May 1998, Vol.4, No.5
Niche Publications Inc.

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THE HOW-TO HOMEBREW BEER M

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RIF Vienna Lager

(Recipe for 5 US gallons*)

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

1. Crack your grains and place them in a grain bag.
2. Add grain bag to 2 gallons of cold water in a 3 gallon (or larger) pot. Place over medium heat. Bring temperature to 170°F and hold for 20 minutes.
3. Remove and discard grains and boil for 20 minutes. At the end of the boil, add Saaz hops, remove pot from heat and steep hops for 5 minutes.
4. Cool the liquid and use it to make up the volume of the kit. Top up with water if necessary. Do not forget to add the pH adjustment package.
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*This recipe is for the 5 US gallon (19 litre) kit. Get in touch and we'll send you the Canadian version. We have other recipes too—just ask.

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Cover photo: Kent Lacin

A Hazy Story

I've always wondered why they don't sell beer-scented perfume.

I mean if you're a woman and you want to attract guys, doesn't this make sense? I picture a whole line of Eau de Malt and Hops. Or companies could incorporate them into their existing products. Tommy Girl by Tommy Hilfiger? How about Tommy Pilsner Girl; now that says something about a woman. Pleasures by Estee Lauder? Frankly, we men would rather be sniffing Porter Pleasures, please.

I bring this up because this month's cover feature focuses on a beer that is quite an experience for the senses.

Let's face it, hefe-weizen may be a traditional beer style in Germany but here in the New World it's flat out different. Beer is clear. Hefe-weizen is cloudy. Beer tastes malty or bitter. Hefe-weizen tastes herby and sort of fruity. Beer smells like hops. Hefe-weizen smells like, well, let's just say Calvin Klein might want to check this out.

Hefe-weizen is a complex combination of flavors. You can't enjoy hefe-weizen and be one of those don't-let-the-meat-touch-the-potatoes kind of people. This is beer casserole; a refrigerator full of flavors rolled up into one package. Hefe-weizen is a beer for people who like gray areas; people who don't need absolutes. Serve it to your lawyer friends.

The publisher of BYO, Carl Landau (not a lawyer), happens to be the world's biggest fan of hefe-weizen. I'm not saying what this indicates about his personality, but I've seen him convert at least a dozen people into regular hefe drinkers. He's the type of person who, even in establishments that clearly carry both kinds of beer — regular and light — will stride up to the bar and ask, "What kind of hefe-weizen do you have?" One time the bartender handed him an appetizer menu.

Hefe-weizen is also a lot of fun to brew because you get to break a lot of "rules." It's cloudy? Great! Has an estery smell? Cool! Got a little warm during fermentation? No problem!

Finally, hefe-weizen is a beer you can tell jokes about. Here are mine: My hefe-weizen is so cloudy that when you pop the cap off, it rains for 20 minutes. And: My hefe-weizen is so hazy that every time I drink one I forget where I put it.

That's it, my whole song in praise of hefe-weizen. The story begins on page 32.

Speaking of things worth praising, don't miss Daria Labinsky's terrific article on cooking with beer (page 20). Daria, one half of the best husband-and-wife writing team in the beer business (she and husband Stan Hieronymus collaborate on the Microbreweries You've Never Heard Of column), includes great details on matching flavors and refining your cooking technique. She also offers some recipes that come directly from top-notch brewpub kitchens.

And by the way, next month we publish the winning entries in the annual BYO label contest. Judging by the entries we've received so far, it's going to be fun!

One more thing. If you don't like the cover on this month's issue, I can't tell a lie. It's Carl's fault.

Craig Bystrynski

Brew Your Own
The How-To Homebrew Beer Magazine

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MPC1

Cool Brewing Setups

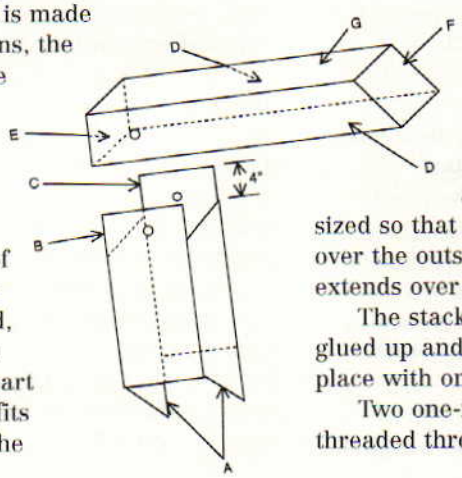
Glenn Brown
Bel Air, Md.

My contraption, a simple hood, fits into the down-draft vent on my stove and captures aromas.

To use the vent, I remove the grill that covers the vent on my stove but leave the filter in place. Then I lower my hood assembly into the stove vent.

When the exhaust fan is turned on, all the exhaust is drawn directly into the hood and then sucked into the stack and out of the house. Nothing escapes.

The vent is made in two sections, the stack and the hood. The stack is the vertical part and consists of four pieces of one-quarter-inch plywood, sized so that the bottom part of the stack fits snugly into the down-draft unit of the stove top. The matching sides (A) are attached to the edges of the front (B) and back (C). No dimensions are given, since your stove top will likely be different from mine. The stack stands tall enough so that the brew pot will fit easily under the hood, with room to stir the brew.



The hood is the horizontal part. It consists of five pieces of one-quarter-inch plywood: the matching front and back (D), the ends (E and F), and top (G) are sized so that the hood fits snugly over the outside of the stack and extends over your burner area.

The stack and the hood are glued up and their pieces held in place with one-inch brads.

Two one-inch stove bolts threaded through holes drilled in the front and back of the stack and the hood and attached with wing nuts hold the hood and stack together. The hood may be reversed on the stack so it can collect the smoke and fumes from either side of the stack.

Light sanding and a couple of coats of polyurethane completes the project. It ain't pretty, but it does the job!

Glenn Brown's brew hood traps aromas that he considers delightful, but his significant other does not.

In a basement he converted to a brewery, Jeff Barboni prepares to become a professional brewer.

Jeff Barboni
San Francisco, Calif.

My brewing obsession began after living in Holland a few years back. Being very close to the Belgian border exposed me to a world of beer that I didn't know existed. Of course this meant a lot of passionate consumption and visits to many great breweries. Upon returning to the states I started homebrewing and working toward a career in brewing. Kitchen brewing quickly became frustrating.

