of wood two-by-four to tap them together.

Pipe threads are tapered, so the farther you screw a threaded pipe end into a threaded opening, the tighter it will get. PVC pipe also has a very frustrating tendency to bind in a fitting. So before you screw any components together, apply a liberal coating of dry bar soap to the pipe-end threads to lubricate them.

Neither PVC nor polypropylene thrives on extended exposure to direct sunlight. Store the rinser accordingly.

And finally, if you mess up and get a connection seriously out of alignment or, more likely, reversed by 180 degrees (believe me, I've done it), you can usually make things right by cutting the naughty pieces apart and

splicing things back together with straight couplings (3/4-inch slip x 3/4-inch slip).

Assembly Instructions

1. **Center Frame:** Essentially, the rinser consists of three horizontal, square frames connected by vertical supports. The center frame is the most complicated and will determine the dimensions of the top and bottom frames. So we'll start there.

a. Cut eight pieces of pipe to 5 5/8 inches in length. Cement one piece into each end (not the 90-degree side opening) of four of the tees (plan symbol C, page 45). Now measure the total length of one of these assemblies from pipe end to pipe end (it should be very close to 12 1/2 inches) and write this figure down somewhere where you won't lose it. This measurement will be used later to determine the length of the side pipe components for the top frame.

b. Next, assemble the middle frame using four of the 90-degree side outlet reducing elbows (plan symbol A) for the corners. Be sure to note on the plan that the side openings of the tees on the side pieces you already assembled will point outward from the center of the frame. Installing 12-inch pipe nipples (E) snugly, but not too tightly, in the threaded side outlets of the elbows and sighting across them during assembly will help you check the component alignment, as the nipples should always be parallel.

c. Holding an elbow flat on the work surface with the pipe nipple pointing upward, cement one end of one of the side pieces into it and quickly rotate the tee so that its side is also flat on the work surface and its side opening is pointing in the opposite direction of the unused opening of the elbow. Using the same procedure, cement an elbow onto the other end of this side assembly. Next, build one more assembly exactly like you built this one.

d. Cement one end of one of the two-side assemblies you haven't used yet (just pipe-tee-pipe) into one of the elbows of one of the side assemblies you just built, again being sure that the side opening of the tee points outward. Cement its twin into the other elbow. When you get through, you will have three sides of the frame assembled in a "U" configuration, with exposed pipe ends (no elbows) at the ends of the legs. The fourth side of the frame has elbows ready to receive the leg ends of the "U."

e. Apply cement to the insides of the two elbows and the outsides of the pipe ends. Hold the "U" and the side pieces flat on the worksurface, and slide the elbows all the way onto the pipe ends. Use your mallet or two-by-four to fully seat the connections. Also, a second pair of hands really

Tools Required

- Things to measure and mark with (tape measure and pencil preferable)
- Fine-tooth saw, such as a hacksaw or, better, a miter saw or, by far the best, a PVC pipe cutter (about $8.50). If you use a saw you will need sandpaper to remove the burrs from the ends of the pipe
- Small radius half-round wood file
- Power drill
- 1/16-inch drill bit
- 1/8-inch drill bit
- 1-inch spade-type wood drill bit
- Small carpenter's square or something similar for measuring 90-degree angles
- Rubber mallet or piece of two-by-four about one foot in length
- Scissors
- Awl, ice pick, or large nail
- Phillips or slotted screwdriver, depending on the type of screws you purchase
- Bench vise

helps here, as you'll need to work quickly.

f. At this point you have a fully assembled, excruciatingly aligned, perfectly square middle frame. No? Don't worry. The top frame will help pull everything back together.

2. **Top Frame:** So we'll proceed to the top frame, which is quite simple compared with the middle frame you just built. You'll have no serious alignment concerns with this frame, as the angles are predetermined by the corner elbows.

a. Screw (don't forget the soap) four 90-degree side outlet reducing elbows (A) onto the ends of the four 12-inch pipe nipples you previously screwed into the elbows of the middle frame.

b. By screwing the nipples in and out of the elbows, try to get all of the legs as close as possible to the same length, with the elbows aligned with those of the middle frame. Turn the frame over and place it on your work-surface like a table to make the final adjustments. You may notice at this point that the legs are splayed somewhat, resembling those of a newborn calf trying to stand for the first time. Don't worry. Remember, the sides of the top frame will pull these into alignment.

