

Brew

Label Contest
Winners!

JUNE 1999, VOL.5, NO.6

YOUR

THE HOW-TO HOMEBREW BEER MAGAZINE

Grain Therapy

Get to Know Your Malt

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Practical Tips!**

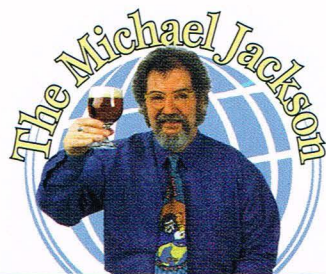
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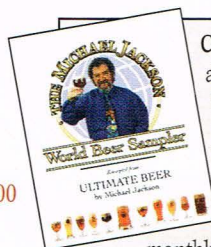
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Contents

JUNE 1999

FEATURES

22 Label Contest Winners *Erika Ehmsen*

It's label time again! Homebrewers display their artistic side in BYO's fourth annual homebrew label contest. The winners prove you can put sutures in paper, tea is a color, strawberry's a scream, and hopping down the bunny trail doesn't necessarily refer to rabbits. Check out Austin Powers' toothy grin, a pro-wrestling poster boy, and more.

28 Grain Expectations *Douglas Fuchs*

Get to know your grains by exploring the world of specialty malts and recipe design. While the pros stick to a limited selection of malts, homebrewers are free to experiment with all sorts of combinations that make great beer.

34 More Incredibly Practical Brewing Tips

Your favorite tips. In February we challenged readers to outdo the 40 Incredibly Practical Brewing Tips in our cover feature. The result: the kind of terrific and innovative ideas homebrewers are known for. Speed up your bottle cleaning with an electric drill. Wort chilling with a car radiator. Make great beer and water the lawn, too. And lots more.

43 Keeping Your Yeast Healthy *Larry Lesterud*

Treating your yeast well is essential to good brewing. So make sure it gets a balanced diet, plenty of exercise, and fresh air. It will reward you many times over with great beer.

DEPARTMENTS

2 Editor's Note

Labels that win with words.

3 Mail

Lovibond substitutions and measuring bitterness.

5 Pot Shots

An apple cider and a lawyer who brews.

56 Last Call

Brewing for the gold.

51 Classifieds

52 Homebrew Directory

55 Advertiser Index

COLUMNS

7 Recipe Exchange

A splash of flavor: taking an original approach to Berliner weissbier.

11 Help Me, Mr. Wizard

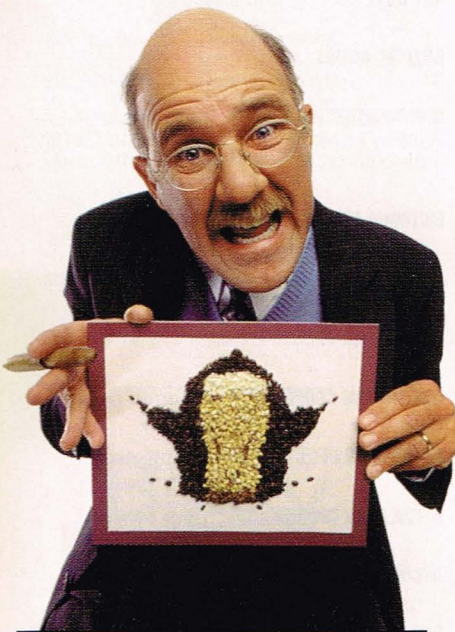
The Guru of Gravity enlightens us on hot-side aeration.

15 Style of the Month

Summer classics: pilsner and nut brown ale.

47 Winemaking

Blending for better wines. A step-by-step guide.



p. 28

So Many Labels...

It's the annual lament of the label contest issue: There are so many great submissions, we wish we could publish many, many more. But if your label didn't make it into the feature, maybe it's mentioned here.

This year's Most Unprintable Label Award goes, hands down, to Bill Hoey of Marietta, Ga. His Kick Him Out Stout label played on this year's most common theme, the amorous life of Bill Clinton. Judges' reactions to the label started at "Gross" and went downhill fast. That was a hell of a Photoshop job, though.

Hoey was also the creator of Reasonable Doubt Stout, which featured OJ's face in a thumbprint and carried the warning that consumption "may result in a loss of memory and swelling of hands — your gloves won't fit..."

Tim Gibbons of Huntington, N.Y., cut through all the hype about born-on dating and went directly to the number homebrewers really care about with his "Done On Date." What difference does it make when it was born; when can we drink it? He also had another great line on his labels: "Total fluid content varies by pour."

Some other highlights and lowlights:

Domestic Tranquility Award: Mike DeVora, Rockville Centre, N.Y., who notes about his NorthEast Fine Strong Ale label: "The wife was none too pleased to see her face on beer bottles in all our friends' fridges."

With Friends Like This Award: Scott Norviel, Jackson Center, Ohio, who brewed a birthday beer called Old Timer Ale. It is, the label notes, "A brew you can enjoy without teeth or hair."

Good to the Last Drop Award: Gary Rice of Gloucester, Va. His Laughing Labrador Farm labels

advise, "If you don't like our beer, then give it to your favorite dog."

Technology Explained Award: Allen Myrick, Davie, Fla., for alt.beer.com, "a virtually refreshing alt beer." The label promises plenty of "fuzzy logic."

Gene Autry Award: Chris Engel of Sioux City, Iowa, for Yippie IPA, You just can't say it without singing.

Name Most Likely to Deter Mooches Award: Jason Klinka, Oklahoma City, for Outhouse Brown Ale.

Surest Prize Winner Award: Tom Lafleur, Amherst, N.H., whose nice Gray Knob Porter label notes the beer is made from "Nobel" hops. How can you compete with that?

And finally, the best story came from Walt Newell of Terrell, Texas. His Brewcop Ale features an illustration of St. Michael, the patron saint of police officers. "I am a detective," writes Newell. "I investigated two people in early 1998 for several felonies. The cases were being finalized with the federal authorities. That is when these people decided to hire a hit man to kill me."

But their mistake: The person they hired was an undercover FBI agent, and they were eventually sent to jail. "I thank the patron saint for his protection every day. Hence I decided to name my homebrew St. Michael's Brewery."

Newell's next beer: No Bail Pale Ale.

Check out some more terrific labels beginning on page 22.

Craig Bystrynski

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Crystal Malt Math

Dear Brew Your Own,

What is the theory behind — and the philosophy surrounding — Lovibond substitution of crystal malts in recipes? For instance, the recipes in the current Style of the Month brewing series call for various Lovibond of crystal malts, not all of which are regularly or readily available. Can higher or lower Lovibonds in lower or higher quantities, respectively, be substituted to take advantage of readily available supplies?

Joe Scarborough
via e-mail

Yes, they can be substituted to balance the color. For example one pound of 40° Lovibond crystal malt equals two pounds of 20° Lovibond crystal (or even one-half pound of 80° Lovibond crystal). The same color would be achieved. But one pound of malt is not necessarily the same as two pounds of malt. The extract amount is different (slightly lower), thus the gravity and everything that follows is different. You can correct this by altering the amount of pale malt in the recipe. A simple rule of thumb is 14.5 oz. pale malt to 16 oz. crystal.

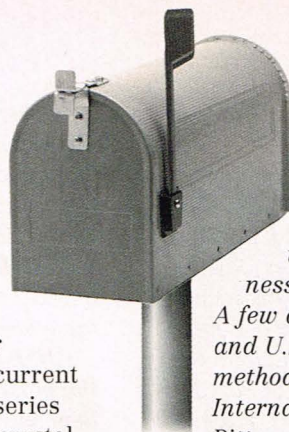
The Style of the Month recipes usually include a combination of 20° Lovibond and 60° Lovibond crystal malt. The idea is to give the grain bill balance and depth. The recipes are formulated to get the maximum amount of flavor, body, and roasted and caramel character out of malt. The higher amounts of 20° Lovibond crystal provide plenty of body and caramel flavor, while the 60° Lovibond crystal contributes good color.

Measuring Bitterness

Dear BYO,

What are International Bitterness Units? Where does the term come from?

Luke Hart
via e-mail



Brewers have devised many ways to measure hop bitterness in beer over the years. A few decades ago European and U.S. brewers agreed on a method of measurement — International Bitterness Units. Bitterness is created when hops are boiled, and a chemical process called isomerization occurs. IBUs measure the amount of iso-alpha acids in beer as roughly parts per million (milligrams per liter).

In general a beer with a bitterness of 27 IBUs is mild, while 42 IBUs indicates a beer that is quite bitter. To learn how to use this method in your homebrews, see "Expand Your Hop Horizons" (June '98 BYO).

Baking vs. Brewing

Dear BYO,

Is the liquid yeast used for beer also usable in baking bread and pastries?

Terri Bradley
via e-mail

There is nothing inherently wrong with using liquid beer yeast for bread. However, you might not want to for several reasons.

One, it's expensive.

Two, it has been bred (no pun intended) for anaerobic metabolism in a high-sugar environment (wort) and might not function well (quickly) aerobically in a high-starch environment (bread dough). So your bread could end up flat, or you might have to proof it for a very long time.

Three, in beer liquid yeast can give you many advantages, but in bread it really doesn't. Not to be gross here, but if there are a few bacteria in the dried bread yeast, it really doesn't matter. The dried yeast will begin making CO₂ quickly — which is really all you want the yeast for in the bread — and the bacteria (and yeast) will be killed during baking.

Know Your Oats

Dear BYO,

Is there a difference between the rolled oats that my local brew shop sells and the Quaker Oats in my pantry? If there is a difference, what problems can arise if I use the Quaker Oats in my oatmeal stout?

*Phil Jaras
via e-mail*

When using oats directly in the mash, the best product is a "torrified" rolled oat or "quick" oats from Quaker. These oats have been "pre-gelatinized." In other words the oat has been steam-heated quickly and rolled, and the starches have been denatured.

If you drop regular oats into the mash, you run the risk of depositing starch in your beer. You

could preboil them and then add them to the mash if they are not pre-gelatinized. Ask your homebrew shop if the oats are torrified or pre-gelatinized (torrified is the British word).

Make sure you mill the oats even finer than the malt to allow the malt enzymes to attack the oat starches efficiently. You will not need any of the oats for the filter bed. Also, oats contain a large amount of oil — believe it or not — so it is possible to use too much and kill the head. No more than 10 percent should be used, and some say 5 percent.

In Need of a Jump

Dear BYO,

I am in need of some friendly advice from fellow homebrewers. After taking a one-year break from brewing, I started back up several months ago. (I use malt extract rather than all-grain). Since then I have made four batches, and all but one did not start fermenting. I had to add an additional packet of yeast in each case after waiting 24 hours for some sign of activity. They always started the second time.

I have been very careful each time. I have analyzed my procedure over and over, but I don't see anything wrong. My question: Do you think it is possible I am having this problem because I am using old malt extract? I purchased several cans more than a year ago and the sell-by date was past due then. (I got a real deal!) What do you think?

*Martin Smith
via e-mail*

Your out-of-date product might start to get oxidized flavors, but it will not become "unfermentable." The fact that the fermentations started with the addition of a second packet of yeast indicates one of two things. One, the wort was not properly oxygenated; or two, the yeast packets were old or ineffective. Take the time to thoroughly aerate your cooled wort and add two packets next time and see if that makes a difference.



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CIRCLE 4 ON READER SERVICE CARD

Terry Trentman Grand Ledge, Mich.

I have been a dedicated beer brewer for about 10 years or so and, I must admit, I am a fair consumer of my products. I started with the kits and bottles, but it didn't take me long to get hooked on all-grain brewing and kegging. It wasn't long before I had my own bar in the basement. I have an old cooler converted into a mash tun and make a drop-dead Lawnmower Pilsner.

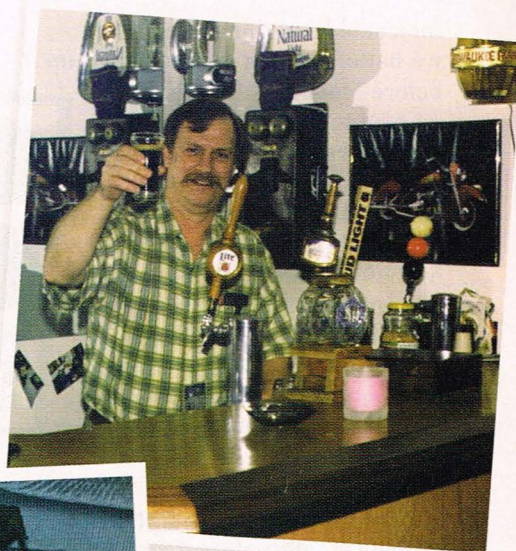
I know I probably shouldn't admit to it, but occasionally I brew beverages other than beer. Several years ago a friend of mine gave me a bottle of something he called "Raisin Jack" to try. He said that it had been in his basement for years and he thought it would still be good. I was a little uncomfortable about consuming it, but he reassured me that he had tried one not long ago and it still tasted just fine. Well, what the heck; I am a consumer.

It was really quite excellent, a hard apple cider for sure, but with more than a hint of raisins. I asked for his recipe, and he told me it was quite simple: Put five gallons of natural apple juice with

three pounds of raisins in a fermenter, add your yeast, and stand back. I decided to give it a try.

Two years later, after many rackings, I racked off a bottle to be consumed by some friends, who had stopped by to see what was brewing. My two kids were giving me a hand with the siphoning. My son is 14, and my daughter is 11. I put the bubbler and plug back in the top of the carboy and was setting it back down on the concrete floor in my brew-room when, you guessed it, the carboy slipped out of my hands and exploded all over the floor. My first reaction was to let go with a litany of language that would make a longshoreman proud, but looking up I saw two wide-eyed kids looking at me like, "Man, is Mom gonna yell at you, Dad."

I stood there for a second and



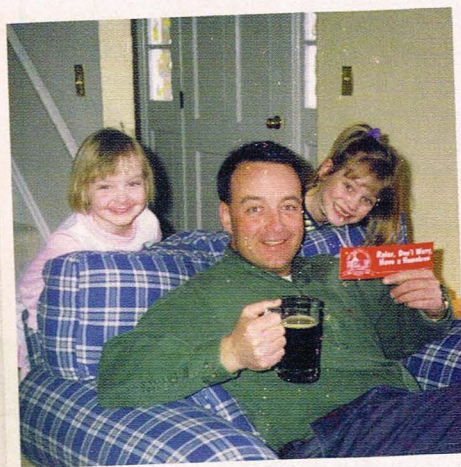
An avid beer fan, Terry Trentman (and his dog, Gerty) tried Raisin Jack, a hard apple cider that is an explosive change of pace from beer.

continued on next page...

Brett Foster Wilmington, Ohio

I'm a lawyer who brews. Even though I'm a lawyer, I lost the argument when it came to brewing in the kitchen. My two little girls and wife ganged up on me, and I didn't stand a chance. Never fear, though; I just ordered an outdoor burner, wort chiller, and 7.5-gallon kettle, so I'll be brewing happily in the garage or out back.

It's an open and shut case: Brewing is a nice change from practicing law.



On a personal note, homebrewers are just nice folks, and brewing is a nice change of pace from the day-to-day work of lawyering. I recommend homebrewing to any stressed-out person, regardless of their chosen work.

STRANGE NAMES!

Do you have an oddly named beer? Tell us about it and send us a picture of you and your pot. 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 erika@byo.com. Be sure to include your mailing address!

continued from previous page

then said something like, "Well, we better get this mess cleaned up before Mom sees it." Oh, how I wanted to recite the litany. It smelled really good in the brew-room for a day or so until the fumes subsided.

I still have the bottle I racked off before the mishap. I just can't get myself to drink it yet; I'm still in shock, I guess. Aw, what the heck. I'm brewing beer this weekend and I think I'll have a little cider during the mash. Cheers, you all.

Drop-Dead Lawnmower Pilsner (5 gallons, all-grain)

This is a beer the whole neighborhood will drink. It's neither high in alcohol nor overly hopped, so most everybody will consume it. It is very important to use soft water (not from the softener). My city water is very high in pH and

bicarbonates. I boil all my mash and sparge water for 30 minutes, aerate, and rack off the next day to lower the pH and bicarbonate content. Do not over-sparge. It can cause your beer to taste a little like straw.

Ingredients:

- 5 lbs. German two-row malt
- 2 lbs. pre-gelatinized maize (corn)
- 1 lb. carapils malt
- 2 oz. Saaz hops (3.1% alpha acid):
1 oz. for 90 min., 0.5 oz. for 30 min., 0.5 oz. for 5 min.
- 1 tsp. Irish moss
- Wyeast 1056 (American ale)
- 3/4 cup corn sugar for priming

Step by Step:

Mash all grains at 149° F with enough water to cover the grist, about 2.5 to 3.5 gal. Mash for 75 min. Sparge with 168° F soft water, which usually takes 30 to 45 min.

Collect 6 gal. or stop sparging when the specific gravity drops to 1.010.

Total boil is 90 min. Bring the wort to a boil and add 1 oz. of Saaz hops. Boil for 60 min. and add 0.5 oz. of Saaz hops. Boil 15 min. more and add the Irish moss. Boil 10 min. more and add the last 0.5 oz. of Saaz hops. Boil 5 min. more and remove from heat. Chill the wort to 65° F, pitch the yeast, and aerate.

Ferment at 65° F for four days and rack into the secondary fermenter. Let it sit in the secondary for a week, then cool to 36° F for one week. Rack the beer into a 5-gal. keg and force carbonate at 12 psi for a few days. If you don't have a keg system, prime with corn sugar and bottle.

OG = 1.040

FG = 1.010

15 IBUs

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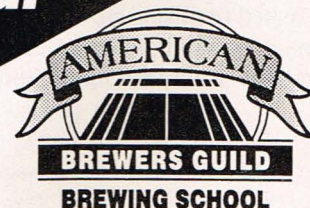
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CIRCLE 2 ON READER SERVICE CARD

A Splash of Flavor

by Scott R. Russell

Sometimes you have to do something new just for the sake of being different. That's the theory behind this month's recipe, which takes an unusual style, Berliner weissbier, then makes a two-for-one substitution that creates a surprisingly nice flavor.

You might know the history and traditions associated with Berliner weissbiers. If not, here's a quick summary.

They are generally light in body, color, and flavor; low in alcohol; often slightly cloudy;

mildly sour; and usually quite refreshing. A perfect summer beer in many ways. They are fermented with yeast strains and bacteria that cause the creation of lactic acid. Often, to counteract the sourness, they are served with a sweet syrup — raspberry, lemon, or woodruff; red, yellow, or green, just like a traffic light. Line up three weissbiers on the bar, flavor each with a



different syrup, and you have an image worthy of the best Impressionist still-life painters.

Never having been one to live completely conventionally — or, in other words, to follow the rules religiously — I decided one time to bottle my Berliner weissbier with the syrup already in it. I had made a batch and intended to divide it in thirds: one-third red, one-third yellow, one-third green.

That was the plan. By the time the bottling was done, though,

Raspberry-Lemon Weissbier (5 gallons, partial mash)

Ingredients:

- 1.5 lbs. pilsner malt
- 2 lbs. malted wheat
- 0.5 lb. carapils malt
- 0.5 lb. Munich malt
- 2 lbs. unhopped wheat dry malt extract
- 1.5 oz. Hallertauer hops (4% alpha acid, 6 AAUs)
- American ale yeast (Wyeast 1056 or 1272)
- 1 to 2 drops 88% food-grade lactic acid, diluted 9 to 1
- 2 oz. raspberry wine flavoring essence
- 1 oz. pure lemon juice
- 7/8 cup corn sugar for priming

Step by Step:

Heat 2 gal. water to 162° F. Mix in crushed grains, getting the temperature as close to 152° F as possible, and hold at that temperature for 90 min. Sparge with 2.5 gal. water at 169° F.