Being a carpenter building fine furniture is precision-based work, so the prep time and lack of exacting controls that I was experiencing at home when brewing drove me nuts! When I was given the opportunity to build a permanent dedicated brewing facility, I quickly took out a loan and began building.

After 10 months of spare time —

and a lot of time I couldn't spare — I had remodeled a once-flooded basement in San Francisco's seedy Tenderloin district and it was time to brew! The equipment decisions were based on advice from a lot of local brewing-supply shops and brewers who were far more knowledgeable and accomplished than I was at the time.

I purchased an oat crimper for milling. Several local brew shops use this mill, and while it isn't designed for malt, it does an excellent job and is built to survive Armageddon. Lautering is a breeze, and extraction is usually between 85 and 90 percent depending on the mash temperature program. The brewing system is a half-barrel RIMS type. It's a very well built system and provided a good starting point. I redesigned several elements and made many smaller modifications to give me a greater degree of control over the process and more ease of operation. At this point I'm very happy with it.

Most of the yeast I culture up from slants and re-pitch up to four times. Since I lack the resources to analyze the health and vitality of the yeast, four generations is as far as I'll go. As far as water goes, fortunately San Francisco has excellent and fairly soft water. Mineral adjustment to emulate various brewing regions is simple. The one thing I always do is adjust pH to 5.5 with lactic acid to assist mashing and lautering. Often pH is the only treatment method used.

I use only whole hops; the false bottom screen won't hold back pellets, and better trub precipitation is achieved with whole hops in the boil.

The mash technique I use depends on beer style and malt used. It is almost always a single temperature mash or a stepped program. I've never done a decoction.

I lauter as slowly as possible (about one hour) and I strike the fire after a few gallons have been collected so that a boil is reached as soon as lautering has ceased.

The chiller that I made brings the average 10-gallon batch to about 76° F in 20 minutes. I use 6.5-gallon carboys as primaries. Yeast is in the fermenter before the cooled wort is added. I injected the wort with bottled oxygen via a homemade fitting en route to the fermenter.

The fermenting beer then goes into a walk-in, temperature-controlled cellar for five days before being transferred to the secondary. The length of conditioning depends on style and gravity. I have a cartridge-type filter, but clarity has never been a problem, so the filter has never been used.

Typically I bottle the higher gravity beers (1.060 and up, up, up) and keg the lower gravity beers.

When formulating recipes and brewing I often divide a batch and pitch two different yeast strains. Sometimes two batches are made with identical grain bills and techniques but with a variation in hopping. Or two batches are made identically except for a variation in mash temperature. When these types of variations are used and recorded in detail, the comparison of results provides incredible learning opportunities.

I try to brew as often as possible (usually two batches one day a week). Since this makes more beer than I could ever drink (safely) I almost always invite a friend, relative, or acquaintance to participate and learn about the process. Not only is it a blast to share the process with people, my own knowledge is ingrained deeper when teaching and explaining brewing to others.

In steering toward a career in brewing, I've obtained a general contractor's license, which will be handy when the time comes to build a full-size facility — not to mention help gaining the confidence of potential investors/partners. I plan to attend the American Brewers Guild's 11-week Craftbrewers Apprenticeship program.

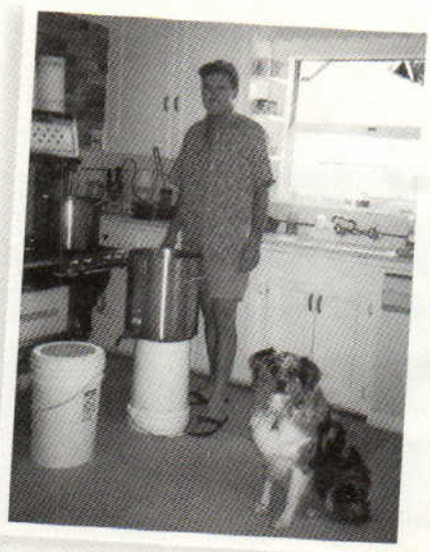
My ultimate goal is to start a micro with a tight focus on producing true-to-style Belgian-type beers.

Wort Hound

Here's another pet who brews — Sheila. She is our three-year-old Australian Shepherd who has been brewing with us since puppyhood. Sheila not only keeps us company while brewing, she serves as quality control and cleanup crew.

Sheila got her first taste of liquid gold when we encouraged her to lap up a beer that was knocked over. She was very thorough and loved every drop! She enjoys sampling the results of our brewing efforts, and she helps in the kitchen when needed. She has a particular fondness for wort, too. When she hears the command, "Hose it up!" she rushes to lick up any wort that my husband, John, may have spilled while sparging. John is planning to brew a rye soon and our loyal companion will assume "hose" position at his side.

Wendy and John Bloomingdale
Redondo Beach, Calif.



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Preventing Off-Flavors

Dear Brew Your Own,

Here's a brewing tip that worked for me. I recently read an article on the Web called "What's living in my keg?" During a recent brew I got off-flavors in my beer due to chlorine left in the keg. The culprit was the pickup tube. I would slosh the sanitizer in the keg and it would fill the pickup tube with solution.

When you set the keg upright the top of the tube would be closed (poppet valve closed) and would trap liquid in the tube due to a vacuum. Now I always hook up a disconnect (no hose attached) that vents the pickup tube.

Warren Moseley
Arlington, Texas

Ratio Rules

Dear BYO,

In "24 Brewing Tips and Rules of Thumb" (March '98 BYO) a calculation states that one pound of malt extract syrup equals 0.75 pounds of base grain malt. That doesn't sound accurate. Shouldn't the ratio be reversed: one pound of grain equals 0.75 pounds of syrup?

Jim Jones
Valpo, Ind.

You are correct; the tip was inadvertently reversed. This ratio is a rule of thumb that takes into account the relative inefficiency of most homebrew systems. Highly efficient systems need less grain to equal a pound of syrup. Professional brewers use a ratio of one to one.

Dear BYO,

In "24 Cool Tips and Rules of Thumb" (March '98 BYO) the first tip states that for every pound of syrup extract in a five-gallon batch, a change of about 0.007 in gravity will result. Will the change be higher or lower? Will the same or similar results occur if a dry malt extract is used?

R.J. Manson
Kaneohe, Hawaii

The change will be an increase of 0.007 per pound. Keep in mind the tip is a rough approximation. For dry malt extract use the rule of thumb that four pounds of dry malt extract is equal to five pounds of syrup malt extract.