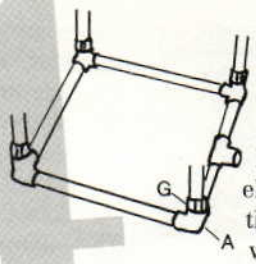
c. Next, you are going to install the sides of the frame into the corner elbows. This is another one of those

places where a second pair of hands will be very helpful. Cut four pieces of pipe to the length you noted in step 1a. Cement one end of one pipe into any elbow. Cement the other end into the elbow that adjoins the other end of the pipe, tapping the connection home with your mallet or two-by-four. You will need to spread the legs slightly to make the connection.

Work your way around the frame, making all of the connections. The final one will be the most difficult. What you have now is a PVC box frame.

3. Connecting Middle and Top: Now you are going to install the elbows that will receive the tops of the legs connecting the middle and bottom frames.

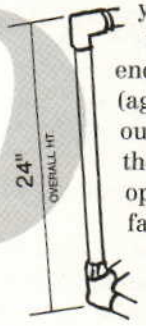
a. Cut four pipe sections 2 1/4 inches in length and cement these into the openings on the sides of the tees on the middle frame.



b. The next step will be to install 90-degree elbows (B) onto the ends of these pipes so that they will point straight down. This will actually be straight up in assembly position, as you will need to have the cube resting upside down on the top frame. To help with your alignment of the elbows, cut four sections of pipe to 15 inches in length (you will use these later for the sides of the bottom frame) and temporarily install them snugly, without cement, into the four elbows. Now, with the assistance of a carpenter's square or something similar that will give you a 90-degree angle, cement these elbows onto the ends of the four protruding pipes, sighting across the temporarily installed 15-inch pipe sections for proper alignment. When finished, remove the temporary pipes, but keep them handy.

4. Bottom Frame: The next step will be to fabricate the bottom frame.

a. To build this frame you will first need to determine the length of the pipes that will form the sides. Cut two pieces of pipe 2 1/2 inches in length. With the cube still resting on its top frame, install them snugly, without cement, into any two adjacent elbows on the middle frame. Now install two 90-degree elbows (B — you should have two left) onto the ends of these elbows (again, snugly, without cement) and align them so that their openings directly face each other.



Measure the distance between

these two elbows (face of elbow to face of elbow), add two inches, and you have the lengths of the sides of your bottom cube. This measurement should be about 13 1/2 inches. Cut three pieces of pipe to this length (using the pipes you cut for step 3b) and set them aside.

b. You will notice that one of the sides of the bottom frame has a tee (C) through which passes the horizontal section of the water supply pipe. To determine the lengths of the two sections of pipe that will be cemented into the ends of this tee to form the fourth side of the frame, use the following procedure. Measure the overall length of the tee (rounded to the nearest 1/8 inch) and subtract two inches. Subtract the result from the length of the other three side pipes and divide by two. Cut two sections of pipe to this length (using the last piece of pipe left over from step 3b) and cement them into the ends of the tee. You will eventually drill through the back of the side opening of this tee, but that will come later.

c. Proceed with the assembly of the bottom frame, using 90-degree side outlet reducing elbows (A), just as you did when building the middle frame. Use the remaining pipe nipples to help with alignment. Be sure that the tee points outward.

5. Connecting Bottom to Middle: You are now going to install the legs that join the bottom frame with the middle frame.

a. Screw a reducing adapter (plan symbol G) into each of the corner elbows of the bottom frame (don't forget the soap) and seat them completely.

b. Cut four sections of pipe to 21 inches in length. Cement them into the elbows on the middle frame.

c. The next step will be like trying to coax an unwilling tomcat into a pet carrier, so definitely grab a second pair of hands. Place the bottom frame on your worksurface (or, preferably, your driveway) with the openings of the reducing adapters pointing up. Hold the assembled cube with the legs pointed downward over the bottom frame. Apply cement to the openings of the reducing adapters and ends of the pipe legs. Quickly insert the ends of the legs into the reducing adapters, push the entire cube assembly/legs down firmly, and tap the legs home by applying your rubber mallet or two-by-four to the tops of the elbows. When you are finished, you will have a rather bizarre geometric shape consisting of two open box frames joined at 45 degrees to each other.

6. Water Supply Pipe Preparation: Now its time to make the hole through the tee in the bottom frame to accommodate the horizontal section of the water supply pipe.

a. Install a one-inch spade bit in your power drill and place the framework assembly upside down on the driveway or floor so that it rests on the top frame. Ease yourself into a chair. Have someone hold the framework firmly in place. Holding the power drill with both hands (it may try to get away from you), drill directly through the opening of the tee and through its back. Use short bursts of power for most of the trip then, as the bit starts to bind when you are most of the way through the back, pull it back a little and open 'er up to finish the hole.

b. Using your half-round file, enlarge the openings in both the front and back of the tee so that a piece of pipe will slide through it with hand force only but still fit snugly.