Add dry malt extract to kettle and bring to a boil. Add the Hallertauer hops and boil 60 min. Remove from heat, add enough cold water to make 5.25 gal., and

cool to 68° F. Pitch yeast.

Ferment at about 65° F for two weeks. Rack to secondary, let age, and clarify for three to four weeks. Acidify with the lactic acid (it is important to dilute it — add a little at a time, stir in well, taste after each addition). Prime with corn sugar, add the raspberry essence and lemon juice, and bottle. Age cool (50° F) for three to four weeks.

OG = 1.045

FG = 1.015

25 IBUs

Alternatives:

All-grain: Increase the pilsner malt to 2.5 lbs. and the wheat to 3 lbs. Omit the dry malt extract. Mash temperatures will be the same, but increase the volume of water to 3 gal. to start and 3.5 gal. for sparging.

Extract: Steep the carapils, Munich, and 0.5 lb. malted wheat in 2 gal. of water heated to 150° F for 45 min. Add 4 lbs. wheat dry malt extract and bring to a boil. Continue as above.

Lactic acid: If you are overly cautious and don't trust yourself with high-concentration lactic acid, you can certainly omit it. The lemon juice will acidify and sour the beer somewhat, just not as much.

Sweetness: If you want your beer to end up a little sweeter, as it would with the addition of syrups to the glass, try adding a little (perhaps 1/2 cup) malto-dextrin powder or 1 to 2 oz. of glycerin (liqueur finishing additive) at bottling. Both additives are non-fermentable and increase the body and perceived sweetness.

Woodruff: Although it is optional to this recipe, woodruff can be obtained in or ordered through most homebrew shops. It does carry a minor government health warning, so read the label carefully. If you choose to use it, make a tincture by soaking 1 oz. of dried woodruff leaves in 2 oz. of vodka for the length of the primary and secondary fermentation. Add this tincture at bottling with the other flavorings.

somehow about a dozen bottles were flavored with all three. How it happened is a very long story — blame it on inattention, distraction, early onset of senility.

In any event, it was another one of those happy accidents. The sweet raspberry mixed well with the citric acidity of the lemon and the vanilla/clove/spiciness of the woodruff. The color was, well, kind of brownish gray. Not the most appetizing appearance, to be sure, but a very nice flavor and aroma. The next time I brewed it, I decided to bottle the whole batch with the mixture, and I managed to find colorless lemon and raspberry flavorings. This batch ended up only slightly greenish, but delicious.

The Berliner style of wheat beer is, however, a very tricky style to brew at home. The difficulty of obtaining the right combination of yeast and bacteria, and the trickiness of brewing a light yet flavorful beer without allowing any

one flavor to dominate, make it one to brew very carefully. I find it easier, personally, to cheat. I brew this as a slightly lighter-than-appropriate Bavarian weizenbier,

◆
I managed to find
colorless lemon
and raspberry
flavorings. This
batch ended up only
slightly greenish,
but delicious.
◆

use a regular ale yeast — or at least not a true weizen yeast — and then sour it with lactic acid at bottling. This gets me close to the tart acidity of the Berliner style, but I don't risk a lactic fermentation, which could get out of control.

For this recipe, I use only two of the three syrup flavors that are traditional, but you can use the woodruff, too, if you wish. The nice thing about this style and this recipe is that they are forgiving; if it's cloudy or grainy or yeasty or acidic...well, all of those can be very appropriate weissbier characteristics.

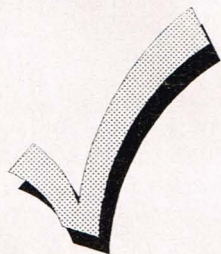
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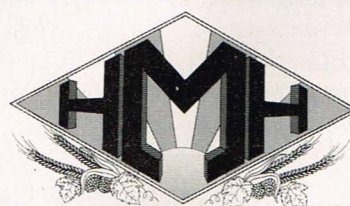
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This is also a good year-round beer to brew.

Jason Alstrom
via e-mail

Ingredients:

- 5 lbs. mild ale malt (preferably English)
- 0.5 lb. Victory malt (preferably English)
- 0.5 lb. dextrin malt (preferably English)
- 0.5 lb. crystal malt (preferably English), 80° Lovibond
- 0.25 lb. wheat malt
- 0.25 lb. dark brown sugar
- 1 oz. black malt
- 1.5 oz. Willamette or Fuggle hops (4.2% alpha acid) for 60 min.
- 0.5 oz. Goldings hops (5.4% alpha acid) for 15 min.
- 1/2 tsp. Irish moss
- Wyeast 1335 (British ale II)
- 1/2 cup corn sugar for priming

Step by Step:

Start Wyeast culture five days in advance, following package directions.

Mash grains in 2 gal. of water and stabilize at 152° to 154° F for one hour. Sparge with 5 gal. of 170° F water.

Total boil is 75 min. Boil 15 min. and add sugar, black malt, and Willamette or Fuggle hops. Boil 45 min. more and add Goldings and Irish moss. Boil 15 min. more. Cool wort to 68° to 70° F and pitch yeast.

Ferment for one week and then transfer into secondary for one more week. Bottle with priming sugar, age 10 days, then enjoy. Cheers!

OG = 1.045

FG = 1.008

26 IBUs

Discombobulator

(5 gallons, extract with grain)

This is a very nice lager that uses Belgian malt and Bavarian-style yeast.

Rick Maestas
Española, N.M.

Ingredients:

- 9.9 lbs. Belgian Abbey malt extract
- 3 oz. Special B malt

- 4 oz. chocolate malt
- 8 oz. wheat malt
- 1 oz. Tettnanger whole leaf hops (4.2% alpha acid) for 60 min.
- 0.25 oz. Saaz hop pellets (3.1% alpha acid) for 60 min.
- 1 qt. starter of Wyeast 2206 (Bavarian lager)
- 3/4 cup corn sugar for priming

Note: You can substitute amber malt extract and 12 oz. carapils if

you can't get Belgian Abbey malt extract.

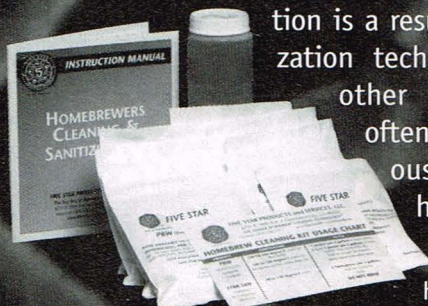
Step by Step:

Steep the crushed grains in 5 gal. of water at 155° F for 45 min. Remove grains and add extract. Stir until extract is dissolved thoroughly. Bring to boil. Total boil is 75 min. Boil 15 min. and add the Tettnanger and Saaz hops. Boil 60 min. more.

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Cool, top up to 5 gal., aerate, and pitch yeast.

Be sure to aerate more than you think is necessary. Ferment at 70° F for one day, then bring the temperature down in five-degree increments until you reach 50° F. Rack to secondary after gravity does not change. Store at 40° F for about six weeks. Prime and bottle or keg as usual.

OG = 1.076

FG = 1.026

23 IBUs

Mick's Oatmeal-Rye Stout (5 gallons, all-grain)

This is a delicious adult beverage with a very interesting texture and malt character, with chocolate and coffee overtones and a nice, lingering head.

Mike Mulhern
Camarillo, Calif.

Ingredients:

- 7 lbs. Klages pale malt
- 6 oz. black patent malt
- 1 lb. crystal malt, 40° Lovibond
- 1 lb. flaked oats
- 1 lb. flaked rye
- 10 oz. roasted barley
- 2.5 oz. Fuggle hop pellets (4.6% alpha acid): 1.75 oz. for 45 min., 0.75 oz. for 10 min.
- 1/2 tsp. Irish moss for 15 min.
- 1 packet Edme ale yeast
- 1 1/4 cup American amber dry malt extract for priming

Step by Step:

Mash grains in 3.5 gal. of water at 155° F for 75 min. Sparge with 4 gal. of 168° F water to collect 5.75 gal.

Bring to boil. Total boil is 90 min. Boil 45 min. and add 1.75 oz. Fuggle hops. Boil 30 min. more and add Irish moss. Boil 5 min. more and add 0.75 oz. Fuggles. Boil 10 min. more. Cool and pitch yeast near 70° F.

Ferment seven days or until done. Rack to secondary and ferment seven days more. Prime and bottle.

OG = 1.065

FG = 1.015

30 IBUs ■

Cooling Off the Hot (Side) Debate

Mr. Wizard

Regarding BYO's response (twice) to Dan Cole of Roanoke, Va., (Mail, August '98, March '99) about hot-side aeration; I know Dan and he is not given to asking contentious questions for the sake of being contentious. I think he has intelligently challenged you to answer a simple question with a real answer. You have twice told him that HSA is not a problem for homebrewers, but you have never given a researched or referenced answer as to why you believe this.

Perhaps most brewers do have a lot to worry about before HSA ranks on their list of problems. Some never get to the level of experience and scope of brewing where it may be an issue. However, as a subscriber, I feel a better answer to the question is called for. A little explanation as to why the editor disagrees so strongly with Mr. Wizard as well as your other feature writers would go a long way to settle this question.

*Andy Lynch and
Bob Bratcher
Star City Brewers Guild
Roanoke, Va.*

Before I jump head first into this colorful debate about hot-side aeration (HSA), I would like to explain where some of the comments in BYO mail and in some of the BYO articles stem. Most of the comments regarding this whole debate have come from commercial brewers who write for BYO.

To paraphrase, they have suggested to our readers not to worry about HSA too much because there are bigger problems to solve. Steve Parkes wrote that "the English

homebrewer is more likely to be opening a can of extract...than worrying about excessive wort splashing causing hot-side aeration" ("Brewing Like the British,"

December '98 BYO). Some readers might have thought Parkes was saying that splashing hot wort could cause HSA, but I think his point was that American homebrewers tend to worry about things more than the English.

Dan Cole has asked for an experiment conducted by a third party to confirm or deny the existence of hot-side aeration. This would be a great experiment if the topic were new.

Fortunately for those interested in HSA, it is a well-researched topic and the research conducted over the years clearly shows that oxygen pick-up during mashing and mash transfer has

an effect on beer flavor.

The topic of HSA can be divided into two are as: 1) aeration prior to wort boiling and 2) aeration after wort boiling. Malt enzymes, such as lipoxygenases and polyphenol-oxidases, that catalyze oxidation reactions are present in the mash and wort prior to wort boiling. In my opinion, this is where the HSA concern makes sense.

The second class of HSA is wort aeration after boiling. The only real consequence I have seen cited about aeration after the boil is an increase in wort color. Keep in mind that very hot wort, wort right after the boil, does not permit much oxygen into solution and under normal

brewery conditions this probably won't cause much wort darkening.

Anheuser-Busch (A-B) uses a device called a volatile stripper that forces hot air over thin films of wort after wort boiling to remove undesirable aromas such as DMS (dimethyl sulfide, which smells like cooked corn). Although A-B has adopted the philosophy of minimizing oxygen pick-up during mashing, mash transfer, and wort collection, the company still uses the wort stripper to make very pale-colored beers.

Personally, I believe the body of scientific evidence surrounding HSA in relation to mash and wort oxidation prior to boiling is believable. Luckily, the problem is easy to control. Basically, don't splash too much during mash-in, transfer from the mash pot to the lauter tun, and wort collection. This seems so simple that most people don't see the big dilemma.

Every serious homebrewer needs to visit an old brewhouse for a different perspective. Many older mash mixers used in commercial breweries had large baffles to aid in mixing. These baffles cause a lot of splashing, especially if the mash agitator is moving very quickly. Next the mash was pumped to the lauter tun. Almost every lauter tun built prior to 1970 was filled from the top. This literally resulted in mash being dropped at a high velocity from about five feet from the false bottom during filling — lots of splashing! Finally the wort was typically pumped into the top of the brew kettle, where it would cascade up to 20 feet to the kettle bottom, resulting in yet more splashing.

Today, mash mixers are designed with special agitator blades to minimize splashing during mash heating. Lauter tuns are filled from the bottom to ensure a very quiet fill. Some experimental lauter



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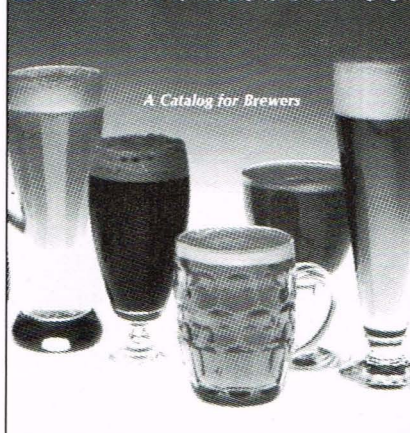
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Brewers Resource



Mr. Wizard

tuns even operate under a slight overpressure from carbon dioxide. New brew kettles are filled from the bottom, and the worry about splashing has been designed out of the modern brewhouse. Even the beautiful and traditional wort grant has been replaced by wort collection piping systems that eliminate any exposure of wort to oxygen during transfer from the lauter tun to the brew kettle. After wort boiling, most breweries use whirlpool vessels to separate hops and trub from wort, and even these vessels are constructed to minimize splashing during filling.

As long as homebrewers exercise a little care, the likelihood of having HSA problems is very slim. The truth is that commercial brewers are concerned about HSA and that companies that manufacture brewhouse equipment have responded to these concerns by changing their designs of the past.

The confusing part for the homebrewer is that many writers who write for homebrew publications also work in the commercial-brewing arena, and commercial-brewing concerns frequently become homebrew concerns. Unfortunately, Mr. Cole felt like he was being brushed off by past comments stating that HSA is not much of a problem for the homebrewer. For what it is worth, I don't feel that HSA is a huge issue for most homebrewers. However, for those inquisitive homebrewers such as Mr. Cole, HSA is an interesting topic.

Mr. Wizard

I have read several books and articles regarding mashing grains, but I am still not sure of the cause and effects on final flavor of different mash temperatures. Does a low temperature create a sweet beer? Does a high temperature create a dry beer? The answer to these questions always gets blurred through lengthy scientific explanations. Can you explain the cause and effect of mash temperature to this non-scientific brain?

*Tom Flanders
Kensington, Md.*

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There is more to mash temperature than finished beer flavor. Mash temperature has an effect on wort viscosity and ease of lautering, it affects the gelatinization of starch ("melting" of the bonds that make starch a crystalline structure), influences wort fermentability, and has an effect on proteins. There are more factors that can be thrown in if decoction mashing and double mashing (the type used for beers like Bud) are considered and if you want to know about the addition of industrial enzymes.

Unfortunately, questions about mashing usually end up with lengthy explanations of all of this stuff, and the answers often raise more questions than they really answer.

The sweet beer/dry beer question focuses the discussion to one area, and that is the activity of two enzymes: alpha- and beta-amylase. The important thing to know about these enzymes is that they both attack starch but in different ways.

Starch comes in two forms. One form is called amylose (about 25 percent of barley malt starch) and contains no branches; it is simply a string of glucose molecules connected like links of a chain.

The second form is called amylopectin (about 75 percent of barley malt starch), and this form does contain branches. Imagine a chain where one of the links is connected to two links and each one of these links is then connected to one other link. Now imagine this scheme where a new branch pops up after every 25 to 30 unbranched segments. The result is a complex structure originating from a single point. Think of a big oak tree with hundreds of branches. It might help to understand what follows if you draw a stick drawing of amylose and amylopectin.

Amylose and amylopectin have ends called reducing and non-reducing ends. The names are not that important, except that the ends of the branches in amylopectin are all non-reducing ends and its "trunk" is the only reducing end.

Amylose is easy because it only has two ends, and one is reducing and the other is non-reducing. When either one of these molecules is split, there is a reducing and a non-reducing end formed.

Amylose and amylopectin are made up of chains of glucose, a simple sugar. They are the only two molecules that alpha- and beta-amylase do battle with in a mash. To get to the heart of the question, I need to give some basics on the two enzymes.

Beta-amylase: 1) has optimal enzyme activity between 140° and 149° F; 2) attacks chains of glucose from the non-reducing end only to form maltose, a simple sugar made up of two glucose molecules. Beta-amylase chews through a chain of amylose like Pac-Man eating dots two at a time; 3) can't break a branch point in amylopectin; 4) is nicknamed the "fermentability" enzyme.

Alpha-amylase: 1) has optimal enzyme activity between 155° and 158° F; 2) randomly attacks chains of glucose and converts large molecules into a bunch of little chunks; 3) can't break a branch point in amylopectin; 4) is nicknamed the "liquefaction" enzyme.

If you want a full beer with a low fermentability, steer your mash away from beta-amylase. This means mash in toward the upper end of the alpha-amylase temperature window and keep the mash as short as possible while still achieving a negative iodine reaction (no black-blue). Although alpha-amylase does manage to produce some fermentables due to its random activity on starch, the higher temperature minimizes the likelihood of rogue molecules of beta-amylase running around whacking off chunks of maltose from the non-reducing ends of starch molecules.

This is kind of like chopping veggies. If you don't like small bits of evenly sliced carrots in your soup, don't invite the local chef who goes chop-chop-chop at 120 chops a minute; instead invite the Boy Scout who goes whack-whack-whack and moves on to the next carrot.

One technique that will further cripple beta-amylase is a thin mash.

Enzymes are more stable when they are latched onto their substrate (the substance they act upon), and a thin mash leaves a higher proportion of the enzymes floating around looking for their substrate. This is one of the reasons enzymes don't have a single optimum temperature. In any case, if you use a thinner mash, you will produce fewer fermentables than in a thicker mash (up to a point — you gotta have water to make wort!).

If your objective is to make a very fermentable wort for a dry beer, things get a little more complex. For starters you really want beta-amylase to be a happy camper. Mash in cool, say around 140° F, and give your mash a good long hold. This will allow beta-amylase to chop up all the amylose and the tips of the amylopectin branches. This is a good start, but there are still a lot of glucose molecules tied up in amylopectin. The only way for beta-amylase to make more maltose is for alpha-amylase to "open-up" amylopectin molecules (the starch that has no branches) with a few random whacks.

If you wait around long enough, alpha-amylase will start to open up amylopectin. Remember, its optimum activity is around 158° F, but it still is active at cooler temperatures, though it's much slower. As alpha-amylase opens up amylopectin, beta-amylase starts tearing into the new non-reducing ends and freeing more maltose. At the end of the "fermentability" rest, the mash should still be heated to around 158° F to achieve a negative iodine reaction. Bud Light is made using this type of mash profile, and the mash lasts for more than three hours. Unlike many other light beers, Bud Light wort has a low concentration of unfermentable carbohydrates and does not use exogenous enzymes (store-bought enzymes) in the process.

Another way to get alpha- and beta-amylase working together is to slowly increase the temperature from 140° F, after your initial 30- to 45-minute rest, to 155° to 158° F.