Pantyhose Advice

Dear BYO,

"A Practical Guide to Lautering" (March '98 BYO) mentions using "preferably never-before-worn pantyhose" as a grain bag.

I would recommend boiling the nylons several times unless you want a horrific brew.

I'll tell you from personal experience (many years ago thankfully) that the ink or dye used in manufacturing the nylons does wonderful things to your brew. My spine is cringing as I write this, thinking back on the lovely brew I concocted with new nylons. Just my two cents.

Kenny Lefkowitz
Blacksburg, Va.

The Right Strain

Dear BYO,

I enjoyed "An American Classic" (March '98 BYO). I believe that many homebrewers do not give American pilsner-style beers the credit that they deserve.

I must, however, disagree with the article's statement that "Wyeast 2035, American lager yeast, is the obvious choice for this style." Wyeast Laboratories describes its 2035 as "Not a pilsner strain. Bold, complex and aromatic, producing slight diacetyl." I have found 2035 quite appropriate for brewing a Boston Lager-style beer.

Homebrewers would be better advised to use Wyeast strains such as 2007 pilsner lager ("a classic American pilsner strain, smooth, malty palate") or 2272 North American lager ("traditional culture of North American and Canadian

lagers and light pilsners").

Of course many homebrewers do not have the ability to ferment at the low temperature that these lager yeast strains require.

I have had excellent results making pilsner-style beer at ale (room) temperature by using Wyeast 1056 American ale and adding two teaspoons of amylase to the wort when pitching yeast.

The enzyme breaks down some of the unfermentable sugars into forms that the ale yeast can digest, resulting in the lower finishing gravity and cleaner flavor profile typical of lager yeasts.

Brooks McNew
Annapolis, Md.

Nutty Beers

Dear BYO,

I read with interest "Recipe Exchange" (March '98 BYO) about nut beers. Although I will probably pass on the pistachio beer, I was interested in his comments regarding the hazelnut beer. Ever since I tried the Longshot Hazelnut I wanted to give it a try, but was unable to duplicate the rich hazelnut flavor of the Longshot. Do you know the secret ingredient?

Rick Lynch
Bloomington, Minn.

Although he hasn't been able to duplicate the beer, Recipe Exchange author Scott Russell has been able to come close. He recommends adding 2.5 to three ounces of liqueur extract, such as Noirot Essence in hazelnut, with the priming sugar. He also suggests trying a flavored Italian soda syrup or organic essences used for baking.

Another Convert

Dear BYO,

I started off by brewing cider. I was looking for a Woodpecker clone but was never able to find one. After several attempts I had given up. The local brew store (90 miles away) was of little help.

I cringed at the thought of attempting to brew my own beer, and my fears heightened after reading one how-to-homebrew book.

My wife purchased one of your magazines in a town 45 miles away. I glanced at it several times and finally, on a long jet ride, began to read "Mr. Wizard."

I was amazed that I actually understood the discussions. I read that issue from cover to cover, literally. I shortly began to brew beer on my own using kits, then extracts, and not long after got into all-grain. I have used several recipes in your magazine and have enjoyed them all.

I have never enjoyed a hobby quite so much! I received a subscription for Christmas and believe this to be the best of all the gifts I received.

Stuart Meyer
Heber Springs, Ark.

Black Steam Ahead

by Scott R. Russell

As we all know, one of the classic examples of the modern brewing renaissance is Anchor Steam. Without getting into any of the controversy over what style it really is, what the proper term for it is, or how much of the name is really copyrighted, let me just say that it is one of my absolute favorite commercial beers.

I find it clean, hoppy, wonderfully refreshing, and drinkable any time with any food, in any company. Even after traveling cross-country to reach me here on the East Coast, the bottled version is still a cut or two above almost any other beer made in this country.

The only comparable beer that I've found, with all due respect and apology to Fritz Maytag (the man who brought Anchor to prominence 15 years before the micro revolution), is my homebrewed version. Sure, I'm bragging. But isn't that part of the fun of homebrewing? In fact I think my version is even a little better, if only because I make it and it is as fresh as it can be.

Late one summer I began dreaming about what I would brew later in the year for the oncoming dark (beer) seasons. I tend to seek out contrasts — lighter beers to remind me of summer during the cold of winter, rich, heavy beers to sip under the stars on summer camping trips (just because!). But I also try for a seasonal and logical approach; you know, brew lagers in the winter, warm-tolerant ales during the summer months, fruit beers in the season of the fruit.

This particular brewing season I needed to start out with a simple restocking of my "house" ales, a dry stout, an amber IPA, a Scotch

Black Steam
(5 gallons, partial mash)

Ingredients:

- 2 lbs. pale malt
- 0.5 lb. dark crystal malt, 90° Lovibond
- 0.25 lb. black patent malt
- 0.25 lb. dark Munich malt
- 5 lbs. unhopped light dry malt extract
- 3 oz. Northern Brewer hops (plus or minus 8% alpha acid): 1 oz. for 50 min., 1 oz. for 20 min., 1 oz. for 5 min.
- Wyeast 2112 (California lager) yeast culture, built up to 1 qt. starter or more
- 7/8 cup corn sugar (for priming)

Step by Step:

Heat 1 gal. of water to 165° F. Crack grains and mash in. Hold mash at 154° F for 75 min., run off, and sparge with 2 gal. at 168° F.

Add dry malt extract to kettle and bring to a boil. Total boil is 50 min. Add 1 oz. hops and boil 30 min. Add 1 oz. hops, boil 15 min. more. Add the rest of the hops, boil 5 min. more, and remove from heat. Add to your primary fermenter along with enough cooled pre-boiled water to make up 5.25 gal. Cool to 70° F, aerate well, and pitch yeast culture.

Ferment between 65° F and 70° F for five to eight days, rack to secondary, and chill to 55° F to 60° F. Lager for two weeks, prime, and bottle. Bottle condition three weeks near 50° F.

Options:

All-grain brewers: Increase pale malt to 9 lbs., mash water to 4 gal. and sparge water to 5 gal. Follow the same mash schedule and temperatures as above, but plan your boil and hop schedule to reduce kettle contents to 5.25 gal.

All-extract brewers: Steep crystal, Munich and black malts in 2.5 gal. of water, raising heat in kettle to 170° F. Remove grains and stir in 6 lbs. light unhopped dry malt. Boil and hop as above.