7. **Webbing Straps:** Next, we're going to leave this opening temporarily and proceed with the installation of the webbing straps on the middle frame. It is this webbing that will support the shoulder of the carboy during the rinse cycle.

a. The straps will go across the top of the middle frame, wrap around the side pipes, and be secured with screws and washers to the backs of the side pipes where they will not be visible. Install the straps next to the ends of the tees and they will be properly positioned to support the shoulder of the carboy.

b. These straps go across the tops of the side pipes, but you are going to install them while the rinser framework is upside down. Therefore, you will install them across the bottoms of the side pipes. If you happen to get them wrong, just change them around.

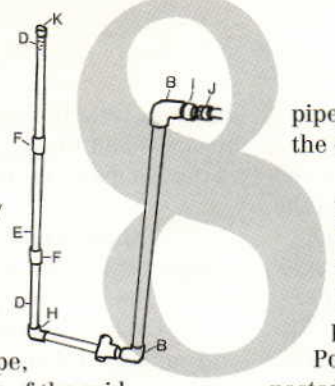
c. When installing the straps, place both of those going in one direction over the tops of those going the other way — don't weave them. This will give you more even support. Also, the straps should be fairly tight but not overly so. They will loosen slightly with use, which is okay.

d. Again, with the assembly upside down, check the two dimensions across the middle frame and use the longer one to measure and cut all four straps. Hold the strap fairly tightly across the opening of the middle frame, wrap it around under the side pipes to the middles of the backs of the pipes and add 1/2 inch to each end. The surplus will give you room to install the holding screws and washers.

e. Cut four sections of webbing to this length with scissors and melt the ends slightly to keep them from unraveling. Just slightly melt the ends, don't light them off. Keep some water nearby just in case.

f. Drill eight 1/8-inch pilot holes for your screws in the backs of the side pipes, 1/2 inch from the ends of the tees.

g. Using an awl, ice pick, or large nail, open a hole through the middle of one end of a strap, about 1/2 inch from



the end. Screw a screw with a washer through this hole and fairly tightly into one of the pilot holes. Wrap the strap around the outside of this side pipe, across the opening of the middle frame, around the opposite side pipe, and secure the end just as you did on the opposite side of the frame. Install all four straps in this manner.

8. **Water Supply:** Now, finally, you're going to assemble the water supply for the rinser. This basically consists of a vertical pipe (that I will call the vertical supply pipe) on the outside of the framework, a short horizontal section (I'll call this the horizontal supply pipe) that passes through the tee of the bottom frame, and an assembly of pipe nipples, couplings, and the spray head (vertical supply assembly) that goes up through the middle of the framework and delivers the rinse water to the carboy.

a. Assemble the vertical supply assembly, consisting of two 10-inch pipe nipples (D) and the two couplings (F), with the remaining 12-inch pipe nipple (E) in the middle. Remember the soap. Leave the shrub head off. When all screwed together, this assembly will probably look a little crooked. Don't be concerned.

b. Cut a 12-inch section of pipe and slip it through the tee in the bottom frame. Cement the 90-degree reducing elbow (H) onto the end that is inside the framework.

c. With the rinser framework sitting upright on its bottom frame, place the vertical supply assembly down through the middle square of the webbing and screw it into the elbow on the end of the horizontal supply pipe. By moving the horizontal supply pipe in or out through the tee and screwing the nipples in or out (as mentioned in 8a, they will probably be a little crooked), position the vertical supply assembly so that it is as close as possible to the center of the square.

d. Cut a section of pipe to 29 inches in length. Cement your last two 90-degree elbows (B) onto the ends of this pipe, with the openings pointing in the exact opposite directions.

e. Now, this step is going to take some eyeballing. Hold the vertical supply pipe, with the elbow facing the framework, next to the section of horizontal supply pipe that comes through the tee. Position it so that when it is connected to the horizontal pipe it will be vertical (parallel to the bottom legs of the framework) and aligned with (just touch) the outside corner of the middle frame elbow. Mark the horizontal supply pipe at the face of the elbow, add one inch, and cut the supply pipe here.

f. Cement the elbow onto the horizontal supply pipe, being sure that the vertical supply pipe and the vertical supply assembly are parallel.