This is easier said than done at

home because small batches are harder to control than larger ones, but in commercial breweries using steam-heated, stirred mashes, this process is easy. The most common way of slowly increasing the temperature is to heat from 140° to 142° F and rest, then from 142° to 144° F and rest, and so on. This stair-step process is much easier to control than a continual rise from "A" to "B" because most mashing vessels are designed to heat at a constant rate and simply heating slower is not an option.

Stair-stepping can be done at home by carefully adding hot water a little at a time or alternating between heating steps and rests. The hard part is getting a good temperature reading while stirring and heating. If you are using gas or electric heat, don't crank the burners up too high because temperature overshoot will most likely follow.

Some brewers do a bit of both. They mash in for a beta-amylase rest and then rapidly raise the temperature to the alpha-amylase rest to avoid too much dryness in the finished beer. Other beers mash in even cooler for beta-glucanase or limited protease activity. This is where the topic of mashing starts to get big.

One word of caution. Many brewers, when first starting out, get what seems like an ingenious idea that will not work. The idea is start out at 158° F to let alpha-amylase do its thing and then to cool the mash down to let beta-amylase do its thing. This won't work because heat denatures enzymes at temperatures above their optimum, and denaturation is permanent. This idea does work in a decoction mash and in the American double mash because only a portion of the mash is boiled, but I'll save that topic for another day!

Mr. Wizard

I have seen primarily two techniques for preparing the specialty grains used with extract recipes. In

one the grains are steeped for 15 to 30 minutes in 150° F water, while in the other the grains are added to the water while still cold and removed just before the water begins to boil. Are these two techniques interchangeable? If they are not and I must use the specific method written in the recipe, how do I determine which would be best in those recipes where the procedure is not included?

*Doug Fetter
Trappe, Pa.*

To answer this question adequately, it is easier to begin with a different question. This question is: Are there any significant enzymatic reactions that occur during the steeping of specialty grains?

With the exception of lightly kilned malts such as Munich malt, Vienna malt, and some lightly toasted malts, specialty malts have little to no enzyme activity because of the high kiln temperatures used to make them. Crystal and caramel malts have no enzyme activity, but these malts have already had their starch converted to fermentable sugars during an extra step in kilning called "stewing." This means that when special malts are steeped in hot water, the only thing that really happens is that the color and flavor compounds created during kilning are extracted from the malt into hot water. Really, steeping specialty grains is not much different than making coffee or tea.

This is much different than normal mashing, because mashing temperature influences enzyme activity, and a change in mash temperature causes significant changes in the composition of worts made from enzymatically active malts, such as pale malt.

With regard to your question, I am sure that a controlled experiment would show that steeping special malts for 15 minutes in 150° F water will yield a wort that tastes different from a wort made from the same mixture of special malts added to cold water and removed right before boiling. I am also sure that if you took

these different worts and conducted a taste panel to determine which wort was best liked, you would not find a unanimous winner.

The point I want to make is that there are some parts of a brewing recipe that are key: malt types, mash temperature, wort original gravity, hop schedule, yeast strain, and so on. And there are some parts of a recipe that will affect flavor but are related more to technique than they are part of the recipe. These include milling method, mash tun design, sparge method, wort cooling method, and steeping method, just to name a few. Having your own set of techniques is one way to establish a signature in your beers.

Non-brewers often compare brewing to cooking. Brewers, on the other hand, usually explain why brewing is different from cooking. As brewers, we all know that brewing is not cooking, but the two do share many common threads. Technique is one of the more important commonalities shared by the two. Take two weekend chili cooks, give them the same recipe, and taste the results. Chances are that the two pots of chili will taste similar but not identical.

Personally, I like a signature touch and have developed a way of brewing and cooking over the years that I consider my own. The next time you brew up a batch perhaps you will conduct an experiment to determine which technique you like best or simply pick one of the methods and make it part of your personal touch! ■

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.

Two Summer Classics

by Mikoli Weaver

Summer! It really is the best time of year, and it's when we really seem to fall in love with our classic styles again, such as June's selections of pilsner and nut brown ale.

The pale brewed in May is ready this month. The amber can be cooled and consumed on June 6, which is also brew day for our first style this month, pilsner. Start right away with this one, because it will take about as long as the maibock did. Then in a week you'll start your second beer, nut brown ale.

Czech Revolution

For most brewers the formal definition of a pilsner is a lager made with hops grown only in the Saaz region of the Czech Republic. But this is not always the case; pilsner has broader implications.

There are three main types of pilsner: the traditional Czech style, German, and European, which is sometimes known as Dutch or Scandinavian. There is also an

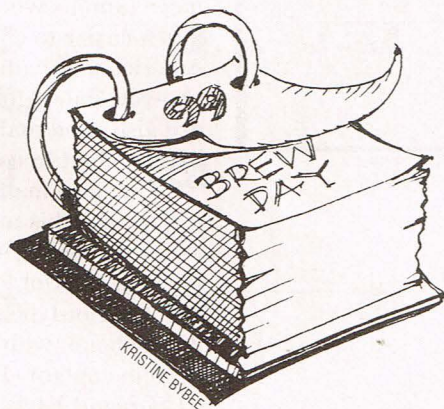
American version, sometimes spelled pilsener, which is often thought of as premium lager and all-malt beer. It is not often produced today, having been replaced by adjunct lagers for the most part.

The original pilsner, Plzensky Prazdroj (Pilsner Urquell), was first brewed in 1842. "Pilsner" refers to the Bohemian town of Plzen in the Czech Republic. "Urquell," which is Germanic, means original source. The pilsner style, and lagers in general, came together partly from advances in malting to create more pale-colored base malts, a viable lager strain of yeast, and mashing by decoction. Advances in equipment technology also played a role as steam was eventually used to heat brew kettles in lieu of fire, thus decreasing the amount of coloring that went on in the kettle. The Urquell brewery still uses a direct-fired copper brew kettle.

These factors created a pale, clean beer, which had never been seen. The introduction of glass drinking vessels served as further impetus. By the 1850s, pilsner — synonymous with lager then — was brewed in Germany and exported to Britain and slowly was gaining a foothold in the United States.

Modern Pilsners

Czech pilsners are very smooth and well rounded, but they have a distinct hop presence from the use of noble varieties, namely Saaz. The finish is very malty and in some cases can be slightly sweet. Terminal gravities run as high as 1.020 (5° Plato). The German examples are similar, but they are lower in original and terminal gravities. They also may have a more perceptible hop bitterness accompanying the noble characters due to



1999 Style Calendar

January Barleywine, Imperial Stout

A cold winter month with two powerful, warming beers. The barleywine will be aged for drinking on New Year's Day 2000. Coming off of December's highly hopped Christmas beers, this really starts off the year with a bang.

February Steam Beer, Dublin Stout

A refreshing steam beer to break up the dark season and a classic Dublin stout to drink in March for St. Pat's day.

March Dunkelweizen, ESB

Two nice beers to begin the early spring. Full of flavor and fun to drink.

April Maibock, Belgian Golden

Starts off with a seasonal maibock, lagered to drink in May, and a nice Trappist ale such as Orval.

May Amber Ale, Pale Ale

Two solid styles, an amber ale and a good American-style pale ale, to add some more hops to the spring season.

June Pilsner, Nut Brown Ale

A pils to start the summer and a nut brown to add a little variety to the summer season.

July IPA, Belgian Tripel

IPA is a summer must, followed by a powerful Belgian tripel to mix it up a bit.

August Witbier, Kölsch

Something for everybody, here are two light beers to fight the heat of the dog days of August.

September Oktoberfest, Hefe-weizen

An Oktoberfest to be lagered for drinking in October and a traditional Bavarian hefe-weizen to usher in the fall.

October Doppelbock, Scottish Ale

A big doppelbock and a Scottish ale to warm us as the nights cool and the leaves fall.

November Porter, Frambozenbier

Two festive beers for the Thanksgiving holiday. A big porter and a French raspberry ale that makes fruit beer acceptable.

December Christmas Ale, Old Ale

Starts off with a hoppy Christmas ale such as Sierra Celebration and an old (strong) ale such as Pyramid Snow Cap.

the higher degree of attenuation, decreased maltiness, and the use of hops other than Saaz (for example Northern Brewer and Perle). The Dutch style is lighter still, commonly made with some sort of adjunct such as corn or rice and attenuated to possess a very dry finish with little maltiness. (See Pilsner Specifications, page 20.)

Some better-known pilsners are Pilsner Urquell and Budweiser Budvar (Czech styles); DAB Pils, Warsteiner, and Spaten Pils (German styles); and Heineken (Dutch style). Beck's, brewed in Northern Germany, is also a very popular beer that models the light Dutch style.

For the most part, when people in the United States think of pilsner, it is Urquell that comes to mind, although some say that Budweiser Budvar (unavailable here) is a better product. The key to reproducing these beers is in understanding the ingredients and the methods involved, because they are a bit unorthodox at times.

Grain Bill

The base of the pilsner should be made of a malt that is as pale as possible and fits your mashing technique. If you insist on making things hard on yourself by doing a traditional decoction, then American or German six-row barley is probably what you want. The only problem is that six-row varieties have a thicker husk, which means more tannins when boiling. It is much easier to choose a good American, Canadian, or English two-row pale. Munich and Vienna are also good malts, but they must be very light in color.

The base malt recommended for the recipes this month is the same as for all the lagers covered, Beeston Chariot Pilsner. It is a two-row Chariot-type barley, 1.5° to 2° Lovibond, with a moderate protein content (10.5 percent to 11 percent) but a correspondingly high diastatic power and good nitrogen level. This means the malt will perform well in a single-infusion mash. The conversion temperature for Urquell is 149° F. That is how

these recipes are formulated. Other pilsners, particularly German varieties, work better at about 153° F.

Water

The water in Plzen is notoriously soft, having 35 parts per million (ppm) total dissolved solids. It is very different from other brewing centers in the world, such as Munich (275 ppm total dissolved solids) and Burton, England (1,100 ppm). So what does it mean? Not much, really. Hard water, like that in Burton, is supposed to be responsible for a more pronounced bitterness in beers, whereas soft water is thought to lend a more subtle bitterness. But the fact is that every mash needs to be adjusted to 5.2 to 5.5 pH for every beer, no matter what your water is like. So really what it comes down to is how to treat the water, not so much what the untreated water will do.

For example the Plzen water is very soft, but the very pale mash of a pilsner needs to be acidified. So you are actually hardening the water to get the numbers you want. Conversely, very hard water may need to be softened to reach the

mash pH desired.

The water profile for Plzen varies with the source consulted, but an average of three different water charts yielded these concentrations (in parts per million): calcium 7, sodium 2, magnesium 2, chloride 5, sulfate 5, and bicarbonate 15.

Mashing

The traditional method of mashing grain for Pilsner is the decoction system. The recipes given use Chariot malt, which lends itself to a single-infusion mash. For purists, the actual decoction schedule from the Urquell brewery has rests at 95° F, 122° F, 149° F, and 165° F.

Fermentation

Both Budweiser Budvar and Pilsner Urquell are produced by very traditional, very lengthy brewing methods. The primary fermentation step at Urquell is done in large wooden casks, pitched at 40° F, and fermented at 46° F for 14 days. Afterward it is transferred to lagering vessels and krausened. The yeast strains available now are very good and cover a wide range of

lagers. Good choices include Wyeast 2278 (Czech Pils), as well as 2124 (Bohemian lager) and 2007 (Pilsen). The 2124 is actually a bit more complex than the 2278 but not as flocculent, which may be a factor if you desire a very clear beer after bottle conditioning.

Lagering

It takes about three months for the beer to be ready to drink, mostly due to a long, cold lagering period. As in the fermentation stage, this is traditionally done in large wooden casks sealed with a thin layer of molten pitch. This also adds to the character of the beer. The alternative fermentation schedule given with the recipes represents a compromise. The beer conditions in the bottle and will be ready much faster. But if you want to emulate Urquell completely, use a 14-day primary fermentation and a three-month lagering period.

To lager use Cornelius kegs with 1 to 2 inches cut off of the draw tube. The keg can be put in a chest freezer, old refrigerator, or an ice-water bath in a plastic garbage can. Excess pressure from the still-active

June 1999

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3 PREP DAY • Assemble pilsner ingredients • Soak equipment in sanitizer • Start 2 pt. yeast starter	4	5
6 BREW DAY • Brew pilsner • Primary fermentation starts, check original gravity and record • Amber ale ready to drink	7	8	9	10	11 PREP DAY • Assemble nut brown ingredients • Soak equipment in sanitizer • Start 2 pt. yeast starter	12
13 BREW DAY • Brew nut brown • Primary fermentation starts • Rack Pils to secondary • Continue fermenting for 14 more days	14	15	16	17	18	19
20 TRANSFER • Rack brown to secondary • Check and record gravity • Check for off-flavors • Continue fermenting for 7 more days	21	22	23	24	25	26
27 BOTTLE • Sanitize bottles and bottling vessel • Record final gravity for both beers • Rack, prime and bottle both beers • Age brown ale 7 more days (Jul 4) • Age the pils at least 4 more weeks (Jul 25)	28	29	30			

yeast can be vented by using the release valve on top of the keg.

When the beer is ready and has cleared sufficiently, it can be drawn directly from the keg into bottles. It will be fairly free of yeast due to the cropped draw tube, and it will be carbonated from lagering under pressure. In fact this can be done in two stages, one for lagering on yeast and a second in which the beer is filtered into a fresh keg to be force carbonated. If you choose this latter method, use a rough filtration of 10 to 20 microns and follow with a polish filtration of 1 to 4 microns, depending on the condition of your beer. Alternatively, finings such as brewer's gelatin work very well, too.

For most brewers, bottle conditioning will work just fine. Most of the sediment should remain in the carboy. The remainder will fall to the bottom over the month of lagering in the bottle (longer if you can stand it). Chill the bottles a few days before drinking to help with cold break and further sedimentation.

When bottling choose amber-colored bottles, or keep your green ones away from all light. Green and clear bottles can produce skunky beer. Care needs to be taken with highly hopped pilsners, particularly ones containing Saaz hops, which easily react to light.

Nut Brown Ale

Brown ales, sometimes known as nut brown because of their color, originated in England and exist as a very strong style today. Brown ale is broken into two categories, Northern brown (sometimes known as strong brown) and Southern brown.

There is also a lower-gravity style of English brown ale known as mild ale, which is like the little brother to the Southern style. It is brewed in the West Midlands around Wolverhampton, or "Black County." Oregon's Deschutes Brewery makes a nice version of this beer called High Desert mild. In recent years this style has been split into light and dark mild in many competitions to reflect the many different versions brewed in the United Kingdom.

Examples of U.K. mild ale are Bank's Mild and Marston's Merrie Monk and Walnut Mild.

The character of English brown is light, with a moderate alcohol flavor. The Northern style has a short caramel finish, and the Southern style is darker, lower in alcohol, sweeter, and less bitter. The American version is a combination of the two, but it has more of everything and possesses a distinct American hop profile. All of the browns have toffee, chocolate, toast, and biscuit flavors associated with the use of the brown spectrum of specialty grains, although in varying degrees of intensity.

The guidelines for an English-style brown ale are: original gravity 1.040 to 1.050 (10° to 12.5° Plato), bitterness 15 to 25 IBUs, color 15° to 22° SRM, and alcohol by volume 4 percent to 5.5 percent. For American brown, the target numbers are: original gravity 1.040 to 1.056 (10° to 14° Plato), bitterness 25 to 60 IBUs, color 15° to 22° SRM, and alcohol by volume 4 percent to 5.9 percent.

The Northern brown is the most common brown imported into the United States, with Newcastle and Samuel Smith's Nut Brown probably the most prevalent.

American and hybrid versions from U.S. microbreweries include Pyramid Best Brown, Deschutes Bond St. Brown, Rogue Hazelnut Brown (which actually has hazelnuts in it), and Goose Island Brown.

Malt

Even though English brown ales are lighter than American browns, the grain bill is essentially the same. An American, Canadian, or British two-row pale malt should serve as the base, or use a combination of these. The two pale malts chosen in these recipes are a standard two-row malt such as Klages, Harrington, or Manley mixed with a significant amount of English Maris Otter for richness and depth. Alternatives are Maris Otter crosses such as Beeston's Pipkin Pale or Halcyon. The body should be fortified with light to medium

caramel malts to add sweetness, caramel flavor, and complexity to the specialty grains. Color ratings of 20°, 40°, and 60° Lovibond are good, as these malts can be used in moderate to high amounts without making the beer too dark.

However, if you are purposely trying to brew a brown ale that is very low in caramel character, such as a low-gravity mild ale, the higher-roasted crystal malts are good for just the opposite reasons. Just a little will add color and body, but the decreased amount in the grain bill means less added flavor. This leads to the use of roasted specialty grains for brown color and chocolate or toffee flavors. Biscuit malt, brown malt, and chocolate malt are good, and all are included in our recipe for American-style brown ale.

These recipes can always be simplified, but the complexity translates into quality. The English recipe is simpler, using only chocolate malt and one type of crystal malt as specialty grains. The English recipes contain no sugar, as is common in many browns.

Hops

Neither version should be overly hoppy, particularly the English recipe, which is more of a testament to the brewer's ability to create a well-balanced beer. The American-style brown can be more bitter, but it should be accompanied by an increase in maltiness and gravity as well. It is for these reasons that hop varieties with high alpha-acid contents are seldom used, in favor of increased hop rates of lower-alpha varieties.

It doesn't take a master brewer to figure out that an English brown requires traditional English hops and, similarly, the American version should be brewed using American varieties. Regular readers of this column have come to expect a few standards in the recipes given. The English recipe uses a Fuggle and Goldings program, which is perfect, but alternatives are Bullion for bittering and Brambling, Progress, and Wye Challenger for flavoring and aroma additions. The American

brown ale recipe employs Cascades for bittering and is finished with Liberty. Other good hops for American brown are Centennial (in moderation), Willamette, Crystal, and Mt. Hood.

Yeast Selection

Yeast selection and fermentation for the browns are exactly the same as the two pale ales from last month, Wyeast 1056 (American ale) for the American and 1318 (London ale III) for the English.

Bohemian Pilsner (5 gallons, all-grain)

This is a well-hopped pilsner with a slight caramel note in the finish and more color than other styles, much along the lines of Urquell. The numbers below are from the Urquell brewery.

Ingredients:

- 6.5 lbs. two-row pale malt
- 1 lb. carapils or dextrin-type malt
- 1 lb. caramel malt, 10° Lovibond
- 4 oz. Saaz hops (3.3% alpha acid): 1.75 oz. (5.5 AAU) for 90 min., 0.75 oz. (2.5 AAU) for 30 min., 1.5 oz. (5 AAU) at end of boil
- 2 pt. starter of Wyeast 2278 (Czech pils)
- 1/3 cup corn sugar for priming

Step by Step:

Mash grain in 2.75 gal. of water for 60 min. at 149° F. Sparge with enough 168° F water to yield 5.75 gal. of wort.

Total boil time is 90 min. At beginning of boil, add 1.75 oz. Saaz and continue for 60 min. more. Add 0.75 oz. Saaz and boil for 30 min. more. At end of boil add 1.5 oz. Saaz charge or, if flowers are available, use in hop back. Whirlpool and cool to 45° F to pitch starter.

Ferment at 45° F for three days, raise to 50° F over four days, and then rack to secondary fermenter. Continue fermentation for seven days until gravity is 1.018 (4.5° Plato). At this point cool to 40° F or below and let settle for seven days. Prime and bottle at 1.016 (4° Plato). Age at least four more weeks before drinking.