Yeast: Although the California lager strain (Wyeast 2112 in particular) is a very warm-tolerant lager strain, it is still best not to ferment too warm. Some ale-like fruitiness is desirable, but it's easy to overdo. Begin fermentation warm and gradually cool the fermenter down. A short lagering stage will finish off the beer without drying it out excessively, and will help clarify it.

A note on packaging: I may be a heretic, but I prefer bottled homebrew to kegged. Some brews, including this one, just seem more balanced, more alive from the bottle than from a keg. The live yeast continues to contribute flavor compounds in the bottle and keeps the beer fresher tasting for a longer time. Also, the natural carbonation from bottle conditioning adds a smoothness that can't be matched by force carbonation (unless you want to get into a nitro mix setup!). This style of beer needs to be relatively highly carbonated, so if you are going to keg it, adjust your pressure accordingly.

ale, a barleywine. Then I would proceed to trying some new brews or some new twists on old favorites. Looking through my recipe files I began wavering between my aforementioned standard California common and a Munich dunkel that had won me a ribbon the previous spring. Back and forth I went, hoppy or malty, light or dark, ale or lager? Yin and/or yang? Fusion. Synergy. Eureka. Magic. The result? A mysterious, moody, elusive concoction called Black Steam.

Reader Recipes

Belgium Wit

(5 gallons, extract and specialty grains)

This is a difficult style to brew as an extract. However, this recipe gets raves every summer from those who like its dryness and low bitterness. The coriander and orange peel make up for the low hops.

John Applegarth
Grand Rapids, Mich.

Ingredients:

- 3 lbs. wheat dry extract (55% wheat)
- 3 lbs. extra light dry malt extract
- 1.33 lbs. flaked wheat
- 1 oz. German Hallertauer hops (4% alpha acid) for 60 min.
- 0.25 oz. Perle hops for steeping
- 0.25 oz. coriander seeds, crushed just before using
- 0.5 oz. orange peel
- Wyeast 3944 (Belgian Witbier)
- 1/2 cup honey for priming

Step by Step:

Add flaked wheat in grain bag to 5 gal. of cold water. Bring to 170° F and remove bag. Add extract and Hallertauer hops. Total boil is 60 min. Add Irish moss 15 min. before end of boil. When boil is finished add Perle hops, coriander, and orange peel. Cover and let rest for 10 min. Cool to below 80° F, transfer (aerating) to fermenter, and top up to 5 gal. Pitch yeast starter at 78° F.

Transfer to secondary after a day or two and bottle when all signs of fermentation have ceased. Prime with honey. Before adding honey, boil it gently, skim off foam, and cool.

OG = 1.040
FG = 1.006-1.012

Palmetto Amber

(5 gallons, extract with specialty grain)

I came across this recipe while visiting my brother one summer in South Carolina. I brought back some yeast slurry compliments of the local brewery. However, I had to break down the recipe for five gallons.

Fred Goeldi
Warren, Mich.

Ingredients:

- 0.5 lb. crystal malt, 80° Lovibond
- 0.25 lb. victory malt
- 0.25 lb. Munich malt, 10° Lovibond
- 8 lbs. Alexander's pale malt
- 1 oz. Cluster hops, for 60 min.
- 1 oz. Cascade hops, for 15 min.
- 2 oz. U.S. Hallertauer hops: 0.5 oz. for 2 min., 1.5 oz. for dry hopping
- 2 Tbsp. gypsum
- 1 tsp. Irish moss
- Wyeast 1056 (American ale) yeast starter
- 3/4 cup corn syrup

Step by Step:

Add grain to 2 gal. of cold water. Bring to 170° F and remove bag. Add extracts and Cluster hops and bring to boil. Total boil is 60 min. Add Irish moss and Cascade hops during last 15 min. Add Hallertauer hops for last 2 min. Cool wort, strain into fermenter, top up to 5 gal., and take hydrometer reading for original gravity. Pitch yeast at 64° F.

Ferment for six days. After fermentation rack to secondary and ferment at 62° F for four days. Dry hop seven to 14 days at 62° F. Take hydrometer reading for final gravity. Bottle and condition for three weeks.

Mini-mash alternative: Steep grains in 0.5 gal. of 150° to 158° F water for 60 min. Do iodine test to check conversion (1 Tbsp. wort to 1 drop iodine). No color change means the wort is ready to sparge. Sparge with 1.5 gal. of 170° F water to get 2 gal. of wort for boil.

OG = 1.054-1.056
FG = 1.013-1.015

California Red Ale

(5 gallons, extract with specialty grain)

This recipe is a favorite of mine and one I keep getting requests for from my friends. Although not stated in the recipe, I prefer to use fresh hops (not pellets) and I always use grain and hop bags for ease of brewing.

Kevin Bell
San Gabriel, Calif.

Ingredients:

- 3.3 lbs. John Bull light malt extract
- 3 lbs. light dry malt extract
- 1 lb. crystal malt, 40° Lovibond
- 5 oz. chocolate malt
- 2 oz. Cascade hops (7.8% alpha acid): 1 oz. for 60 min., 0.5 oz. for 30 min., 0.5 oz. for steeping
- 1 tsp. Irish moss
- 1 vial White Labs pitchable California ale yeast (or Wyeast 1056)
- 3/4 cup corn sugar for priming

Step by Step:

Crush grains and steep in 3 gal. of 160° F water for 30 min. Bring to 170° F. Remove grains and add extracts. Total boil is 60 min. Bring to a boil and add 1 oz. hops. Boil 30 min. and add 0.5 oz. hops. Boil 30 min. more. Remove from heat and add last 0.5 oz. hops. Let steep for 10 min. Top up with cold water to make 5 gal. Cool and pitch yeast at 70° F.

Ferment 10 to 14 days at 68° to 70° F. Prime and bottle. ■

Share Your Recipe!

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Second Time Around

Mr. Wizard

Is secondary fermentation really necessary? I have brewed some extract recipes using only primary fermentation, then I have repeated the same recipes using both primary and secondary fermentation. My taste buds can't tell the difference.

If one adds enough yeast to the fermenter and the beer is done fermenting within 10 days, why not bottle and let the beer condition in the bottle? If the purpose of secondary fermentation is to separate the beer from the trub to avoid off-flavors imparted by dying yeast and other components of the trub, then isn't this accomplished by careful siphoning and bottling?

Some beers (such as Chimay) actually state on their labels that secondary fermentation occurs in the bottle.

Please enlighten me about the advantages of secondary fermentation.

Theodore Braiman
Elmira, N.Y.