g. With your file, slightly flatten the corner of the middle frame elbow

where the vertical supply pipe will sit next to it. Better yet, if you can, file in a shallow groove.

h. Strap the vertical supply pipe to this corner with the two-inch hose clamp (L). You'll have to unscrew the clamp all the way and open it up to get it around. Locate the clamp around the side outlet shoulder of the elbow. Put a dab of cement between the vertical supply pipe and the elbow, and then crank the clamp down just tight enough to hold everything is place.

i. Cut a section of pipe 2 1/2 inches in length and cement it into the elbow at the top of the vertical supply pipe. Onto the exposed end of this pipe, cement the adapter (I) and then screw on the brass hose swivel (J).

9. Spray Head: Finally, you're going to drill the holes for the spray part of the vertical supply assembly.

a. Clamp the brass shrub head (K) in your bench vise, seat the adjustment screw in the top all the way down, and drill a 1/16-inch hole directly through the middle of the screw.

b. Remove the top 10-inch pipe nipple from the vertical supply assembly and install the shrub head on one end. Wrap the nipple with a piece of towel or something else soft and put it in the bench vise. Approximately 3/4-inch below the shrub head, drill a series of six 1/16-inch holes spaced evenly around the circumference of the nipple. These holes should point upward (toward the shrub head) at an angle of approximately 45 degrees. (Folding two adjoining sides of a piece of paper together at the corner makes a good 45 degree angle for a guide.) It will be easier to drill the angled holes if you first start them straight in and then move the drill to the desired angle. Approximately 3/4 inch below this line of holes, drill another series of 1/16-inch holes pointing directly outward at 90 degrees. Finally, another 3/4 inch lower on the nipple, drill a third row of holes angled downward at 45 degrees. Stagger the rows so that the holes are not directly in line vertically.

c. Screw the 10-inch nipple back onto the top coupling of the vertical supply assembly and you're finished!

Using the Carboy Rinser

Set the frame on some surface, such as your lawn, which you don't mind getting wet and connect the garden hose. After the interior of the carboy has been thoroughly soaked and brushed, place it upside down on the rinser with the vertical supply assembly passing through the neck. Turn on the hose full blast and leave it on for several minutes. If the water starts backing up in the carboy, turn the pressure down slightly. When finished, turn the hose off and all of the water will drain out of the carboy. You can let it air dry in this position if you wish.

Brewing in the Slow Lane

by Stan Hieronymus and Daria Labinsky

New Orleans is called the Big Easy, and people take things slowly here. This attitude may infuriate outsiders who are in a hurry, but it's not a bad one to have when you are a brewer.

Acadian Brewing Co. in New Orleans makes lagers, and brewmaster Doug Lindley takes his sweet time. The beers are fermented for about 10 days and aged for at least a month. The result is clean, flavorful beer that doesn't stray far from its European roots. "German people come in and say, 'This is like home,'" Lindley says with pride.

Nothing moves fast at Acadian. It takes 40 days to produce the beer and seven minutes just to pour a 16-ounce glass of Hefe-Pils.

It doesn't take a brain surgeon to figure out why lagers are the beers of choice in Louisiana. Acadian's beers are meant to be drunk cold in hot, humid weather, but they have more than enough taste to stand up to the chill. Acadian Pilsener, the first beer the microbrewery produced, is malty with a crisp, bitter finish. Vienna Amber, which Lindley prefers to call simply "Vienna" because "amber's a color, not a style," is malty and hoppy. Both the pilsener and the Vienna are bottled for distribution.

The draft-only selections include some very interesting choices. One seasonal brew is Helles Bock, made with a triple decoction mash and aged for three months in the tank. Lindley decided to brew the Helles because it's light in color, which appeals to Southern beer drinkers. It is well balanced, sweet, and malty but with enough hops to cut the sweetness. Helles Bock proved quite popular, and Lindley is considering producing it year-round.

Hefe-Pils, an unfiltered, draft version of the pilsener, is (at the time of this writing) sold only at Acadian's taproom and one other account. Hefe-Pils is pulled out of secondary fermentation just before fermentation is complete, then slow-fermented in the keg. It's served from a slow-pour tap to give it a creamy, dense head. It takes a bartender about seven minutes to pour a 16-ounce glass of the Hefe-Pils, but the wait is well worth it, as the beer explodes with flavors.

"People will come in and swear it's a different beer (than the pilsener)," Lindley says.