Terminal gravity for Urquell is

1.015 (3.7° Plato), so this should be right on.

OG = 1.049 (12.1° Plato)

43 IBUs

4.2° SRM

4.5% ABV

Bohemian Pilsner (5 gallons, extract with grain)

Ingredients:

- 6 lbs. very light pilsner malt extract syrup
- 1 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 10° Lovibond
- 4.25 oz. Saaz hops (3.3% alpha acid): 1.75 oz. (5.5 AAU) for 60 min., 1 oz. (3.1 AAU) for 30 min., 1.5 oz. (5 AAU) at end of boil
- 2 pt. starter of Wyeast 2278 (Czech pils)
- 1/3 cup corn sugar for priming

Step by Step:

Start with 5 gal. of water in boil kettle. Steep crushed grains in a nylon bag at 150° F for 30 min. Remove bag and rinse with enough

168° F water to make 5.5 gal. Add extract. Total boil time is 60 min. At start of boil, add 1.75 oz. Saaz and boil for 30 min. Add 1 oz. Saaz and boil for 30 min. more. At end of boil, add 1.5 oz. Saaz or, if flowers are available, use in hop back. Whirlpool and cool to 45° F to pitch starter.

Follow the fermenting instructions and refer to the specifications for the all-grain version.

American Brown Ale (5 gallons, all-grain)

Ingredients:

- 7.5 lbs. two-row pale malt such as Gambrinus or Great Western
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 40° Lovibond
- 0.5 lb. biscuit malt
- 0.25 lb. brown malt
- 0.25 lb. chocolate malt
- 1.5 oz. Cascade hops (6% alpha acid): 0.5 oz. (3 AAU) for 90 min., 1 oz. (6 AAU) for 45 min.
- 0.75 oz. (4.5 AAU) Liberty hops (6% alpha acid) at end of boil

Brewing Schedule Notes

June 3, Thursday Prep day for pilsner

Assemble all ingredients for pilsner, sanitize equipment, and start yeast culture for brewing on Sunday.

June 6, Sunday Brew day

Brew pilsner, record original gravity, and begin fermentation. Amber ale (brewed in May) is ready to drink.

June 11, Friday Prep day for nut brown

Assemble all ingredients for brown ale and sanitize equipment. Start yeast culture for brewing on Sunday.

June 13, Sunday Brew day

Brew nut brown ale, record original gravity, and begin

fermentation. The pilsner will be racked over to a secondary and the gravity recorded. Check for off-flavors or contamination. Continue for 14 more days.

June 20, Sunday Transfer

The brown should be ready for transfer to secondary. Record gravity and check for off-flavors. Continue for seven more days.

June 27, Sunday Bottle both beers

Both beers should be ready to bottle today. The nut brown will be aged another week before drinking, and the pilsner needs at least four more weeks. Date and reserve a case of the pils for drinking later in the year.

July brews: IPA and Belgian tripel.

World Beer Cup Pilsner Specifications

Pilsner Style	OG	IBU	ABV%	Color °SRM	Commercial Examples
Czech	1.044-1.056	35-45	4-5	3-5	Pilsner Urquell
German	1.044-1.050	30-40	4-5	3-4	Spaten Pils
Dutch	1.044-1.059	17-30	4-5	3-4	Heineken
American	1.046-1.050	13-23	4-5	2-8	Budweiser

- 1 pt. starter of Wyeast 1056 (American ale)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 3.25 gal. of water at 150° F for 60 min. Sparge with 168° to 170° F water to collect 5.75 gal. of wort.

Total boil is 90 min. At start of boil, add 0.5 oz. Cascade hops and boil 45 min. Add 1 oz. Cascades and boil remaining 45 min. At end of boil, add Liberty hops to finish. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Ferment at 69° F for seven days, then rack to secondary. Continue fermentation for seven more days until gravity is about 1.012 (3° Plato) or fermentation stops. Let settle, rack, prime, and bottle. Age seven more days before drinking.

OG = 1.056 (14° Plato)

33 IBUs

17° SRM

5.5% ABV

American Brown Ale

(5 gallons, extract with grain)

Ingredients:

- 7.5 lbs. pale malt extract syrup
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 40° Lovibond
- 0.5 lb. biscuit malt
- 0.25 lb. brown malt
- 0.25 lb. chocolate malt
- 1.75 oz. Cascade hops (6% alpha acid): 0.75 oz. (4.5 AAU) for 60 min., 1 oz. (6 AAU) for 45 min.
- 0.75 oz. (4.5 AAU) Liberty hops (6% alpha acid) at end of boil
- 1 pt. starter of Wyeast 1056 (American ale)
- 2/3 cup corn sugar for priming

Step by Step:

Start with 5 gal. of 150° F water. Steep crushed grain for 30 min. Sparge grains with enough 170° F water to make 5.5 gal. Heat to boiling and add extract syrup. Total boil will be 60 min. At start of boil, add 0.75 oz. Cascade hops and boil 15 min. Add 1 oz. Cascades and boil remaining 45 min. At end of boil, add Liberty hops to finish.

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Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Follow the fermenting instructions and refer to the specifications for the all-grain version.

English Brown Ale (5 gallons, all-grain)

Ingredients:

- 7.25 lbs. Maris Otter
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal, 40° Lovibond
- 0.25 lb. chocolate malt
- 1.5 oz. Fuggle hops (4.2% alpha acid): 1 oz. (4.2 AAU) for 90 min., 0.5 oz. (2.1 AAU) for 30 min.
- 1 oz. (5.5 AAU) Kent Goldings hops (5.5% alpha acid) at end of boil
- 1 pt. starter of Wyeast 1318 (London III)
- 2/3 cup corn sugar for priming

Step by Step:

Mash grain in 3 gal. of water at 150° F for 60 min. Sparge with 168° to 170° F water to collect 5.75 gal. of wort.

Total boil time is 90 min. At start of boil, add 1 oz. Fuggle hops and boil 60 min. Add 0.5 oz. Fuggles, boil remaining 30 min. At end of boil, add the Kent Goldings hops. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Ferment at 69° F for seven days, then rack to secondary fermenter. Continue fermentation for seven days until gravity is about 1.012 (3° Plato) or fermentation is finished. Let settle, rack, prime, and bottle. Age seven days before drinking.

OG = 1.048 (12° Plato)

23 IBUs

16° SRM

4.5% ABV

English Brown Ale (5 gallons, extract with grain)

Ingredients:

- 7 lbs. English pale malt extract syrup
- 0.5 lb. carapils or dextrin-type malt
- 1 lb. crystal malt, 40° Lovibond
- 0.25 lb. chocolate malt
- 1.75 oz. Fuggle hops (4.2% alpha acid): 1.25 oz. (5.25 AAU) for 60 min., 0.5 oz. (2.1 AAU) for 30 min.

- 1 oz. (5.5 AAU) Kent Goldings hops (5.5% alpha acid) at end of boil
- 1 pt. starter of Wyeast 1318 (London III)
- 2/3 cup corn sugar for priming

Step by Step:

Start with 5 gal. of 150° F water. Steep crushed grain for 30 min. Sparge grains with enough 170° F water to make 5.5 gal. Heat to

boiling and add extract syrup. Total boil will be 60 min. At start of boil, add 1.25 oz. Fuggle hops and boil 30 min. Add 0.5 oz. Fuggles and boil 30 min. At the end of boil, add Kent Goldings hops to finish. Whirlpool and cool to 69° F to pitch starter. Oxygenate/aerate well.

Follow the fermenting instructions and refer to the specifications for the all-grain version. ■

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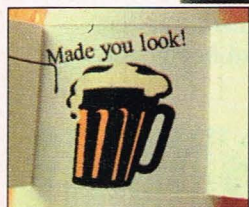
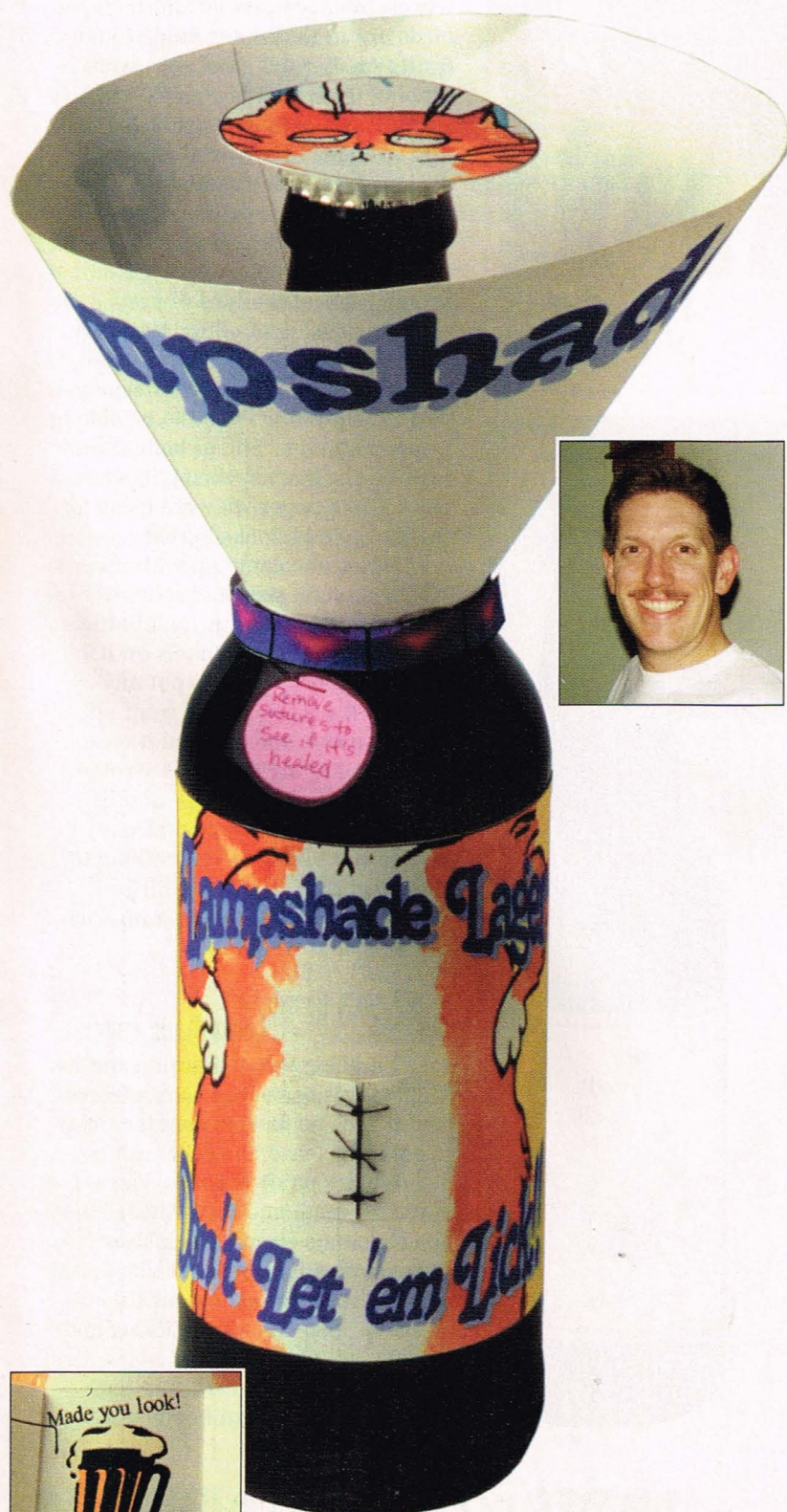
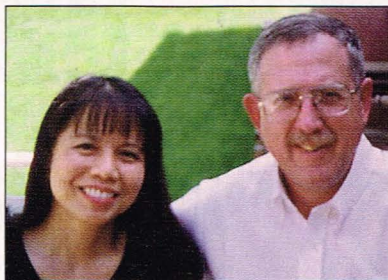
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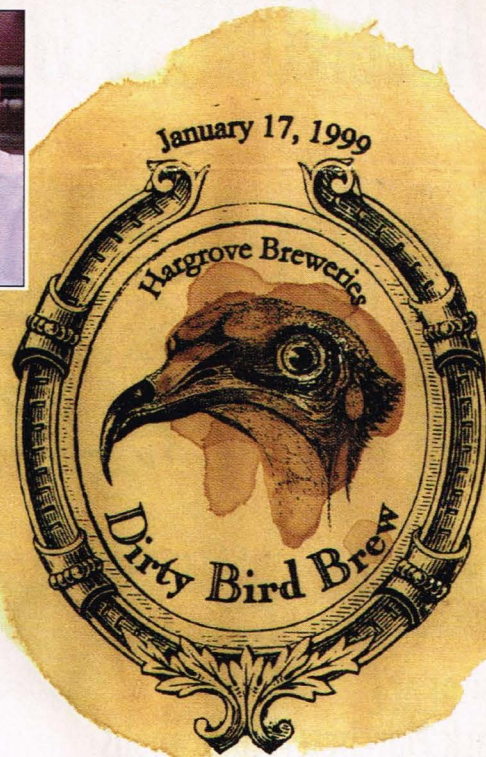
LABEL CONTEST WINNERS

by Erika Ehmsen

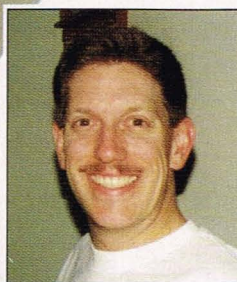
1st PLACE (amateur)
Jan & Connie Hargrove/Duluth, Ga.



BOTTLE PHOTOS BY TODD HAMMOND



2nd PLACE (amateur)
Thomas Pierce/Victorville, Calif.



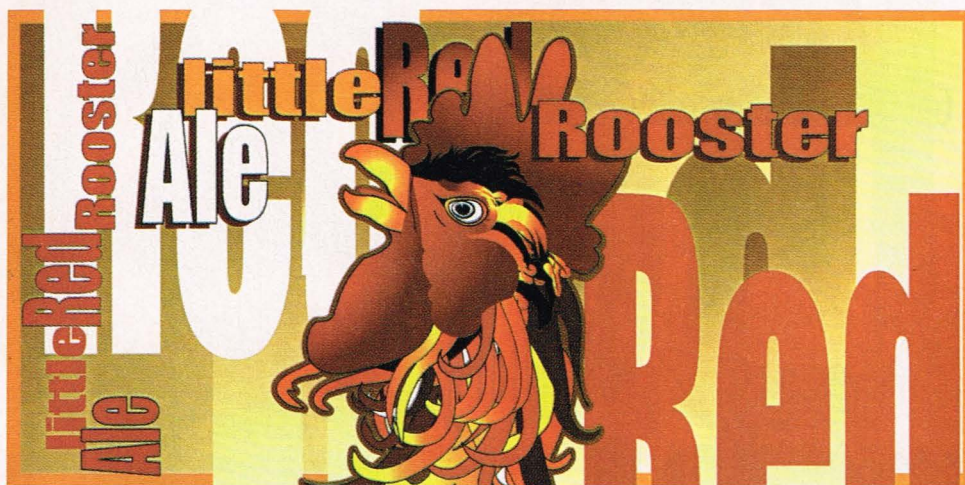
1st PLACE (AMATEUR) **Dirty Bird Brew**

A football game and a sibling rivalry spurred Connie Hargrove to create the Dirty Bird Brew label for his favorite porter. When the Atlanta Falcons and Minnesota Vikings were pitted against each other in the NFC Championship game in January, the Atlanta-dwelling Hargrove was inspired — inspired to tease his Minnesotan brother.

"The Atlanta Falcons started this bit about the Dirty Bird dance," Hargrove explains, referring to the endzone dance that Falcons running back Jamal Anderson would do when he scored a touchdown. "It came down to the Atlanta Falcons playing the Minnesota Vikings, and my brother lives in Minnesota and is a big fan of the Vikings. So (my wife and I) decided that we had to get a beer together to commemorate this."

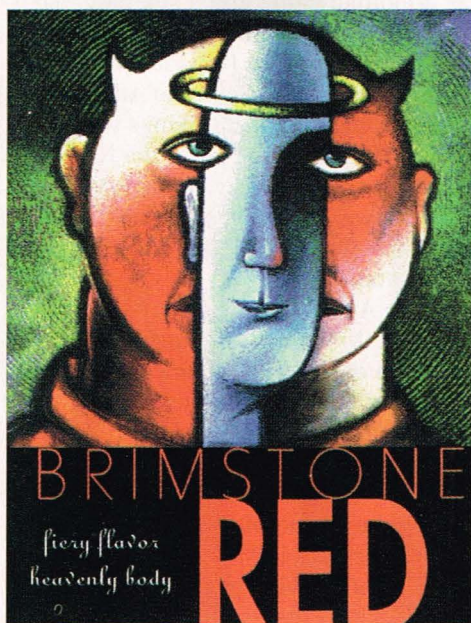
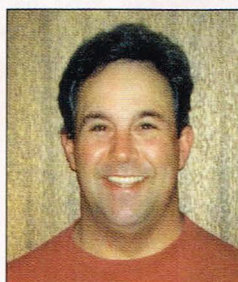
Hargrove and his wife, Jan, decided to make Harry's Robust Porter, a beer named for the owner

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1st PLACE (professional)
Jack Marchese/Minneapolis

3rd PLACE (amateur)
Chris Whitbeck/
Washoe Valley, Nev.



EDITOR'S CHOICE (professional)
Barry Fitzgerald/Lawrence, Kan.



of their local homebrew shop. "My wife said, 'We have to make a label for it.' And I said, 'Incorporate the Dirty Bird, if you can.'"

The bird on the label is an Egyptian vulture, picked because of its resemblance to a falcon (both birds are in the raptor family) and for its steely-eyed gaze. "We were flipping through a bird book and I said, 'This one looks nastier than any of them,'" Hargrove says. Jan designed the label around the clip art of the bird, designing the scroll on a computer. A tea bag was used to stain white paper the mottled brown color of the bird of prey.

"We drink a lot of tea, Hargrove says. "There was a teabag lying on the counter, and the color was just perfect. Jan said, 'I need to be able to incorporate this.' She picked up the tea bag and started wiping it across a piece of the paper we were using for the label, and it looked great.

"When she came up with the label I thought this is absolutely perfect, so we fixed us up a bottle and put one of these labels on it," Hargrove says. "I didn't put anything in the bottle, and I went ahead and capped it and shipped it to Minnesota to my brother. I wrote a little note along with it — and by this time the Falcons had already beaten the Vikings — something to the effect that 'The Dirty Birds drank your brew.' He got a big kick out of it, and we did, too."

2nd PLACE (AMATEUR) **Lampshade Lager**

Searching for an amusing and fun label for his beer, Dr. Thomas Pierce had to look no further than the many clients who leave his office with lampshades on their heads. Pierce is a veterinarian, and "lampshade" is the nickname given to the plastic cones, called Elizabethan collars, that newly fixed pets wear around their necks to keep them from licking and pulling out their stitches.

"I see all these cats and dogs that we have to send home with

LABEL CONTEST WINNERS • LABEL CONTEST WINNERS

Elizabethan collars to keep them from chewing at themselves," Pierce says. "I started thinking what would be fun to see on a bottle, and I thought I could make a label that has actual stitches in it that you can take out. (Then) I thought, let's put an E-collar on the bottle."