Secondary fermentation is a loosely defined term used by both homebrewers and commercial brewers to describe several different changes that beer undergoes after its main fermentation. Most brewers would agree that a true secondary fermentation is used to naturally carbonate beer, to allow the beer to naturally clarify by sedimentation, and to allow the beer to mature in flavor. Classical examples of secondary fermentation include lagering, cask conditioning, and bottle conditioning.

In the true lager process, beer is transferred from the primary fermenter when some residual fermentable sugars remain. In the fermentation of a normal-strength beer, a common point for the transfer is when the gravity has dropped to about 1.016.

In traditional lagering the beer is held in a closed vessel (the "secondary") at cold temperatures for a period of three to 12 weeks. During this period fermentation completes, the beer becomes carbonated, yeast settle out of the beer (resulting in clarity), and "green" flavors (such as the buttery smelling diacetyl and green apple-like acetaldehyde) left in the beer from primary fermentation mellow.

The "kraeusen" process is a variation of the lager process except the beer is completely fermented during the primary fermentation, and actively fermenting beer or kraeusen is added as the beer is transferred to the aging tank.

Cask-conditioned ales are somewhat similar to kraeusened lagers except priming sugar, usually corn sugar, is added to the completely fermented ale instead of actively fermenting wort. Also, cask-conditioned ales are usually dry hopped for aroma and have finings added to the cask to accelerate clarification. Like lagers, cask ales mature in flavor, carbonate, and clarify during their secondary fermentation. The process is much shorter, however, lasting several days vs. several weeks.

The last example of a traditional beer using a secondary fermentation is bottle-conditioned beer. Usually, these beers are allowed to settle for some period prior to bottling to remove most of the yeast. When the time is right, the beer is transferred out of the fermenter, priming sugar is added, and the beer is packaged.

Some brewers actually filter the beer after fermentation and add yeast in addition to the priming sugar. The carbonation and flavor maturation then occurs in the bottle. So does natural clarification, when the bottle is left undisturbed.

All of these methods have three things in common: carbonation, flavor maturation, and clarification. Not all beers are made using these techniques. For example many microbreweries and brewpubs allow the beer to finish fermenting and then hold the beer at fermentation temperature for a couple of days for the diacetyl rest. This time allows for diacetyl that is left after fermentation to be absorbed by yeast and converted into a flavorless compound. After the diacetyl rest the beer is quickly cooled, filtered, and carbonated.

Beer made using this method can be as tasty and satisfying as one made using a traditional method of secondary fermentation. The difference is that the only thing that happens to the beer during its short aging period is that the flavor is matured and a lot of the yeast settles out of the beer. However, the beer is not clear, and it is not carbonated.

None of these methods is right or wrong, but they all can be used to make good beer. The method you are currently using is bottle conditioning and it does involve a

secondary fermentation. If you are happy with the results, stick with it. Personally, I like my bottled beers to contain very little yeast sediment and always allow the beer to settle for at least one week before bottling. Whether this is done in a separate carboy or in the same vessel the beer fermented in, the secondary fermentation still occurs in the bottle and the beer is clear, mature, and carbonated. Happy fermenting!

Mr. Wizard

I'm a beginning homebrewer and have invested much more in my newfound hobby than my wife wishes to acknowledge.

My next big purchase is going to be a wort chiller. However, I do have one question about cooling the wort before pitching the yeast. Everything I have read says that the wort must be cooled before pitching the yeast. When you put the hot wort into a primary fermenter that already has three gallons of cold water, doesn't that cool the wort enough to pitch the yeast?

I have made several batches this way and haven't noticed any off-flavors yet. Is there something I am missing here?

Doug Southern
Riverside, Calif.

In your particular case you are not missing anything. As long as the cool water sitting in the bottom of your primary fermenter has been boiled to kill any bacteria that may be present and cooled, then you won't have any problems.

A wort chiller will become a necessary part of your arsenal of homebrewing tools when you begin boiling all of your wort. This usually occurs when extract brewers jump into the arena of all-grain brewing. Until then you will do just fine cooling your wort with cold dilution water.

If you really want to get the hackles on your wife's neck rising, I would like to suggest that you invest in a new mash tun, a stainless steel brew pot, a kegging system, a refrigerator to ferment the lagers you will be brewing with your new wort chiller, and a fancy-schmancy counter-pressure bottle filler. Happy homebrewing!

Mr. Wizard

I'm an all-grain brewer who has been spending a lot of time lately thinking about my mill. This is mostly due to my perfectionist nature. I'm fortunate enough to have a two-tiered gravity-feed system that enables me to mash under (almost) perfect conditions, but there is one issue that's eating at my psyche. I use a Corona mill for all of my grain. I have it set to break every single kernel and I have zero sparging problems.

The only problem I do have is all the negative press this particular mill gets. The claims include that it produces too much flour, leads to inefficient yield of malt extract, and produces poor grist.

I admit that it produces a lot of flour, especially because mine is motorized, but is flour a bad thing if you still have the husk intact?

Also, I hear a lot of talk about gravity points per pound. What is this magical mathematical formula? I would like to use it to see how my yield stacks up against brewers with roller mills.

James Adams
Independence, Mo.

This is one of those questions that really gets my wort boiling. You don't have any real problems with your mill except you feel your homebrewing colleagues will turn their noses up at your Corona mill! I must admit I am not blameless when it comes to Corona bashing, but you must have inner strength and simply ignore generic comments about brewing equipment if the topic doesn't apply to your own situation. Let's face it, beer columns can be boring to read without a little opinionated controversy!

If you had yield problems, severe lauter problems, and beers with grainy, husky flavors, I would suggest evaluating your milling method, but you don't. Every piece of equipment must function well within context.

In recent years a new type of mash filter has been making waves in large commercial breweries because it works well with a hammer mill. The hammer mill beats the malt into a fine flour, leaving no trace of husk pieces. This type of grist would be disastrous in an infusion mash tun or a lauter tun but works great in the Mash Filter 2001. Coors, Guinness, and Bass are three of the breweries successfully using this new technology.

A malt mill should do two things for the brewer. The first is to give the brewer a reasonable shot at extracting the goodies within the malt during mashing. The second is to leave the grist in a condition that allows for easy and efficient wort separation.

In general the finer the grist the better the yield, and the more difficult the wort separation. However, what one brewer considers unacceptably fine may be very coarse to another. In your case you don't have lauter difficulties but you don't know your yield.