Lindley prefers not to offer details about his beer recipes other than to say they conform to the Reinheitsgebot (German purity law of 1516), that he uses a German yeast strain, and that the hops are imported Hallertauer and

Saaz, processed to give them a higher alpha-acid content. "There's more concentrated bittering and less trash and trub in the kettle," Lindley explains. "Your yield is higher, and it's cheaper in the long run."

David Macon, Doug Lindley, and Monte Brown can usually be found brewing at 3 a.m. when it's cool and quiet.

The beer is brewed with dechlorinated local water, sterile filtered and acidified to lower the pH. "A lot of people think Louisiana water is extremely hard, but it's not," Lindley says. "It's very close to Munich water but has more sulfate than I wish it had." He has had to adjust the hop levels in his recipes to compensate for the potential harshness the sulfates can produce.

Lindley began brewing lagers as a homebrewer. "Everybody was making ales using (Wyeast) 1056 yeast," he says. "I wanted my own identity." He had been homebrewing for years when he got laid off from a construction job and began to seriously consider turning pro. He spent time at New Orleans' Dixie Brewing Co., learning from its brewers, then hooked up with Jim Cronin, a homebrewer and former neurobiologist who wanted to open a microbrewery. In 1990 Cronin, the brewery's president, began raising money, and Lindley made sample batches of beer to serve bankers while pursuing funds. The brewery rolled out its first batch of Acadian Pilsener in January 1996 and debuted the Vienna in September 1996. Acadian produced about 2,000 barrels in its first year.

Acadian is located in a former marine shop, with ceilings high enough for sailboats and a loftlike second floor that hangs, sort of like a balcony, over the main floor. The brewery is on the second floor; the lagering tanks, kegging equipment, bottling line, and cold room on the first. Because a gate extends across one of the tall garage doors, it's an open-air brewery but one with a determined emphasis on cleanliness. Lindley will allow only one yeast strain in the brewery, and that is kept in a yeast brink inside a clean room. It's transferred to fermenters through an enclosed line. Throughout the brewing and bottling/kegging process, strict rules apply, down to transfer lines with a minimum number of flex points.

Having the brewery on the second

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floor presents an obvious problem: How do they get those tons of grain up the narrow, metal stairs? Lindley, First Assistant David Macon, and Second Assistant Monte Brown don't use the stairs. Part of the second floor's low wall collapses, so they swing it out of the way and carry the grain with a fork lift.

The brewers make 37-barrel batches, which yield about 35 barrels. The equipment includes DME stainless-steel kettles and converted dairy tanks with the front legs cut down so the yeast will run out. The yeast brink is a converted child's whirlpool.

The brewers usually brew three times a week. "Most brews take place at 3 a.m. or 4 a.m. — less heat, less distraction, and it's quieter," Lindley says. They don't grind the grain until the end of the day before they brew, to prevent moisture from building up in the grist case and harming the grain.

Each brew is a three-step mash. The wort is fermented at 50° F, then lowered to 48° F after a day or two for a diacetyl rest. The beers are lagered at 31° F, and each glycol-chilled lagering tank is individually controlled. The lagering tanks hold 110, 90, and 31 barrels, respectively, which allows Acadian to blend batches and make a more consistent product. The beer is filtered but not pasteurized and has a shelf life of about 100 days.

The three brewers also handle all the bottling and kegging, a time-consuming part of the production. They label the bottles first on an Enos labeler and usually bottle once a week. They use a four-head Meheen filler that can do one bottle every two seconds. "It's really not that fast when you're doing 400 cases of beer," Lindley says.

Given Louisiana's heavily Catholic, French-descended populace, it seems appropriate that a crucifix hangs over the brewing equipment at La Brasserie D'Acadie. Lindley says that the crucifix is there "because all of us are Catholic, and because a lot of breweries in Germany have them." He read somewhere that the German brewers believe a crucifix protects the brewery. "So far it's worked for us," he says.

Acadian Brewing would like to do 5,000 barrels in 1997, but that could stretch the small bottling line to its limit. The beer is available throughout New Orleans and in other parts of Louisiana, including Shreveport, Baton Rouge, and Thibodeux. Acadian has more than 50 draft accounts, mostly in New Orleans.

A good place to sample the beer is at the brewery's taproom, The Beer Garden, located in the same building as the brewery (it was the boat shop's showroom) but officially a separate business. The Beer Garden features a copper-topped, 59-foot, L-shaped bar, which Lindley built, and pours beers from nearly every Louisiana brewery, including Abita from Abita Springs, Dixie Brewing Co., and Louisiana Brewing Co. of Breaux Bridge. The bar sells other beer in bottles as well as wine and liquor.