Thus was born Lampshade Lager. The beer itself is a California common. The label around the body of the bottle is drawn to look like a cat's abdomen, complete with real stitches (which Pierce laced up). A picture of a rather upset cat is on the bottle cap, and around the neck of the bottle is a paper cone designed to resemble an E-collar. Also around the neck is a pet-identification tag that reads: "Remove sutures to see if it's healed." Under the stitches is a "surprise": a picture of a beer with the words "Made you look!"

A cat in heat (that was subsequently spayed and sent home in a lampshade) was the inspiration for the prose on the back of the label.

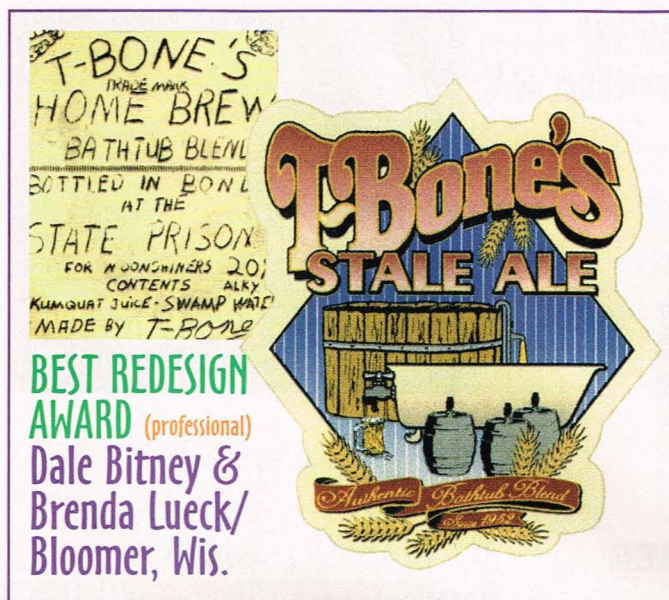
*Three a.m. my ears awake
The howls so loud I think they'll break
Calling the boys, not cats but men,
Alas, my cat's in heat again...
Tomorrow you can make a bet
This randy cat goes to the vet...
Minor charges that aren't too steep
Nothing compared to the price of sleep...
I pick her up and to my dread
"What's that lampshade on her head?"
Is she hurt or is she sick?
"Nope. It's just so she won't lick."
"Lick?" I thought, they can't be serious
I'll leave that on and she'll be furious...*

3rd PLACE (AMATEUR) Cottontail Pale Ale

Inspiration for the name of Chris Whitbeck's Rabbit Brewing Co. and Cottontail Pale Ale was just outside the homebrewer's front door and around the corner.

"I live on Rabbit Drive," Whitbeck explains. "The Cottontail Pale Ale I just came up with naturally because my cross street is Cottontail."

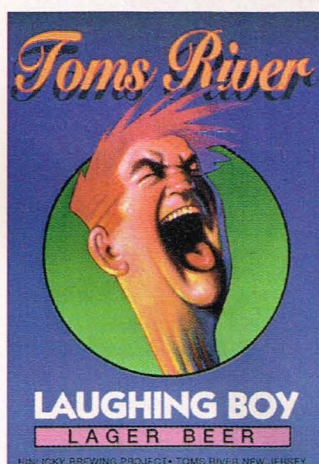
"I got to thinking one day, I've got to label my beer because all my buddies love it," he says. "I'm a full-time sports official and a full-time stay-at-home dad, so I brew every



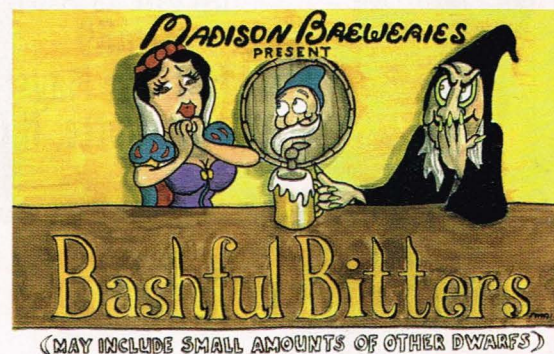
BEST REDESIGN AWARD (professional)
Dale Bitney & Brenda Lueck/
Bloomer, Wis.



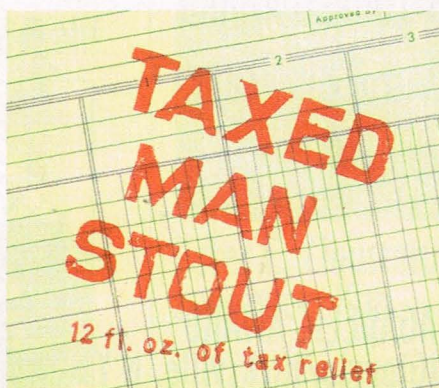
BEST TWIST ON ART AWARD (amateur)
Chris & Tammy Gordon/Lansing, Mich.



REQUIRES SUNGLASSES AWARD (professional)
Gregg Hinlicky/
Toms River, N.J.



TWISTED FAIRY TALE AWARD (amateur)
Adam Madison & Dave Douglas/Greenfield, Ind.

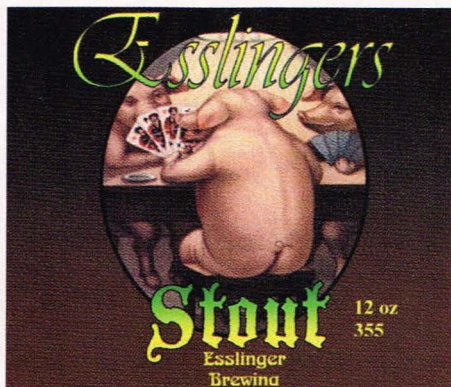
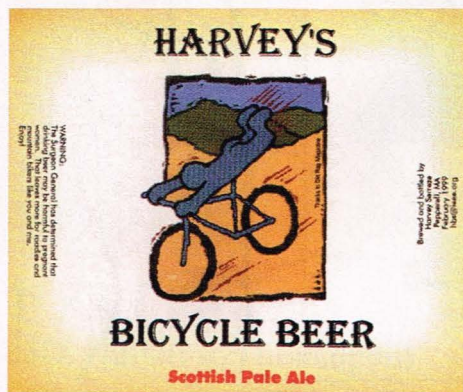


TOO TRENDY AWARD (amateur)
Jeremy Archer/
Glendale Heights, Ill.

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PIG IN A POKER AWARD (amateur) Richard Esslinger/Hurricane, W.V.



ALL DOWNHILL AWARD (amateur) Harvey Serreze/Pepperell, Mass.

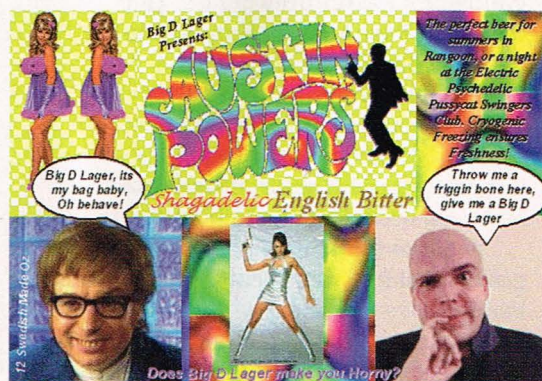
NATURE CHANNEL AWARD (amateur) Marlowe Mager/ Charlotte, N.C.



WISH WE HADN'T LOOKED AWARD (amateur) Thomas Pierce/Victorville, Calif.



SHAGADELIC AWARD (amateur) John DiGiorgio/Hicksville, N.Y.



other week and I share a lot of my beer with my umpire friends. So that's why I thought, I've got to come up with labels. So I started asking my friends to help me think up label names."

Whitbeck and his friends and family contributed names such as Hare of the Holiday Ale, Bunny Rabbit Bock, Jack Rabbit Red, and Peter Rabbit Porter, all of which are beers that Whitbeck regularly brews and bottles. He knew he wanted just the right rabbit on his label, and when he saw some drawings made by a friend, he asked her to try sketching a few bunnies. Her pictures formed the basis for the current rabbits on Whitbeck's labels, many of which are holding a mug of frosty homebrew.

The pastel-attired bunnies are the focus of Whitbeck's labels, but if you look closely you'll also notice a tiny bee on every label (on his winning entry, the bee is to the right of the uplifted beer mug). "The bee represents the honey," Whitbeck says. "I use honey in a lot of my beer. It gives it a higher alcohol content and it gives it a smoothness. I use two pounds of honey in most recipes, including my Cottontail Pale Ale."

Whitbeck enjoys extract and all-grain brewing so much that he's considering large-scale brewing. "I'm thinking about copyrighting the labels and the name Rabbit Brewing Co.," he says. "And I'm working on some...back labels and neck labels."

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THE PRIZES

First Place Amateur:

- Complete homebrew kegging system from Canada Homebrew Supply
- 10-gallon brew pot (Polar Ware #360BP) from Polar Ware
- Two tap handles from Sculpture Concepts

First Place Professional:

- 60-foot copper immersible wort chiller from The Grape and Granary
- 6.5-gallon cylinder conical plastic tank from Affordable Conical

Second Place Amateur:

- 1 Kool Keg (type to be chosen by winner) from The Beer Essentials
- Korney Keg for three- or five-gallon tank from The Beverage People
- King Kooker #83, propane outdoor cooker with 30-inch tripod stand, 155,000 BTUs, and flame-protective wind guard from Brew Your Own Brew

Third Place Amateur:

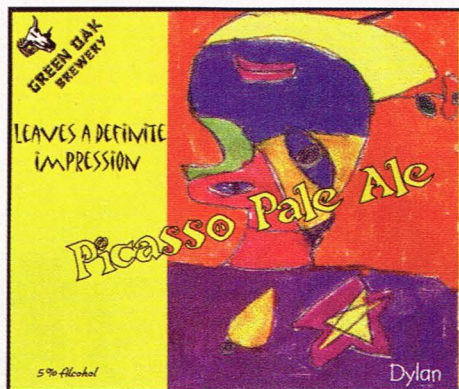
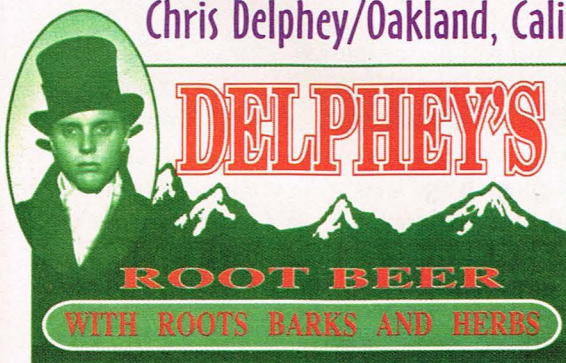
- Two Party Pigs with activation pumps from Quoin

Other Prizes Include:

- Wort Works Beer Kit and Vintners Reserve Wine Kit from Brew King
- 50-pound bag of two-row malt from Briess Malt
- 10 homebrew cleaning/sanitizing kits from Five Star Products
- One each of all Belgian sugars and herbs/spices in the Brewers Garden line from F.H. Steinbart
- Checktemp 1 (Microprocessor thermometer) from Hobby Beverage
- Brewer's Calculator (software) and *Using Hops* (book) from HopTech
- Three-month membership to Judy's Homebrew Beer Kit of the month club; signed copy of *Winemaking Judy's Way*, and *other Beverages*, too from Judy's Homebrew Shoppe
- Two-year supply (25 packs) of Straight-A cleanser from Logic, Inc.
- Domaine Tradition Wine Kit and Tundra Beer Kit from Mosti Mondiale
- Any two beer kits with White Labs pitchable yeast from Northern Brewer
- Four dozen golf balls, all Maxfli MO90, from Paulaner North America
- Cru Select Platinum Wine Kit (Australian Sav. Blanc) from RJ Grape
- Vino Europe Wine Kit and Belferm Beer Kit from Signeurie
- Cellar Classic Wine Kit and Brew House Beer Kit from Spagnols
- Four Books from Storey Books
- Two made-on-site ingredient kits (winner's choice) from Vintage Cellar

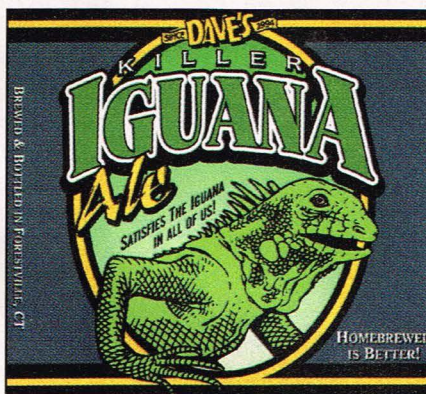
DICKENS AWARD (amateur)

Chris Delphey/Oakland, Calif.



BEE AFRAID AWARD (amateur)

Robert L. Seiple Sr./Tewksbury, Mass.



BEST REPTILE AWARD (professional)

David Levesque/Forestville, Conn.

FINE ART AWARD (amateur)

Gary Shewchuk/Brighton, Mich.

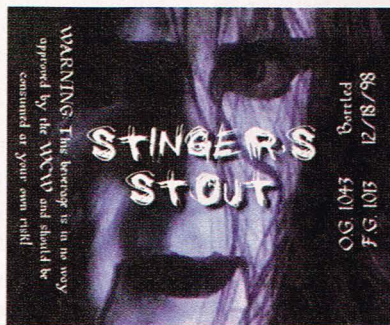


HELLUVA LABEL AWARD (amateur)

Al & Eric Gmutza/ Mount Vernon, Ind.

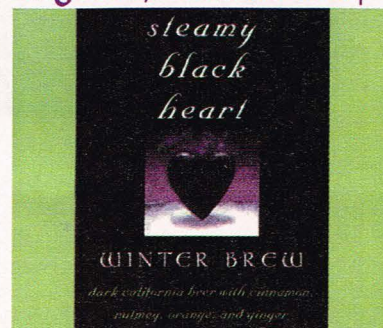


HEART OF DARKNESS AWARDS



Peter E. Clouston/
Lawrence, Kan. (amateur)

Edward Alderson/
Brighton, Mass. (professional)



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Grain Expectations

Exploring Specialty Malts and Recipe Design

Brewers always seem to get a bright gleam in their eyes when designing a new beer recipe.

Poring over available specialty malts and beer profiles, brewers drool with anticipation at the thought of filling a room with the sweet malt aroma from the mash, filling glass after glass of wort during the sparge to check the color and malt profile, designing the hop rate at the last minute, and telling vicious lies to other brewers about how the color and specific gravity hit their targets dead on. Standing like a proud parent, the brewer demands that everyone acknowledge the new beer, as if receiving a blessing from a miracle fount of holy water.

Only miracles can assure that every new recipe hits the target beer style every time, but brewers should never worry too much. Beer is beer. If sanitation is top notch, the beer will taste good, regardless of the target style. Professional brewers will change the name and style of a beer after primary fermentation, creating the common

illusion that they meant to brew the "new" style in the first place. With new recipes, the fun is in the process and in all the homebrew resulting from experimentation.

Homebrewers can choose from a wide variety of specialty malts, from American to imported malts, available whole or crushed at any homebrew supply store. Professional brewers are more traditional when designing new beer styles, and many would twitch with disgust at the idea of including 2 percent caraVienna malt in an American pale ale.

Homebrewers can brew under no such illusions of tradition and can add any specialty malt to any recipe, resulting in some very interesting and tasty beer. In the wide world of brewing beer, homebrewers maintain an edge over professional brewers because professional brewers usually stick to a limited selection of specialty grains.

Experimenting with all the available specialty malts can win homebrew awards, fill the garage with delicious beer, and defy the stubborn tastes of professional

by Douglas Fuchs



TODD HAMMOND

When you understand malt's role in brewing and are familiar with the flavor and color qualities of different malt varieties, you can experiment by simply changing the ratio of a few grains to create dramatically different beers.

Transformation: Experimenting With Grains

You can test the effects of both minor and significant recipe changes to discover the influence of each specialty grain on overall flavor.

The test works with any beer recipe with a low hop rate and only a few specialty malt additions. The yeast should be a neutral yeast, with few fruity or other flavors thrown off during fermentation. A good hop for this purpose is Saaz. Four to five pounds of light dry malt extract can substitute for pale barley grain in a partial mash.

The test recipe for this example begins with an American pale ale, in which the target color is light straw color with hints of copper. The target malt

profile is low to medium-low body with subtle caramel and malt flavor.

An addition of two specialty malts generates an American amber ale, in which the target color is bright amber. The target malt profile is a medium-bodied ale with distinct caramel flavor.

The substitution of one specialty malt for another generates a standard brown ale. The target color is amber-streaked brownish bronze. The target malt profile is a medium-bodied ale carefully blending caramel and light chocolate flavor.

All test batches are for five gallons with target specific gravities about 1.045.

Basic Recipe: American Pale Ale

Ingredients:

- 10 lbs. two-row pale malt
- 8 oz. Munich malt (for body)
- 8 oz. carastan malt, 13° to 17° Lovibond
- 8 oz. wheat (for head retention)
- 2.5 oz. Saaz hops
- yeast
- 2/3 cup corn sugar for priming

Step by Step:

Mash grains in 11.5 qt. 170° F water for an hour at 158° F. Sparge with 5 gal. 170° F water through sparge bucket into brew kettle.

Bring to a boil and add Saaz hops. Boil 60 min. Chill to 70° F and pitch yeast.

Ferment seven days around 70° F. Rack to secondary for seven days. Prime and bottle.

Notes:

The hop rate will not produce a classic American pale ale but will define a malt profile consistent with the style. The carastan defines the malt profile with subtle caramel flavor. Changing from carastan at 13° to 17° Lovibond to 30° to 37° Lovibond adds even more caramel flavor and light copper color while still defining the overall malt flavor profile as subtle, not aggressive.

Amber Ale

To adjust the recipe to generate an American amber ale, add two specialty malts, both crystal malt at different Lovibond ratings.

Ingredient Additions:

- 12 oz. crystal malt, 50° to 60° Lovibond
- 12 oz. crystal malt, 70° to 80° Lovibond

Step by Step Changes:

Increase the mash water to 13 qt.

Notes:

The addition of the crystal malts adds distinct caramel flavor and amber-red color. The beer should shift toward medium body. The malt profile should be a powerful component of the overall beer. Of course, the hops would again need to be increased to generate a true American amber beer.

Professional Results:

This process is a simplified version of the exact technique used by professional brewers to generate a new recipe. From an American amber ale to a standard brown ale, subtle changes in the grist bill result in subtle yet necessary changes in the color and malt profile of the target beer style.

Brown Ale

To adjust the recipe to generate a standard brown ale, use the amber ale recipe additions and step by step changes. The only change is to replace the Munich malt with an equal amount of chocolate or brown malt.

Ingredient Changes:

- Delete 8 oz. Munich malt
- Replace it with 8 oz. chocolate malt (light or dark) or brown malt

Notes:

The chocolate malt will complement the crystal malts, generating a round flavor profile rich in complex chocolate caramel, almost toasted malty flavor. The crystal malts could be adjusted as well, replacing the high-Lovibond crystal malt with brown malt to mix with the chocolate malt to generate a powerful brown ale with distinct malty flavor.

brewers who would never add 2 percent light chocolate malt to an all-grain British extra bitter.