To calculate the "points per pound" of yield, you need three numbers: 1) the gravity points in your wort (this is the number behind the decimal in the original gravity; for example, 1.048 specific gravity equates to 48 gravity points); 2) wort volume; and 3) pounds of malt used in the brew.

The yield is simply:

$$\frac{\text{Points} \times \text{Gallons}}{\text{Pounds of malt}}$$

Let's assume you used 7.5 pounds of malt to produce five gallons of wort with a specific gravity of 1.048. The yield comes out to be:

$$\frac{48 \times 5}{7.5} = 32$$

Most malts have a maximum or theoretical yield of about 36 points per gallon but a yield of 32 points per pound is a good yield.

The goal of brewing is plain and simple: to make good beer. If you have a system that makes good beer, then you can start making the system more efficient.

Just remember that an efficient system that produces bad beer has failed the primary goal, but an inefficient system that produces good beer only makes that good beer more expensive to make.

Mr. Wizard

I have types of calculations that I use to help with brewing. I can calculate my original gravity, final gravity, bittering units, alcohol, and how to convert between extract and grain. The one calculation that eludes me is how to calculate calories!

How can a homebrewer calculate calories?

Fred Goeldi
Warren, Mich.

The calculation used to calculate calories in beer is straightforward but relies on two key numbers that a homebrewer will only know if he has a laboratory. The two numbers are alcohol content by volume and residual carbohydrate.

Alcohol can be approximated by using your brewer's hydrometer. Just note the original and final gravities and use that difference to estimate alcohol content by weight. Most homebrew hydrometers have alcohol scales printed on them.

To begin the calories estimate, take alcohol by volume and multiply by 10 to determine how many milliliters of alcohol are in one liter of beer, then multiply by 0.79 grams/milliliter (the density of alcohol) to convert milliliters to grams. Next, multiply this number by seven calories per gram of alcohol to determine the number of calories contributed to a liter of the beer by alcohol.

Residual carbohydrate is more elusive than alcohol because the final gravity of beer is technically referred to as apparent extract, since hydrometer measurements are interfered with by alcohol.

The true amount of extract remaining in beer is called "real extract" and can't be measured without removing the alcohol from beer. Since this can only be determined in a laboratory setting, real extract must be approximated from the apparent extract.

There is no rule that works for all beers, but a reasonable estimate of a beer's real extract is to multiply the apparent extract (in degrees Plato) by 1.5. For example if a beer has an apparent extract of 2° Plato (the same as 1.008), the real extract estimate is then 3° Plato.

Next multiply this by 10 to get the number of grams per liter. Since degrees Plato is the same as a percentage, a 3° Plato beer contains three grams of carbohydrate per 100 milliliters or 30 grams of carbohydrate per liter. If you multiply 30 grams of carbohydrate by four (calories per gram of carbohydrate), you get 120 calories from carbohydrate in one liter of beer.

To estimate the total calories simply add the calories from alcohol to the calories from carbohydrate. If you are into nutrition, you will notice no calories from protein or fat, but these two classes of compounds represent very few of the calories in beer and can be neglected.

Here is an example: Suppose you have a beer with 5 percent alcohol by volume and an apparent extract (hydrometer reading) of 1.009. Begin by calculating the number of calories from alcohol. This is equal to:

$$5 \times 10 \times 0.79 \times 7$$

$$= 276.6 \text{ calories from alcohol.}$$

Next, convert 1.009 to degrees Plato by dividing 9 by 4. This is equal to 2.25° Plato. Calories from carbohydrate are equal to:

$$2.25 \times 10 \times 4$$

$$= 90 \text{ calories from carbohydrate.}$$

Add the two together and the answer is 366.6 calories per liter of beer or about 130 calories for a 12-ounce (355 ml) serving.

I must stress that this is only an estimate. Breweries that brew light beers must show that their light beer contains at least one-third fewer calories than the regular version and are required to determine calories in a laboratory fashion. However, if all you want to do is to wow your friends, this method will work.

Mr. Wizard

I am an all-grain brewer and have the ability to raise and step my temperatures during my mash cycles. Recently, I brewed a wheat, red, brown, and a blonde. In my mash I made my last step 167° F for eight minutes before I transfered it and began to lauter.

I found that with these brews my lautering was very challenging and it took a long time to collect my volume of wort.

After some thought I decided to brew some of these beers again, but this time I raised my last mash step to 170° F for eight minutes before I transferred it over for lautering. It ended up being a lautering dream and took far less time to get my target volume of wort.

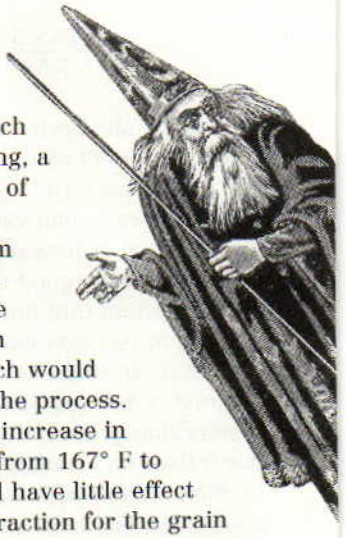
Does the three-degree change really make a difference in my lautering? Does something different

happen in the starches at 170° F than would happen at 167° F to make my lautering time different?

Brad Rush
Oostburg, Wis.

Temperature does play a very important role in the rate of wort flow from the lauter bed because an increase in temperature lowers wort viscosity and in turn increases wort flow rate.

Wort viscosity is also affected by starch gelatinization. When starch gelatinizes, or loses its crystalline structure when heated in the presence of water, it thickens. This happens in the beginning of the mash, and most of the starch is broken down during mashing.



If the mash temperature is raised too much before sparging, a small amount of starch can be extracted from the mash bed and can cause an increase in viscosity, which would tend to slow the process. However, the increase in temperature from 167° F to 170° F should have little effect on starch extraction for the grain bed.

There are many more factors affecting the rate of wort runoff from a lauter tun than simply temperature. Malt grind, malt type and source, mash temperature, mash pH, mash duration, sparge water temperature, and equipment all factor into wort runoff. Change any one of these variables and your lauter performance is likely to change.

If you feel confident that you did not change these parameters, then the temperature change probably was responsible for the change in wort flow.

In general, mash-off temperature is one of the factors carefully monitored in commercial breweries. Differences in temperature as small as three degrees are certainly great enough to make the task of lautering easier. ■

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.