The Beer Garden is casual, with wooden booths, tables, and chairs. A variety of Louisiana- and beer-related photographs and ads, including a couple of vintage concert posters that some music fans would kill for, decorate the walls. It only serves chips and such, unless you're lucky enough to be there on a Saturday during crawfish season. You can also order in New York-style pizza from the restaurant across the street. Live music, in a variety of styles, is featured regularly.

The Beer Garden sells six-packs and 5.2- and 15.5-gallon kegs to go. The smaller kegs have proven popular at parties and have helped the brewery get tap handles in bars, because the hookups are the same as for half-barrel Sankey kegs. The Beer Garden opens at 11 a.m. seven days a week. New Orleans has no closing hours, so it closes when the customers are all gone.

While Acadian Brewing's beer is primarily consumed by Louisianans, sales to tourists are a significant part of the business. "Tourists are looking to drink the local beer here," Lindley says. "They don't come here to drink Bud. They come here looking for Abita, Dixie, or us."

Acadian Brewing Co., is located 201 N. Carrollton, New Orleans, La. 70119. Call (504) 488-8274. ■

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

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"You Sent Me the Bucket but Not the Mop"

by Richy Rodriguez

In 1992 I was very interested in brewing beer and thought my dad might be, too. I thought a kit would make a great Father's Day gift. I began looking for the best prices in beer brewing kits. I called several mail-order companies and checked out some local stores.

The research took me longer than I expected. By the time I decided I wanted to give the gift, it was too late to send a mail-order kit to my father, who lives in Puerto Rico.

I wanted to get rid of all the prices that are listed with the supplies and translate the instructions into Spanish; he doesn't speak English.

When I got the kit home I began to translate the instructions into Spanish. I had four days to get the package to him by Father's Day. At the time I could not afford to send such a big package by overnight carrier.

The translation consumed more time than I thought it would. I was up until 2 a.m. working on it. I didn't have a printer and was using an old typewriter. I retyped the instructions in Spanish more than 10 times. My wife told me to write them by hand, but then she remembered that my handwriting is worse than my typing.

When I finally finished, I went to bed. I remember thinking, "Now I only have to pack it and mail it. What a relief."

I thought the box and, of course, the packing material were going to be easy to find. The next day I went to a supermarket to get a box, but the boxes were either too small or wet. So I bought a very large box from U-Haul. After putting everything in the box I realized I had forgotten packing material. So back to U-Haul. Eventually, the box was packed and ready to go. I just needed to mail it.

United Parcel Service was the cheapest, but it was too far away. Besides, I had to get the mail from my post office box. So the US mail was it. Twenty bucks later it was on the way to Puerto Rico. I could not wait to hear my father's surprised reaction. It was the perfect present because he likes to do things on his own and, most important, he likes beer.

Saturday was a long day and I could not wait for the night. I called my Dad, and he told me that he received the package and thanked me for it. Then he asked me how come I didn't send a mop and a broom. The question caught me by surprise. He said, "You sent me the buckets but not the mop." The beer kit included two five-gallon buckets and the rest of the brewing material.

My father, shown holding my son, thought his homebrew kit was a joke.

I said, "Didn't you read the letter with the instructions?" He asked me what letter I was talking about. I explained to him what it was and his response was, "This is illegal; I can go blind (a rumor about homebrewing probably started by a large beer company). Do you want to get me arrested? (Another rumor probably started by a large beer company.) You must be crazy (a rumor that was probably started by my brothers)."

I could not believe it. I gave my father what I thought was the perfect present, and he thought I sent him a janitor starter kit.

Well that was just great. I explained to him at length just how easy it is to brew your own beer and wine and that it is legal and not going to make him blind or impotent (yet another rumor). In the end I found out that he thought the gift was a joke.

The buckets were taken by a friend, the ingredients were taken by my brothers, and the beer caps were used in a beer-cap-throwing contest, of course, while drinking beer from a large brewing company. I'm glad I didn't send him beer bottles.

My dad kept the Father's Day card. The instructions ended up lost in the packing material and went out with the trash. I mailed him a new set of instructions, only to find out that my brothers, on a Sunday afternoon, had cooked up the brewing ingredients and, after 10 days of fermenting, the brew grew mildew and was thrown out.

Now for Father's Day I send him things that you can figure out just by looking at them, like a Coke can in the shape of an airplane, live lobsters, and a penny collection (it was a lean year). Plus, I don't want him to think I am crazy. ■

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