Down to the Basics

The main job of the mash is to allow enzymes to turn the starches in malt into fermentable sugars and non-fermentable carbohydrates. The common base malt for brewing all-grain beers is pale barley malt. Pale malt provides most of the fermentable sugars and all of the necessary enzymes (diastatic power) in all-grain recipes. The enzymes created and activated from mashing pale barley grain assure complete conversion of starches to sugars of the entire grist bill (grains to be used for the brew). The addition of specialty grains (which do not contribute as much — if any — diastatic power as pale malt) defines the beer styles by adding specific flavors and aromas. Brewers can also add adjuncts, considered to be anything from oats, wheat, and rye to additives such as coffee. Any ingredient in beer not grain, hops, water, or yeast is considered an adjunct or additive.

When designing any beer recipe, always consider the diastatic power of the total grain bill. A good rule of thumb for new all-grain brewers is to keep the grist bill at least 65 percent pale malt to assure enough enzyme content to exact complete conversion.

Malting barley is a complex process. First, barley seed is steeped in water to generate and/or activate enzymes. The steeping process begins the germination of the barley grain seed, which is then kilned to stop the process and trap enzymes within each seed. By placing the germinated barley seed in a hot oven, the kilned grain develops its character. Pale malts are kilned at cooler temperatures to assure high enzyme concentration and low color. Specialty malts are kilned at higher temperatures for longer periods of time to raise the color, flavor, and aroma profile of the barley seed. A “modified” barley grain seed means it is malted by a maltster to maintain high enzyme content.

Most barley grains today are so highly modified that conversion from starch to sugar takes place in 15 minutes or less, especially if the grist bill features 60 percent pale malt or more.

Exploring Malts

A good way to move from malt extract brewing to all-grain is the partial mash. The extract provides the base malt, while the specialty grains define the beer style. Partial mashes can feature from one to four pounds of specialty grains for a five-gallon batch. Some homebrewers add five to seven pounds of two-row modified pale malt in the partial mash to extract base sugars from two sources, extract and all-grain conversion.

Purchase crushed grain, or lightly crush the grain yourself, maintaining as much full husk as possible. To create your mash add one quart of water for each pound of grain (this is the same ratio often used for all-grain brewing) to a pot. Bring the water to 170° F, add the crushed grain, stir like crazy, and try to maintain the temperature of the mash between 148° and 160° F for at least 20 minutes.

This temperature range is warm enough to release the malt's character, but not so hot that the malt releases astringent tannins. You can hold the mash on the stove. Another technique to maintain a consistent temperature with partial mashes is to pre-heat the oven to just warm, hit your target temperature, and put the pot in the oven. If you're mashing any pale malt, let the mash sit at the target temperature for an hour.

Strain the grains through a stainless steel strainer into your brewpot. This process is called lautering. Sparge at least one gallon of 170° F water through the grains to extract as much flavor as possible. Sparging is the process of spraying water over the grains after mashing to retrieve any residual liquid malt sugar clinging to the husks.

If the partial mash included pale malt, sparge one quart of 170° F water for each pound of grain, pale

malt and specialty combined. Don't worry about target temperature of the sparge water that much, except try not to sparge with water warmer than 170° F (which would extract tannins).

Turn the temperature all the way up to boil the wort. Just before full boil, when the foam begins to rise, remove the pot from the heat and add all the extract. Watch out for boilover! Partial-mash boils love to spill out onto your nice clean floor. After the protein break — you'll see the protein coagulate at the top of the wort — add hops.

Drink another beer and congratulate all involved on a job well done.

After a few partial mashes, many homebrewers get the itch to move to all-grain brewing. Partial mashing and all-grain brewing are different in that the specialty grains in a partial mash supply taste and color but do not need to have their starches converted to sugar. That's what the extract provides. All-grain mashes need to make this conversion. The all-grain mash needs to hit certain temperatures that make the enzymes most efficient.

Experimenting with temperature control of even a small mash can help move brewers from partial mashing to all-grain brewing. The experience with temperature control of the partial mash is what homebrewers need to increase the pale malt in the grist bill, making up for the sugars lost by eliminating the extract.

With all-grain equipment being fairly cheap, the additional cost of all-grain brewing is offset by the low cost of pale barley malts and specialty grain.

Crystal Malt

Specialty malts determine all of the color and malt profile of the beer, with the hop rate combining with the specialty malts to establish the aroma. New all-grain and partial-mash brewers should not be too concerned about color at first. Different homebrew systems and procedures will extract slightly different color effects from the

same grain. Only dedicated note taking and experience can help homebrewers and professional brewers learn how specialty-malt combinations result in specific target colors, from glassy amber ales to golden-bronze bocks.

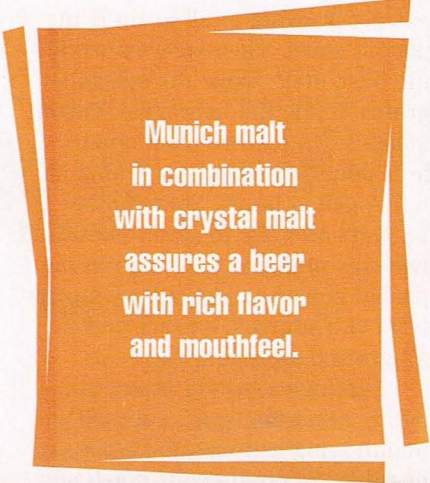
When designing a beer recipe remember that the higher the degrees Lovibond, a number that determines the color roast of the barley grain, the more color and roasted flavor will be imparted to the beer. For example one pound of carastan malt at 13° to 17° Lovibond in a five-gallon batch will impart a light shade of copper and subtle hints of caramel, while a pound of crystal at 90° to 115° Lovibond for the same batch will generate a medium to dark amber color and rich, slightly toasted caramel flavor.

The most popular specialty malt is crystal malt, a barley grain that imparts different shades of amber color and caramel flavor. Crystal malt also provides body and mouthfeel because the grains contain unfermentable sugars. Almost all ales contain some amount of crystal malt in the grist bill. Brewers usually use light crystal, called carastan, at 13° to 17° Lovibond, to impart body and mouthfeel to the beer. Another light crystal malt, carastan at 30° to 37° Lovibond, also contributes to body but can raise the color a few shades of copper while adding a light caramel flavor to the overall profile.

American and British pale ales (including IPA) feature about 6 percent of the grist carastan at 13° to 17° Lovibond and 4 percent or more of carastan at 30° to 37° Lovibond to result in the light copper to light amber color of the beer styles. Some pale-ale recipes also maintain 3 percent or less of medium crystal malt at 50° to 60° Lovibond or 70° to 80° Lovibond to darken the beer to a bright, rich copper with streaks of amber and increase the caramel sweetness.

The medium crystal malts define the malt profiles of Scottish ales, American ambers, and American red ales. Most brewers

add different percentages of every light to medium crystal malt available to the grist bill of these beers. A traditional American red can contain 6 percent carastan at 13° to 17° Lovibond, 4 percent carastan at 30° to 37° Lovibond,



**Munich malt
in combination
with crystal malt
assures a beer
with rich flavor
and mouthfeel.**

4 percent crystal at 50° to 60° Lovibond, 2 percent crystal at 70° to 80° Lovibond, and 2 percent crystal at 95° to 115° Lovibond. Eliminating the 95° to 115° Lovibond crystal can result in an American amber.

The dark-roasted crystal malts feature the rich, roasted caramel flavor and deep bronze color perfect for strong ales, old ales, porters, and stouts. Strong and old ales can feature up to 9 percent crystal at 135° to 165° Lovibond to darken the color and add the roasted caramel flavor that matures with aging to a smooth, crisp, and powerful malt profile.

Porters can feature a wide variety of crystal malt combinations, including 5 percent crystal at 70° to 80° Lovibond, 5 percent crystal at 95° to 115° Lovibond, and 5 percent crystal at 135° to 165° Lovibond in addition to the chocolate and black patent malts that determine the dark brown to amber-streaked black color of the style.

Stouts can also feature up to 9 percent crystal at 135° to 165° Lovibond to maintain the rich body of oatmeal and foreign-style stouts. Brewers usually feature the medium crystal malts in an Irish

stout recipe.

With any ale recipe, when in doubt, add light to medium crystal malts for body and mouthfeel and light caramel flavor and medium to dark crystal malts for rich, full-bodied beers with deep, slightly toasted caramel flavor.

Munich Malts

The next popular specialty malt is Munich malt, an imported German pale malt that sustains kilning at a higher temperature than American or British pale malts to impart a slightly darker color and richer flavor. Munich malt also adds body and mouthfeel but without the caramel flavor of crystal malts. Munich malt in combination with crystal malt assures a resulting beer with rich flavor and mouthfeel, the level of which depends on how much of each specialty grain is added to the total grist bill.

A superb example of an ale brewed with a high percentage of Munich malt is Rogue Ales Maierbock, a Pacific Northwest-style bock fermented with ale yeast. Rogue Ales' notable head brewer, John Maier, uses Munich malt as a base specialty malt in many of his beers, resulting in the big, rich, and full beers Maier traditionally brews. Any imported German bock, such as a Paulaner Salvator, expresses how a high volume of Munich malt tastes in a lager.

Munich malt is the base malt for German ales and lagers, replacing two-row pale malt. To brew a bock or doppelbock traditional brewers might sweat through a decoction mash (in which part of the mash is removed, boiled, and returned to the mash, sometimes repeatedly, to raise the temperature). But German Munich malt is so highly modified that an infusion mash (in which grains are added to hot water to reach and maintain a single temperature) will usually suffice. This is especially true if crystal malts or cara-malts are added to give the beer lots of body. Many homebrewers and professional brewers "cheat" their way through a German ale and

lager recipe by featuring 50 percent to 60 percent two-row pale malt and 30 percent to 40 percent Munich malt with up to 20 percent other specialty malts.

By using only Munich and crystal specialty grains, partial-mash brewers and beginning all-grain brewers can brew every pale ale beer style imaginable, as well as strong ales, old ales, Scottish ales, American ambers, and American reds. Most seasoned homebrewers suggest that new all-grain brewers stick to these styles at first because the experience blending different crystal and Munich specialty malts will help all-grain brewers design the malt profile and color of any beer style.

Branching Out

To brew porters and stouts, brewers can add chocolate, brown, and black patent malts to the grist bill.

A porter can feature 2 percent to 5 percent light chocolate malt, brown malt, or a combination of both. Brown porters can maintain 10 percent to 20 percent brown malt. A 2 percent addition of black patent malt can be added to assure the dark color of robust porters. Stouts can feature up to 12 percent light chocolate malt and 2 percent to 5 percent dark chocolate malt to assure the dark color and rich caramel, chocolate, lightly roasted flavor dictated by the style.

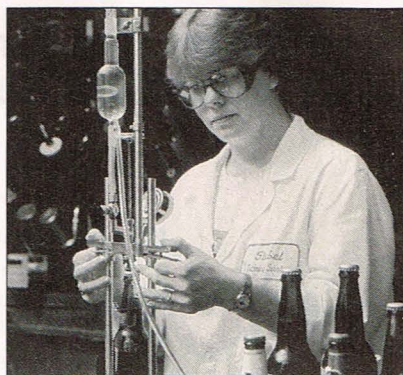
Other fun specialty malts include Vienna malt, used primarily in German-style ales to impart a slightly spicy malt flavor and rich copper color. Some brewers use cara-malts, especially when brewing rich German ales and lagers with an infusion mash system. Carapils adds aggressiveness to the beer and should be avoided except in extreme moderation. CaraMunich adds body and a more mellow malt flavor, but it should still be used in moderation. CaraVienna, the most commonly used and best in terms of adding the least amount of aggressiveness of the three, adds spicy malt flavor superb in aged, German-style, cold-conditioned beers.

Many other unique specialty malts can be used, from Belgian Special B — a rich, flavorful, and somewhat chocolate malt superb in porters — to Belgian Biscuit malt, an aromatic malt that imparts an inviting, lightly spicy aroma to pilsners. When designing a new recipe, add only a few ounces for a five-gallon batch of the unique specialty malts to assure that

the malt profile of the beer style isn't destroyed by adding a high percentage of grains that impart powerful flavors. But never worry too much about each result; there's always another brew, and the refrigerator will be full of tasty beer. 

Douglas Fuchs is a professional brewer based in Eugene, Ore.

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More Incredibly Practical

February's cover feature, "40 Incredibly Practical Brewing Tips," inspired readers to respond with their own favorite tips. Here is a sampling.

Efficiency Brewing

Make Use of Your In-Laws

To increase the amount of batches you do, adding more variety without more brew sessions, start brewing with a brew partner. I introduced my brother-in-law to homebrewing a few batches ago. Now we do batches together. Instead of having five gallons of a single style, we split the batches and each go away with one case of each style from that night's worth of brewing. Although the brewing session may be a bit more complicated, it doesn't usually take that much more time than just a single brew session.

— *David Russell*
Plymouth, Mich.

Presto Chango

I brew in my basement and use the rinse tubs for all my washing and sanitizing. To speed the

changing of my various accessories, including the Jet Carboy and Bottle Washer, rinse hose, and wort chiller, I attached quick-disconnect hose fittings made for use on garden hoses. I put a male nipple on the rinse-tub faucet, and a quick-disconnect female fitting on each accessory. This makes changing from one to another much quicker.

— *David M. Szakacs*
Niles, Ohio

Going the Extra Gallon

I brew all-grain and always bump up my yeast cultures. This tip makes sure I always have some sterile wort on hand for my yeast starters. I make 10-gallon batches (this will work for smaller or larger batches), but I always design my recipes for 11 gallons of finished wort. I only ferment 10 gallons and can the last gallon in canning jars. I collect the extra wort straight from the kettle and process the jars just

Real Brewing Tips

Cleaning

Dirty Bottles? Drill 'em

I find that previous homebrews have left deposits and haze in many of my bottles. First I soak them in a half-cup ammonia in three gallons of water for 15 minutes to loosen up the crud. Then I scrub them with a standard bottle brush.

To make this process go much faster, I modified the brush to fit my electric variable-speed drill. Use a hacksaw to cut off the loop at the end of the handle. You may want to cut more depending on the height of your bottles. Mount the cut-off end into the drill just like you would a normal bit. Push the brush end into the bottle and crank up the drill. Reverse the direction on the drill occasionally to keep the bristles from matting down in one direction. After you are done "drilling" the bottle, rinse and sanitize.

— Bruce Wells
Scarsdale, N.Y.



like canning vegetables. This saves having to dedicate time for making starter wort; it gets done when I'm already in the brewery.

— Tom Bechard
Rouses Point, N.Y.

Good to the Last Drop

To get every last drop of wort from the boiling kettle to the fermenter while leaving the trub behind, I have developed this procedure.

First boil wort; I usually do a concentrated wort boil. Add Irish moss during the last 10 minutes of the 60-minute boil. Cool with an immersion wort chiller. Whirlpool the wort and allow to settle. I separate the wort from trub by siphoning.

The trub remaining in the kettle

still contains a small amount, 12 to 16 ounces, of concentrated wort. Pour the remaining wort through a sanitized funnel into a sanitized glass jug. Seal air tight and put in refrigerator overnight. The trub will further separate during the cooling period. The next day, pour the clear wort through a sanitized funnel into a glass container. I usually use a 16- or 22-ounce beer bottle.

Cover the bottle and pasteurize the wort by putting the bottle into a pot of boiling water. Water should be one-half to three-quarters up the side of the bottle. Boil for 15 minutes. Note that the volume will increase as the wort is heated, so allow additional space in the bottle to compensate. After pasteurizing, cap and allow to cool. This sanitized wort can either be added directly to

the fermenting beer or used for a yeast starter for your next batch. If I'm going to use it as a starter, I usually add about 4 ounces of pre-boiled water to compensate for the higher gravity.

— Michael J. Matuszczak Sr.
Wilbraham, Mass.

Cleaning

Glue Repellent

Sam Adams labels are particularly difficult to remove from the bottle. I add about a half-cup of ammonia to three gallons of water and soak them over night. The next day, the labels are easy to remove or are already on the bottom.

— Bruce Wells
Scarsdale, N.Y.

Fermentation

Go With the Flow

When draining a bottle or carboy, turn it upside down and twist your wrist to cause the neck of the bottle to make a few circles. This sets up a whirlpool inside the bottle. Now air has a path up the vortex of the whirlpool, eliminating any glugging. And any little particles get suspended in the swirling water and exit the bottle in record time.

— Bill Harter
Waterford, Pa.



Cleaning With Grandma

It is necessary to scrub all your equipment before you sanitize it, but what about the inside of your racking cane or siphon tube? Solution: Take about a 10-foot piece of yarn and stick one end of the yarn into the end of your cane or siphon tube. Then suck the other end of the tube. The yarn will snake right through the tube. Now tie the two ends of the yarn together with a sloppy knot and immerse everything in a cleansing solution. Finally, pull the knot back and forth through the tube.

Incidentally, I find Grandma is a good source for yarn. She is always willing to swap the yarn left over from her last afghan for a few homebrews.

— Bill Harter
Waterford, Pa.

Also Good for Salad Dressing

Is the bottom of your brew kettle looking really bad, and scrubbing doesn't help? After

cleaning with soap and water, pour in enough vinegar to cover the bottom. Let it soak for 10 to 15 minutes, then wipe the beerstone away! Wash the kettle again with soap and water and admire the shine.

— **Michael Pelter**
Hammond, Ind.

Sanitizing

For That Sanitary Look

A long tub used for wetting wallpaper makes a great container for sanitizing long brewing items such as racking tubes, long-handled spoons, and even small parts. You can lay it in your bathtub, fill it with hot water, and add your favorite sanitizing solution. These tubs are cheap and are readily available at hardware stores and wallpaper supply stores.

— **Craig Weisman**
Louisville, Ky.

No More Chugging

Are you sick and tired of the time and effort that it takes to hold that 6.5-gallon carboy full of sanitation solution over the sink to empty it?

It sure does get heavy! It would go so much quicker if it didn't gulp and gargle on the way out. Well here's a dandy.

Immerse your racking cane into the solution and clip it into place. Invert the carboy over your sink, making sure the racking cane end within the carboy is in the airspace.

Tah dah! The water pours smoothly (and more important, quickly) from it. No more gulping and gargling.

This significantly cuts down on the time you have to spend lifting that heavy carboy. Consequently, you have more time (and energy) to have fun brewing.

— **Chad Cree**
Muncie, Ind.

Mashing

The Well-Dressed Mash Tun

Since I like to be able to apply heat from my stove-top burner directly to my mash tun to step up temperatures, I chose to have my 10-gallon stainless kettle do double duty as a mashing vessel.

To solve the problem of maintaining mash temperature at each step without constantly adding heat and stirring, I created a simple, cheap, and highly efficient "mash jacket" using materials readily available in any hardware store.

Just take a roll of that foil-coated bubble-wrap insulation used for hot-water heaters, cut it to size (including holes for the kettle handles), seal the cut edges with duct tape, and apply adhesive-backed Velcro strips to the ends. Then simply wrap the insulation around the kettle two times (securing with the Velcro). You're ready to mash on the stove! For

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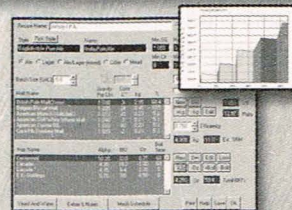
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added efficiency, you can cut out a circular piece to place over the kettle lid as well.

I've used my setup for more than 30 all-grain brews now, and it's still in great shape. As for efficiency, I only lose about 3 degrees during my 60-minute saccharification rest.

(Just a note: Avoid direct contact between the mash jacket and the burner.)