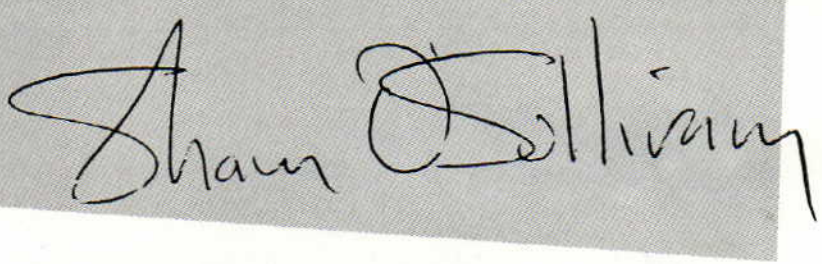
Body Builders

by Suzanne Berens

Steelhead Brewing Co.

"The whole idea behind mouthfeel is to create a balanced beer."

Brewer: Shaun O'Sullivan



Brewer: Shaun O'Sullivan
Brewery: Steelhead Brewing Co., San Francisco
Years of experience: Four
Education: Completed brewing courses at University of California, Davis
House Beers: Blonde Pale Ale, Pier Post Stout, Hefe-weizen, Beach Street Porter, Fort Point Strong Ale, Bombay Bomber IPA, Steelhead Amber, Razzmatazz

Adding body to your beer depends on the style. Our blond pale ale is the lightest beer we have. In this beer we're not after a lot of body. We use pale malt and flaked maize. The pale malt adds some body, while the maize enables you to brew a light-colored beer without adding body. When adding corn add it toward the middle of your mash-in. Run pale malt in the beginning and end, otherwise the mash is more likely to get stuck. There is no husk in flaked corn, so no filter bed is formed. Adding pale malt first acts as a natural filter while lautering. It's also important to stir properly, but you would do that anyway while hydrating your grain.

Carbonation adds to mouthfeel and body. The Blond Pale has 2.5 volumes of CO_2, which contributes to head retention and mouthfeel. For homebrewers use about 20 percent corn if you want a good head but you don't want a lot of body in the rest of the beer.

Our hefe-weizen is a medium-bodied, unfiltered wheat beer. We use a single-step infusion mash. We don't do a protein rest, so we are adding all that protein that wasn't degraded in the mash to the kettle. This method and using wheat malt add body and aid head retention.

Wheat malt has a higher protein content than the pale malt and doesn't have any husk material. It, too, may cause a stuck mash. A lot of professional brewers add less than 5 percent wheat to give a little body to beers in general and to promote head retention. When I was

The Tips

- **Depending on the style, add just under 5 percent wheat to give beer body.**
- **Add no more than 20 percent crystal malt to your total grain bill. This adds body directly and produces rich flavors that add to the perception of body.**
- **Dry hopping lends hop oils that help aid head retention, an important aspect of body.**
- **Mash at higher temperatures to activate enzymes that produce body-building dextrins.**

homebrewing I added one-quarter pound, depending on the beer. Flaked oats work that way, too.

Our amber is medium-bodied. We add caramel malt to it. Caramel or crystal malt during the malting process is kilned at high temperatures, which produces melanoidins. When these are heated in the kettle they darken the wort and produce rich, malty flavors. Here we use a gas-fired (as opposed to steam fired) kettle, which produces hot spots that caramelize the wort. This gives the beer a rounder, maltier flavor, which in turn adds to the perception of more body. Homebrewers should add crystal malt as no more than 20 percent of their total grain bill.

Obviously I add oatmeal to the oatmeal stout. As with the protein that is pulled over in the wheat in hefe-weizen, oatmeal lends a lot of body and promotes head retention. I add oatmeal as 13 percent of the overall grist bill. I wouldn't go over 15 percent. The goal is balance. Also, take care to avoid stuck mashes. Stir when doughing in and don't add oatmeal first.

Our IPA is medium-bodied. I add Vienna and Munich malt. Munich adds body, aids in head retention, and has a husk. It also has a toasty, oak quality. We dry hop this beer, which aids head retention.

For all-grain homebrewers who are using a single-step mash and want to add body, mash near 155° F. There are two main enzymes involved in mashing: alpha-amylase and beta-amylase. Beta-amylase is a key element in saccharification, the process of converting starch to fermentable sugars. It works best between 131° and 140° F. It produces highly fermentable wort, rich in maltose, not considered to be real body building. So we mash between 150° and 155° F to activate alpha-amylase, which converts malt starch into dextrins. Dextrins are body-building unfermentable sugars. At 150° F usually both enzymes are activated.

For our strong ale, I mash a little higher to get more complex unfermentable sugars. If I want to produce really dry beer, I mash at lower temperatures: 149° to 150° F. ■

The Cabernet Sauvignon of Beers

by Alex Fodor

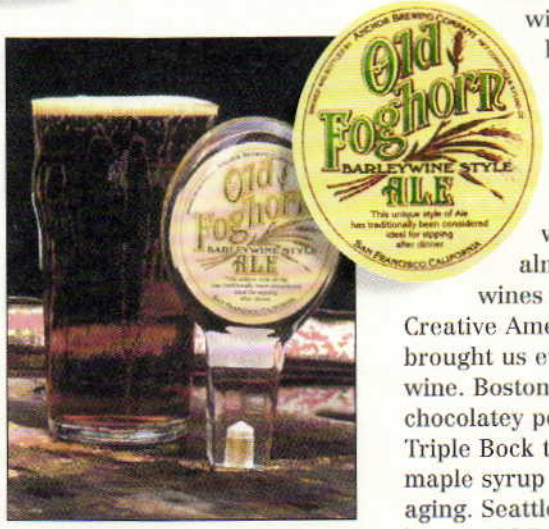
El Niño got you down? Stoke up the fire, sit back, and bask in the warmth of a mature barleywine. No other beer so aptly captures the brewer's art.

Although there are no grapes involved, this beer bears the distinctive title of a wine. This is due to its unusually high alcohol content and complex flavor. If you are searching for the Cabernet Sauvignon of the beer world, this is it.

One of the earliest versions is Bass No. 1 Barley Wine circa 1903. Referring to this beer, a 1909 article in the medical periodical The Lancet said, "It possesses a decidedly nourishing value. The beer was in excellent condition, free from hardness or acidity, and from excess gas. It is a very palatable malt liquor, having an attractively rich malty flavor." Despite its past endorsement from the medical community, Bass No. 1 Barley Wine is now brewed only on occasion at Burton's Bass museum.