— Kurt Elia
Richmond, Va.

Prevent Hot Flashes

When mashing, I have found that temperature control is vital. Many home electronics stores sell digital thermometers that have probes designed to be placed on the outside of a building while the read-out is on the inside. The probe can be sanitized and placed in the mash to measure temperature very accurately. Unfortunately, the digital thermometers only go up to 158° F. So I've used a regular thermometer for the mash-out.

— Edmund F. Measom
Central Florida Home Brewers, Orlando, Fla.

Boiling

Boilover Rx

After experiencing several horrifying boilovers, I finally found the perfect solution. In a kitchen store I found an item called the "Pot Watcher." Simply drop this inexpensive glass disk into your brew kettle, and you achieve a great rolling boil without the added distraction of boilovers.

— John Bryant
Albuquerque, N.M.

Chilling

Get Chunky

If you brew from extract or partial mash, oftentimes you need a certain amount of "make-up" water to top off a batch to five gallons in the primary fermenter. I pre-boil make-up water and have it ready in a sanitized bottling bucket ready to add to the primary fermenter.

My tip is to freeze any leftover make-up water in sanitized containers so these chunks of

sanitary ice can be added to chill the next batch of brew and add to the final volume at the same time.

— Jon Stika
Dickinson, N.D.

Raspberry Ice

When brewing those summer weizens (it's never too early to start), try taking a sterilized plastic food-storage container and filling it with pasteurized (through boiling or canning) raspberry puree (make sure the puree doesn't include preservatives, which could inhibit yeast). Put it in the freezer the night before brewing.

Place the frozen fruit in the bottom of the primary before adding hot wort. This drastically reduces the temperature of the wort as the fruit melts, allowing you to pitch yeast without wort chillers or other bothersome quick-chill techniques!

— Andy Mulherin
Barry's Homebrew Outlet, Philadelphia

Supercharged Immersion Cooling

To increase the efficiency of my copper-coil immersion wort chiller (especially during those summer months when the coolest tap water is tepid at best), I simply added a second copper coil, connecting it to the main unit with additional vinyl tubing and worm clamps. Then, when I'm ready to chill my wort, I hook up the first coil to the kitchen faucet and set it in an ice-water bath in the sink and place the second coil in the hot wort as usual. Since the tap water must pass through the first coil in the ice water before it gets to the wort, it's a lot colder and the process goes a lot faster.

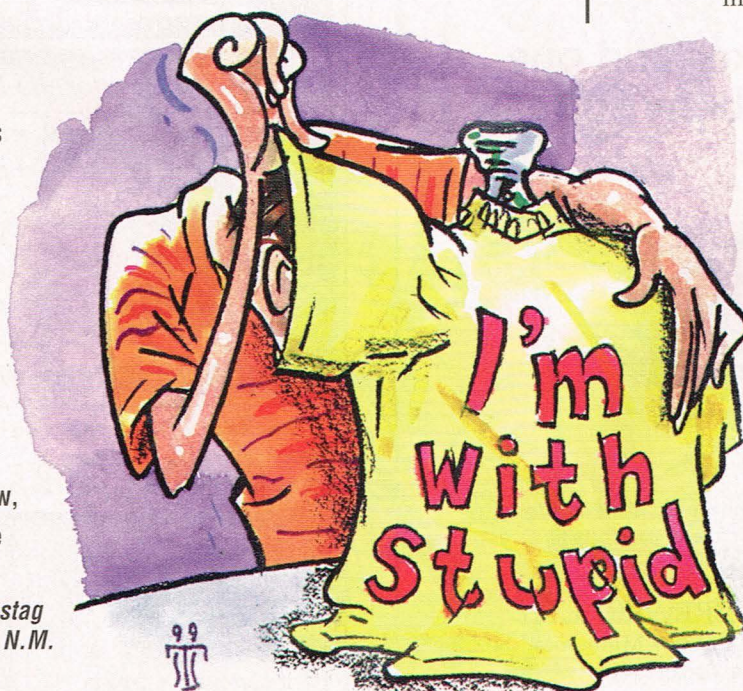
— Kurt Elia
Richmond, Va.

Aging

The Shirt Off Your Back

To keep my carboys away from the dreaded daylight, I use an old T-shirt. Just slip it on; the airlock fits through the neck hole. To snug it up around the neck, use a rubber band. To sneak a look at the brew, peek through one of the arm holes.

— Bill Krostag
Rio Rancho, N.M.



The Quick Chiller Method

Chill your wort in 15 minutes with an easy-to-make, double-coil immersion chiller. This is a quick do-it-yourself project that will give you cooling efficiency at less than half the cost of mail-order chillers.

Go to your favorite home supplies store and, for about \$20, purchase a 50-foot coil of 3/8-inch copper refrigerator tubing. In the same aisle you can also pick up two 4-foot sections of clear, flexible poly-tubing, two small stainless hose clamps, and an adapter for your kitchen faucet or garden hose (whichever is more appropriate).

Once you get home, start coiling one end of the copper tubing around the bottom of your five-gallon bottling bucket. The other half of the tubing can be coiled around something with a smaller diameter, say, a coffee can (this will be the inside coil). Connect the poly-tubing to each end of your new

copper chiller with the hose clamps and connect the faucet adapter to the free end of one of these sections.

Make sure that your hose clamps are snug or you'll have cold water shooting all over your kitchen walls (that never happened to me, of course).

— Andy Lowe
Vista, Calif.

If Only Mowing Were This Easy

I have garden-hose adapters on the input and output of my immersion chiller. I take the warmed water output of my immersion chiller and connect it to a garden sprinkler. Now, I water the garden and lawn while brewing! I find that the water is just warm by the time it comes out of the sprinkler, flies through the air, and hits the ground, so you don't have to worry about cooking your grass.

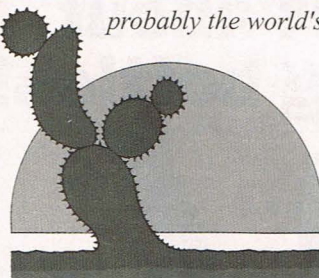
— Bruce Wells
Scarsdale, N.Y.

Pump Up Your Beer

A quick, easy, and fairly cheap way to cool your wort is to use a Powerhead. A Powerhead is used in an aquarium for the under-gravel filter or to create a current. Prices range from \$20 to \$100.

I use the "Powerhead 201" (about \$30). Another item you will need is a large plastic tub (about 12 gallons) with nice rope handles. These lightweight, durable tubs are available at discount department stores and sell for \$9.99 (\$5.99 sale price). You can also use the tub as a water bath for fermenting beer and for equipment storage.

The Powerhead comes with a grill for the intake and two mounting devices (use the suction-cup mount). Attach the intake grill and mount the Powerhead so the bottom of the Powerhead is one inch to two inches above the bottom of the tub. It is very important to fill the tub with water until the



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Powerhead is covered. Do not run the Powerhead without water; this will burn out the pump. Also, the hot brewpot might melt the bottom of the tub without water.

Take the brewpot off the fire and put it in the tub. Turn on the Powerhead and add ice up to a few inches from the top of the pot. The bonus to this method is that the current causes the pot to slowly spin, which creates a whirlpool inside the pot, helping to settle out trub. This method cools five gallons of boiling wort down to 70° to 72° F in 30 minutes.

— *Richard and Bruce Mackay
Mackay Ales, San Diego*

Just Don't Add Coolant

If you have an old car radiator, you can use it as a pre-chiller to go in-line before your immersion chiller. You drop the radiator in a cooler of ice water and chill the water going to your immersion chiller. Fittings can be made from

parts found at your local hardware or automotive store.

— *Gregg Stephens
LaGrange, Ga.*

any restaurant-supply store for \$5 to \$6.

— *Stuart Comen
Cheshire, Conn.*

Fermentation

Whip It Into Shape

As well as being a homebrewer I am also a chef. Whenever I need to incorporate air into a mixture I use a whip.

The one I use for aerating my chilled wort is called a 16-inch piano-style whip. It is made of stainless steel, so it cleans and sanitizes very easily. With proper care it will last almost a lifetime.

After I cool my wort I whip it for one to two minutes. After this very short time I have at least a 2-inch froth on top of my wort. I pitch my yeast and let it go. I've had great success with this method.

The whip can be purchased at

Blow It Off

I've just started using Cornelius-style soda kegs in the brewing process. It occurred to me that it would be a good idea to conduct secondary fermentation in the Cornelius keg. However, the pressure build-up from the CO₂ being generated by the yeast would be a problem. So, I put together an airlock designed for a Cornelius keg.

I started with the gas-side quick connect, the bend from a racking cane, and a standard three-piece airlock.

I cut the bend of the racking tube away from the shaft. Then I connected the bend with the gas-side connection and airlock by two pieces of tubing on either side of the bend. I used two pieces of tubing to



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reduce the diameter from one fitting to the next.

— **Edmund F. Measom**
Central Florida Home Brewers, Orlando, Fla.

Aging

Get a Clear Look at Aging Beer

When bottling with my standard brown bottles, I always try to add at least one clear bottle for each batch. This gives me an opportunity to see what is happening to the color and clarity during its maturation. If your beer is stored properly away from light and heat, there should be no difference in its taste compared with your brown-bottled versions.

— **David Russell**
Plymouth, Mich.

Handy for Moving, Too

If your carboy came in a box, you have the perfect carboy cover. Completely open one end of the box, normally the top. Then tape the flaps together, so the flaps continue straight and flat with the sides of the box. This makes the box taller than it was. Flip it over the carboy, and you have an instant cover. The extra height of the box gives you space for the airlock.

— **Bruce Wells**
Scarsdale, N.Y.

Shake, Shake, Shake

While bottle conditioning I often get yeast that clings to the side of the bottle. I find the best way to get rid of it is to shake the bottle vigorously. I grab the bottle by the stem, turn it upside down, and shake well until there is no more yeast on the bottom of the bottle. When the yeast settles out, in a few days, there is no more yeast on the side of the bottle.

— **Bruce Wells**
Scarsdale, N.Y.

Transfers

Making the Move

Here is the method I use to ensure additional air is not added to

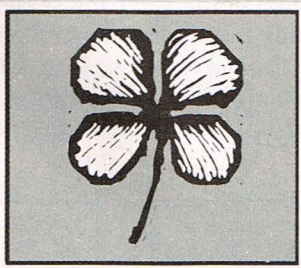
my fermenting beer while transferring it from the primary to the secondary fermenter or to the bottling bucket. This method is also effective for rinsing the secondary carboy or bottling bucket.

A couple of days before transferring the beer, boil one-plus gallons of water for 15 minutes. At the end of the boil, pour it directly into a one-gallon juice jug. Make

sure to preheat the glass jug. Cover the jug with plastic wrap, secure with a rubber band, and cover with aluminum foil in case the plastic breaks. Let cool to room temperature.

To siphon, fill the racking tube with water from the kitchen faucet. Don't worry about bubbles at this point. Insert the racking cane into the glass jug. Lower the other end

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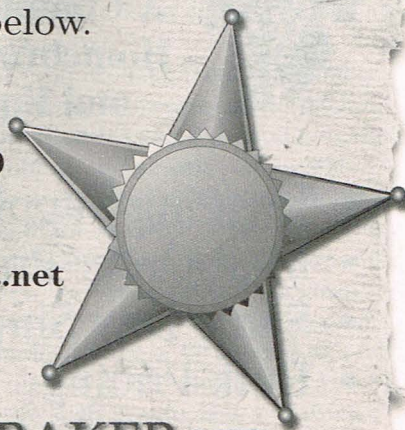
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into the secondary and start siphon. Pinch out any air bubbles in the siphon tube. Move the tube around inside the carboy to thoroughly rinse off any remaining sanitizing solution. When the level in the juice jug falls to about three inches from the bottom, clamp the siphon tube to shut off the flow. Raise the lower end of the tube and put it into the glass jug with the racking cane to keep it filled with water. Swirl and empty water from the secondary.

Lower siphon tube back into secondary. Insert racking cane into the beer. Start siphon.

This method is sanitary and efficient because it allows the brewer to use sterile water to rinse the carboy. It is also, for me, the easiest way to siphon.

— *Michael J. Matuszczak Sr.*
Wilbraham, Mass

Simply Having a Ball

Sterilize the racking cane, the

siphon hose, and an in-line ball valve (available from homebrew retailers). Attach the siphon hose to the cane and insert the in-line ball valve at the other end of the hose. Start the siphon by sucking on the in-line ball valve and shut it off as it reaches the valve. Remove the in-line ball valve and allow the beer to flow into your transfer carboy. You have a sterile end and do not have to hassle with water or additional tubing.

— *Chris Godfrey*
Mission Viejo, Calif.

New Uses for the Old Cane

I cut a racking cane about five or six inches below the curve. The straight part I use when racking. I attach it to the siphon hose and use it to direct the flow to the bottom of the receiving vessel. This avoids splashing and aeration.

The curved piece I use when rinsing and draining carboys. Just stick it in the mouth of the carboy. It

lets air in the bottle, draining it much faster.

— *Gary Muehe*
Bridgeview, Ill.

Storage/ Transportation

A Couple of Crate Ideas

I've found these cheap storage cubes (available at any Wal-Mart or home center) to be invaluable. Place a carboy in a milk crate, and you have protected it from breakage and given yourself two sturdy handles to carry it with.

You can also turn the milk crates over and stack one on the other on your counter top. This creates a light, strong, and removable shelf to place your bottling bucket on, enabling you to use a gravity-fed bottle filler without crouching on the floor.

— *Kurt Elia*
Richmond, Va.



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Keeping Your Yeast

Healthy

by Larry Lesterud

As a professional brewer I am often asked for homebrewing advice or to sample and critique homebrewers' wares. Most often I am quite impressed with the talents of our local homebrewers and find the quality of their beers comparable to commercial examples. Every once in a while I taste one that has gone awry, and the most

common problem associated with those beers is a lack of attention to what I feel is the most important and underestimated ingredient in beer: yeast.

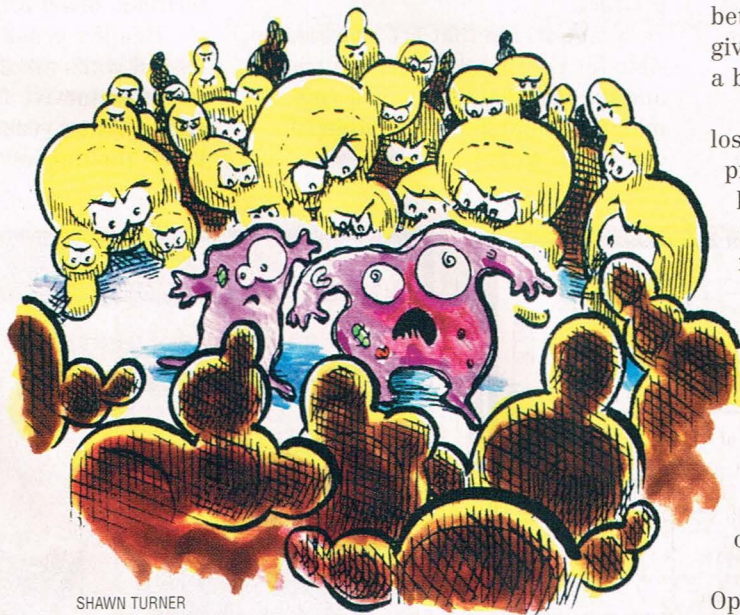
Yeast is a carbon-based lifeform just like you and me and has many of the same requirements for a healthy, productive life. Your efforts to feed and take care of your yeast will reward you with consistently better beer. Exercise your yeast, give it plenty of fresh air, and feed it a balanced diet.

Exercise simply means use it or lose it. If you picked up a fresh pitch from the brewery downtown but left it in the refrigerator for a month, it might be time to re-culture or make another trip to the brewery. Your yeast is no longer fit to sustain a healthy fermentation, and off-flavors will likely result from autolyzed (dead) yeast. You could also suffer a stuck fermentation even though you pitched what seemed like plenty of yeast.

The problem is one of viability. Optimally a brewer should pitch a slurry with as close to 100 percent viability, or live cells, as possible.

Vitality is also an issue. Yeast might be alive but in poor condition if nutritional requirements are not met. Be sure to pitch fresh yeast, supply it with plenty of oxygen at the beginning of fermentation, and supplement with nutrients if you brew high-gravity beers or brew with a high percentage of adjuncts.

Perhaps the most important yeast nutrient is molecular oxygen. Without oxygen, the growth of new yeast cells is limited, which results in inferior, slow, or incomplete fermentations. The addition of oxygen



SHAWN TURNER

is critical when the yeast is to be re-pitched into successive batches. The results of oxygen deficiency become most apparent after several batches when yeast viability and vitality decline, often resulting in autolysis, stuck fermentations, increased diacetyl (buttery flavor), and high levels of esters (fruity flavor).

Assure that the wort is cool before aerating it and pitching the yeast, because the solubility of oxygen decreases with an increase in temperature. Oxygen solubility is also inversely proportional to wort density. When fermenting strong worts, you need greater aeration. This is because oxygen is less soluble in a high-gravity wort and yeast needs more oxygen to ferment a strong wort.

While too little oxygen prompts reduced viability and vitality, too much oxygen can cause nutrients to be expended in excessive yeast growth rather than the production

of alcohol. But I have yet to hear of a case of over-oxygenation by a homebrewer, since most homebrewers do not have the means to inject pure oxygen into their wort. To aerate your batch, shake or rock the fermenter until a dense foam head appears on the surface of the wort. Some homebrewers use an aquarium pump with a sterile air filter and aquarium aeration stone, but great care must be taken when employing this method because of the risk of contamination.

During the aerobic growth stage at the beginning of fermentation, yeast cells use oxygen for the synthesis of cell membrane constituents such as fats and sterols. Without oxygen, yeast growth is limited, and defects become apparent in the final product.

Components that are responsible for the metabolism of nutrients and the building of new cell-wall material could build up within the cell rather than being excreted. This

causes higher levels of esters.

As much as they need oxygen, yeast need vitamins and minerals. Read the label on a bottle of vitamin B. Chances are, the source of vitamins is brewer's yeast, and in fact yeast is one of the few food sources to contain nearly all of the B-complex vitamins. Go ahead and pop a vitamin B for yourself: it may prevent a hangover. As for your brew kettle, give it some brewer's yeast. A tablespoon should be enough for a five-gallon batch. At our brewery we put a pitcher of yeast in every 50-barrel brew at the beginning of the boil. If you don't have fresh yeast available to put in the kettle, any yeast-nutrient packet will serve well. Most yeast-nutrient packets are simply fortified, dried brewer's yeast.

Healthy yeast contains within its cell walls all of the nutrients it needs to survive for a short time in stasis. When yeast is boiled in the kettle the nutrients are released for



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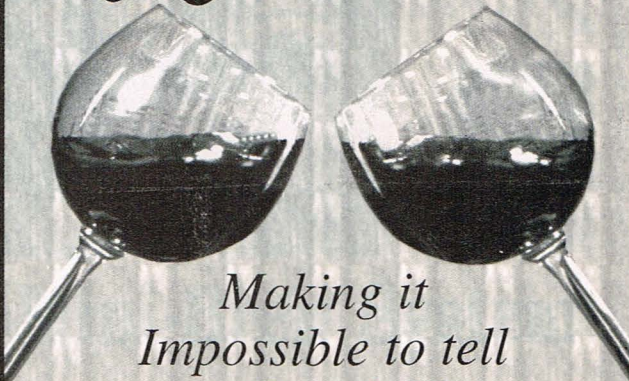
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the next generation. Those nutrients include amino acids, which are a source of assimilable nitrogen, and vitamins such as niacin, thiamin, pantothenate, riboflavin, folic acid, pyridoxine, and biotin. Yeast also contains minerals such as potassium, iron, copper, zinc, phosphorous, magnesium, and calcium. Calcium and magnesium ions also come from brewers' salts and brewing water and aid in yeast flocculation (clumping and sinking). All of the nutrients in yeast are thermostable, even though the yeast cells themselves will be killed in the boil.

Most of these same nutrients are also found in malt, along with carbohydrates, or fermentable sugars. Those sugars include maltose, maltotriose, glucose, sucrose, and fructose and are broken down by enzymes within the yeast cell wall during fermentation.

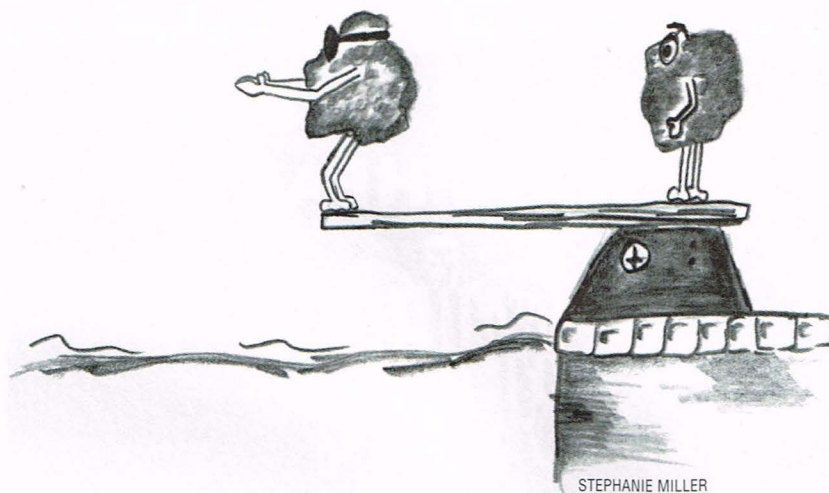
Fermentable sugars are the primary carbohydrate for the

production of alcohol and carbon dioxide.

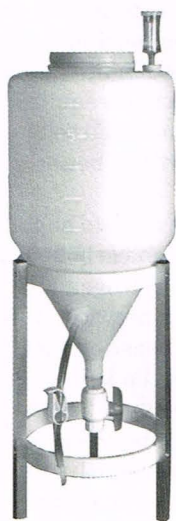
Wort is the principal source of all nutrients for yeast and contains B vitamins, amino acids, carbohydrates, and minerals from barley. Additional minerals are supplied from brewing water and brewing salts. In a normal

fermentation all of the nutrients the yeast needs are supplied in the wort without any requirement for supplementation.

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are also important when a high carbohydrate fraction is used, as when brewing with sugars, honey, rice, corn, or other adjuncts. Addition of these adjuncts proportionately decreases the concentration of amino acids and other nutrients in the wort while increasing the carbohydrate levels.

Essentially, in high-gravity

brewing or when brewing with adjuncts, a brewer is asking the yeast to do more with less. Therefore, it becomes imperative to supplement with yeast or yeast nutrients in the kettle boil and to properly aerate the cooled wort to assure that all nutritive requirements are available to your pitching yeast.

When brewing barley wines,

bocks, or other high-gravity beers, supplementation is recommended. High-gravity beers often create a problem with alcohol toxicity for yeast, but supplementation may increase yeast's tolerance to ethanol.

Strong worts also cause increased pressure in cells (through osmosis) due to a high concentration of sugars, and this may cause the yeast to autolyze. However, with proper nutrition and oxygenation, most yeasts will still be able to sustain a normal fermentation.

Supplementation and increased oxygenation help yeast remain healthy and viable even under adverse conditions. Oxygen has been found to be the most significant nutrient in high-gravity worts. Even in an all-malt wort in which all the nutrients have been provided, the yeast cannot fully use those nutrients unless there is sufficient oxygen to initiate optimal yeast growth.

In a wort of average gravity brewed from malt or malt extract, all of the nutrients needed to sustain a healthy ferment and viable, re-pitchable yeast cells are in the wort. All you need to do is brew. Supplementation of vitamins or nutrients above that required by the yeast does not lead to further yeast growth or better fermentations.

Brewers might need to supplement worts with high carbohydrate levels and reduced nitrogen levels, as is the case when brewing with adjuncts. Yeast or yeast-extract nutrient packets in the kettle assure that there are enough nutrients available, but when brewing medium-gravity beers such as pale ales from all malt, there's no need to supplement.

I tell visitors at my brewery that my boss is a single-cell fungus and my job is simply to feed it. So go brew and feed your fungi. You've been doing it all along. ■

Larry Lesterud is head brewer at Humboldt Brewing Co., Arcata, Calif.

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Blending for Better Wines

by Alison Crowe

The ancient Greeks used to mix their wine with herbs, spices, and pine-tree resin. In medieval England it was considered an honor to be given both the wine and the water pitchers so you could mix your drink according to your own tastes. In modern-day France, winemakers at world-famous chateaux such as Margaux and La Fleve concoct carefully calculated blends of each year's harvest to achieve the perfect Grand Crus.

Wine has been blended for centuries. It long has been known by winemakers and wine drinkers alike that combining the virtues of one wine with another wine (or with something non-wine altogether) can create a beverage that is better than the sum of its parts.

The Process

You can blend for complexity, to balance different sensory characteristics such as astringency or oakiness, or to increase or decrease characteristics such as acidity or alcohol content. It all depends on the wines you start with and what you'd like to do with them.

Before getting started, it's wise to follow a few helpful hints. First, most winemakers will tell you that blending a sound wine with a faulty wine will produce faulty wine. Some folks think that mixing a stinky barrel that has been spoiled by hydrogen sulfide with one that has no bad qualities will yield a drinkable wine. In most cases, after blending the two the stink will still be perceptible and what you'll be left with is two barrels of undrinkable wine.

Second, blending two or more wines can cause unforeseen instabilities or other imbalances. Wine is a complex chemical soup that

exists in a constant state of delicate equilibrium. Two wines that appear to be stable and sound might, when mixed together, throw a horrid tartrate crystal precipitation or worse, suffer a protein instability and become cloudy. This occurs because each wine's unique equilibrium (often pH dependent) is thrown off when mixed with the other.

Third, it is critical to do many small-volume trial runs, called bench tests, before you make your master blend. This allows you to discover which proportion best meets your winemaking goals and whether the trial blend you like best will be stable. These trial runs are the essence of the blending concept. There are no recipes for blending, and each blend is the result of careful experimentation and record-keeping.

Blending for Complexity

Let's say you have three wines. Each has something to contribute, but not one is great on its own. The Cabernet is a little vegetative, the Zinfandel is fruity but dull, and the Merlot has a very neutral aroma but a lot of body. You think that together they might make a great wine.

Well, there's only one way to tell what that magic proportion might be. You have to assess each wine's characteristics individually, think of possible combinations and then, using very small volumes (a few milliliters), make up mini-blends in small glass containers. Let these mini-blends marry for a period of three weeks; observe for any obvious instabilities such as tartrate precipitates, cloudiness, or off-odors; and then pick the one you like best. (See How to Do a

Bench Test, page 48.)

Many wineries operate on this principle. They use whatever resources they happen to have to produce the best wine possible, which then becomes their "premium" blend. You can do the same with your wine. Just remember to keep good records and keep tasting until you find what you like.

Balancing Sensory Traits

Another blending technique

involves trying to increase or decrease the presence of a certain sensory characteristic such as acidity, sweetness, bitterness, or astringency. Say that your Zinfandel was extremely astringent, the Cabernet was very sour, and your Merlot didn't quite finish fermentation, so it had just a bit of residual sugar left over.

Using the bench-test technique you would experiment with different proportions of each of the wines in

your samples. The Merlot's residual sugar might mitigate a little of the acid in the Cab, while the astringency of the Zin might be played down by the relatively neutral Merlot.

When making your mini-blends keep in mind what kind of volumes you're working with. It doesn't make sense to make bench-test blends that are five parts Merlot to one part Zinfandel unless you just want to make a small volume of this

How to Do a Bench Test

Even though bench testing (so called because it's often done in the winery lab, on the "lab bench" or counter) is seen as something that only commercial-scale wineries can do, home winemakers can scale down the process and see very comparable results.

Basically the concept is that you want to make small versions of possible "big batch" scenarios, let these mini-batches sit for three weeks to let flavors and aromas marry, and then smell, taste, and evaluate the resulting mini-blends to see which one you like best. Then apply the proportions that result in the best blend to the larger final blend.

Materials:

- About 5 to 10 tall (volume of 50 to 100 milliliter) clean, clear glass containers that are all the same (available in natural-food stores and chemistry-supply catalogs)
- Lids to fit containers (plastic wrap and rubber bands will work in a pinch)
- Graduated cylinders or graduated pipettes (available through winemaking-supply retailers)
- A clean, well-lit workspace, preferably free of strong odors, loud noises, or other distractions

- Writing materials
- Tape
- A dark, dry cupboard or other storage area

Procedures:

Assess the dominant characteristics and possible shortcomings, if any, of the wines you plan to use. Decide what you want to achieve in your blend. Something obvious may present itself, such as trying to blend out the over-oakiness in one wine.

Once you have assessed the situation, you're ready to start assembling your mini-blends. Calculate the proportions you'll use by working with the Pearson Square method (outlined on page 50, "Measurable Characteristics"), or use arbitrary proportions such as one-third of each of three wines.

Begin by measuring in different proportions of the wines using the graduated cylinder or pipettes to completely fill the volume of your container to eliminate headspace. This is important because you are dealing with very small volumes of wine. Any oxygen might damage the mini-blend and skew your evaluation of it.

This is where a bit of math might come in. If you've used the Pearson Square method to calculate the proportions to be

used, you must convert that over to volume. A 2:1 ratio of Wine A to Wine B means that you will put in two-thirds Wine A to one-third Wine B. If your small container is a 100 milliliter (ml) volumetric flask, then you will combine 66.7 ml of Wine A with 33.3 ml of Wine B.

For each sample, label the container with a bit of tape and a letter or number, and record in your notebook which proportions correspond with each.

Cap or seal the containers tightly, mix by inverting gently, and then store in a cool, dry, dark place for three weeks to let the flavors and aromas marry.

In three weeks observe the aroma, color, flavor, astringency, bitterness, and body of all of the blends. Record your impressions in detail, labeling each set of tasting notes clearly with the blend number. Pick the top three and taste them again. Rank these three wines in order of preference, and pick the top mini-blend to be your guide when making the master blend.

After the blending stage, it is important to stabilize the entire blend, not just the two or more wines that comprise it. An instability in the new wine might result if this is not done after blending and before bottling.

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blend or have a lot more Merlot than Zinfandel. And don't forget to taste, taste, taste until you find the magic combination that works best for you.

Measurable Characteristics

If you commonly measure such qualities in your wine as total acidity (TA), ethanol content, and residual sugar content, these numbers will help you fine-tune your blending technique. These numbers have a linear relationship and are useful for blending with the help of another tool: the Pearson Square.

Say Wine A has 11 percent alcohol and Wine B has 14 percent. Your goal is to achieve a wine with 12 percent alcohol. How much of each wine should you blend?

You don't have to do any complicated algebra; simply draw a square on a piece of paper. On the upper left-hand corner write in the alcohol percentage (11) for the

wine of origin with the smallest percentage, which in this case is Wine A. On the bottom left-hand corner of the square, write in the percentage for the wine with the highest concentration of alcohol, in this case 14 (Wine B).

In the middle of the square, write in your desired concentration, which is 12. Now take a deep breath. This is the only math you have to do.

Subtract Wine A's value (11) from the number in the middle (12). Write the answer (1) to the right of your square. Draw a line above it. Then subtract the number in the middle of the square (12) from Wine B's value (14). The answer should be 2. Write this number on top on the line that you've just drawn over the number 1. And voila! You've just discovered that for your two wines to come together to make a wine of 12 percent alcohol, you must mix them in a ratio of 2:1,

which means two parts Wine A (11 percent) to one part Wine B (14 percent).

This little trick also works for titratable acidity, sugar, and free sulfur dioxide. It doesn't work with pH or any other units that do not behave in a linear manner.

So now that you've got a few ideas about how you might want to go about blending your wines, go for it! Even if you're a very small-scale kit winemaker, you can experiment with blending by making different kinds of five-gallon kits and adjusting your volumes accordingly. And for anyone blending at any volume, it's important to test, taste, and use your imagination. ■

Alison Crowe is a graduate of the University of California, Davis, winemaking program and works in the university's Department of Viticulture and Enology.

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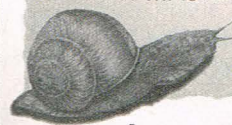
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Advertiser Index

Page Circle
No. No.

Affordable Conical	45	1
American Brewers Guild	6	2
Austin Homebrew Supply	45	3
Beer, Beer & More Beer	40	-
Brew King	4	4
Brewer's Resource	12	5
BrewPub Magazine	50	-
California Concentrate	10	7
Cascadia/Cooper's	Cov. IV	8
Connoisseur International Beer Club	Cov. II	-
Crosby & Baker Ltd.	41	-
Cyberbrewing.com	6	9
E.C. Kraus	44	-
E.J. Wren Homebrewer Inc.	51	10
F.H. Steinbart	46	11
Fermentap	49	12

Page Circle
No. No.

Five Star Products	9	13
Foxx Equipment Company	51	14
Grape and Granary	42	15
High Point Designs	51	16
Hobby Beverage Manufacturing Co.	42	17
Homebrew Adventures	10	18
Homebrew Heaven	44	19
LD Carlson Company	49	-
Liquid Bread, Inc.	49	20
LOGIC, Inc.	39	21
Medicine Rock Division - Dakota Supply	40	22
Midwest Homebrewing Supplies	8	23
Mosti Mondiale	21	24
Muntions p.l.c.	20	-
Northern Brewer, Ltd.	37	25
Northwestern Extract Co.	Cov. III	-

Page Circle
No. No.

Portage Hills Vineyards	8	26
Promash	37	27
RCB Equipment	51	6
Siebel Institute of Technology	33	28
St. Louis Wine & Beermaking	51	-
St. Patrick's of Texas	39	-
Vinotheque U.S.A.	12	29
White Labs	51	30
William's Brewing	50	31

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Homebrewing for the Gold

by Gary King

Psst...Hey, buddy. Yeah, you, Homebrew Boy. I hear you brew a heck of a beer. All your friends rave about it. They drool over the thought of every five-gallon batch, and you just eat it up.

But you have a dirty little secret, don't you? Through all the praise you've never — that's right, never — even *placed* in a homebrew competition. It's time to come clean. No bronze, no silver, and certainly never a gold. There, it feels better to let it out, doesn't it?

There must be some way to rectify this situation. You want to drink from the mug of victory. You want to come out of the closet of brewlosers and into the winner's circle? Okay then, pay attention. What I'm about to reveal is for your eyes only.

The following is a true story. Let's go back to the summer of '98. It was the Fourth of July, Independence Day. The weather was perfect for outdoor brewing. The skies were clear, and our homebrew equipment glistened in the sun. My brewing partner, Dan, and I had bought the freshest grains, the most aromatic hops, and the purist strain of yeast, and we had slightly altered the malt content of a published ESB recipe to call it our own. Nothing could go wrong. We watched with glee as our boiling grains and hops rapidly turned to wort. We drooled as our brew cooled and was transferred to a glass carboy. We hit it with yeast and placed it in a cool, dark cellar. We relaxed and had a homebrew.

Our beer was brewed, the day was young. Our wives had given our leashes a few extra links for the day, so we decided to whip up another batch. Using some leftover grains,

some old hops, and a very tired package of dry ale yeast, we started to throw together another brew. The weather started to turn, getting very hot. The humidity rose and sweat rolled down the backs of our knees. Flying bugs and gnats hovered over our boiling wort, diving like moths to a flame. Our propane ran out 15 minutes into the boil. This brew was turning into a nightmare. Finally, we got it transferred into various pots and pans, finishing the boil on the kitchen stove. It took great restraint not to just throw this mess out, but we finally got it into an old plastic

added raspberries — bam! — and still nothing happened. "Clear!" More oxygen, some orange extract — bam! A faint pulse...bubbles in the airlock. Life. The cast of "ER" would have been impressed.

The ESB was to die for. Perfect clarity, great body, and a hoppy bitterness that made our tongues twirl. It was entered in "The Taste of the Great Lakes" homebrew competition. Arguing that the more you entered, the cheaper the entry fee, Dan insisted we enter the raspberry orange sludge thing we had brewed. Against my

better judgment I agreed.

At the competition we were stunned to learn the ESB hadn't placed. The score sheet read "significant flaws, no head, plastic flavor." Ten out of a possible 50 points. We were humiliated, crying in our beer, looking for a hole to crawl into.

We sat there disheartened, in stunned silence as the last of the awards were announced. Dejected, we barely heard our names announced: "Dan Stafford and Gary King, second place, fruit and vegetable beer." Well, you probably saw this coming like a Mack truck, but our raspberry orange sludge had taken a silver. Our high-fives and victory dances gave way to a couple of smug smiles. Master brewers! We knew it all along.

So you want to brew a winner? Just keep throwing those grains and hops together. Keep brewing beer. And remember, above all else, "Clear!" ■

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



It ain't always pretty...Dan (left) and I learned to walk on the dark side of homebrew competitions.

bucket, storing it far away from our perfect ESB.

Within hours the ESB started percolating with active fermentation. Meanwhile, the leftover sludge we had concocted sat there for a week without a single bubble escaping the airlock. It had flat-lined. Yelling "Clear!" we tried to resuscitate it with a fresh packet of yeast — bam! Nothing. "Clear!" We



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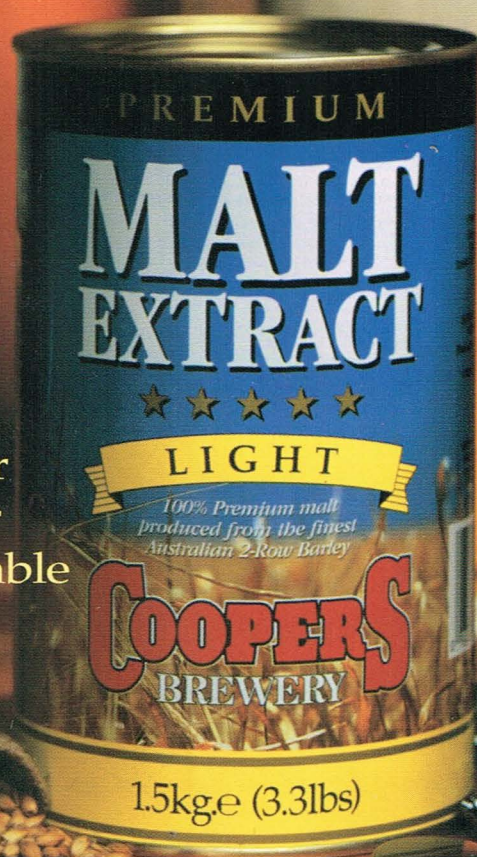
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