In 1969 Eldridge Pope introduced Thomas Hardy Ale (original gravity 1.125). Hardy was a Victorian writer who often praised the local beer. To return the favor the brewery named a beer after him. This barleywine is still available today. Vintage dated for the year of release, Thomas Hardy should age well for far more than five years.

Anchor Brewing Co. of San Francisco made the first barleywine of the microbrewery revolution in 1975. Old Foghorn (OG 1.100) is the classic American barleywine, with a hefty dose of hops to prove it. It is available on draft and in bottles.



Considering such inspirational predecessors, it is no wonder there are now almost as many barleywines as there are brewpubs. Creative American breweries have brought us every variety of barleywine. Boston Beer Co. makes a chocolatey port-like brew called Triple Bock that includes a touch of maple syrup and a year of barrel aging. Seattle's Pike Brewery brews Old Bawdy with peat-smoked malt. Sierra Nevada is proudly responsible for the American hop-intensive Big Foot.

In another part of the world, Belgian-style barleywines, such as

Bush Beer (brewed by Dubuisson and known in the United States as Scaldis) set themselves apart with unique yeast flavors.

Because barleywines tend to showcase a brewery's best and are expensive to make, brewers do not hold back on creativity. Although it is possible to define the style to strict parameters, it is rather unrealistic. If the addition of honey, biscuit malt, or chocopuffs suits you, then try it. Still, try to imagine what it will actually taste like rather than assembling your recipe haphazardly. This brew is too time consuming and expensive to mess up.

Barleywine can be brewed from a base of malt or malt extract. Well-modified British pale ale malt is the more traditional choice. However, domestic, German, or Belgian pale malts will make excellent beers. A mixture of light and amber malt extracts will give a color in the desired range. The desired color range of classic barleywine is copper to dark amber with an SRM between 14 and 30. Sugar may compose up to 15 percent of the extract. Since barleywine has so much pale malt, a large amount of crystal malt is not needed to add flavor.

Think in terms of balance; too much crystal may make the beer sickeningly cloying. Only add roasted malts if you are interested in brewing an imperial Russian stout. Use an infusion mash temperature between 150° F and 155° F to create a wort with high fermentability. The desired original gravity falls between 1.085 and 1.120. Because such a large amount of malt is required, all-grain brewers may choose to supplement their wort with malt extract to achieve the proper gravity. As an alternative, brew a two-gallon batch. Another, more complicated, option is a parti-gyle brew. A strong beer is made with the first runnings and a lesser beer with the low-gravity runoff.

Hop variety is up to the discretion of the brewer. For a classic British style, English hops such as Fuggle and Kent Goldings are the best choice, especially for aroma and dry hopping. If you prefer American barleywine, try varieties such as Cascade and Columbus for aroma. Late hop additions and dry hopping will add complexity to your barleywine. Bitterness may range from 50 to 100 IBU. British barleywine falls at the lower end of this spectrum while American versions tend to be more bitter. Remember that high-gravity worts have a lower hop utilization rate, so you may need to use more hops than usual.

Some brewers ferment their barleywines with wine yeast. Homebrewers have made barleywines with Pasteur Champagne yeast and had good results. However, there is no need to use a wine yeast if you choose a suitable beer yeast. Because barleywine finishes with a gravity of 1.024 to 1.032 and an alcohol content of 6.7 to 9.6 percent by weight and 8.5 to 12.2 percent by volume, you will want an attenuative yeast (one that ferments wort thoroughly) with a high alcohol tolerance, such as Wyeast 1056 (American ale). Mixing yeast varieties often creates a more interesting beer.

Fermenting a barleywine is a big job for yeast. To help them out, the brewer should provide a well-aerated wort and pitch an especially large volume of yeast. Fermentation temperature should be maintained between 58° and 70° F. Occasional rousing may also help the fermentation along. Expect the total fermentation and aging time to be longer than normal. Age the barleywine in bulk for at least two months before bottling. However, be careful to avoid oxygen exposure during this time. Some brewers may choose to age their barleywine in barrels. New barrels will impart too much flavor and should be avoided. If they can be found, used wine barrels may prove interesting. They may also be home to beer spoilers such as *Brettanomyces*, which can survive high alcohol levels.

Dosing the beer with fresh yeast at the time of bottling may ensure a

Rose Revisited
(5 gallons, all-grain)

Ingredients:

- 20 lbs. British pale ale malt
- 1 oz. Galena hops (10% alpha acid) for 60 min.
- 4.5 oz. Fuggle hops (4% alpha acid): 2 oz. for 30 min., 1.5 oz. for 15 min., 1 oz. at end boil
- 1.5 oz. East Kent Golding hops: 1 oz. at end of boil, 0.5 oz. dry hopped in secondary
- Wyeast 1968 (Special London ale) or other British style ale yeast
- 1/2 cup priming sugar

Step by Step:

Mash grains into 6 gal. of water and hold for a mash rest at 152° F for 90 min. Sparge with 168° F water to collect 6 gal. of wort.

Total boil is 90 min. Boil for 30 min. and add Galena hops. Boil 30 min. more and add 2 oz. Fuggle hops. Boil 15 min. more and add 1.5 oz. Fuggle hops. Boil 15 min. more and turn off heat. Add 1 oz. Fuggle and 1 oz. East Kent Golding hops. Cool and aerate. Pitch yeast at 70° F.

Ferment between 58° and 70° F. Add 0.5 oz. East Kent Goldings to dry hops in the secondary and age for one to two months before bottling with corn sugar and fresh yeast.

OG = 1.110
FG = 1.025-1.030

successful secondary fermentation in the bottle. Some brewers prefer to add only one-half cup priming sugar, since the beer will probably ferment out very dry during the long aging, producing more carbonation than expected.

Old Glory
(5 gallons, extract)

Ingredients:

- 9 lbs. pale liquid malt extract
- 6 lbs. amber malt extract
- 1.5 oz Galena hops (10% alpha acid) for 60 min.
- 4 oz. Cascade hops (5% alpha acid) 1 oz. for 30 min., 2 oz. at end of boil, 1 oz. dry hopped in the secondary
- Wyeast 1056 (American ale yeast)
- 1/2 cup priming sugar

Step by Step:

Dissolve malt extract into 4 gal. of hot water and top up to 6 gal. Total boil is 90 min. Boil for 30 min. and then add 1.5 oz. Galena hops. Boil 30 min. more and add 1 oz. Cascade hops. Boil 30 min. more, turn off heat, and add 2 oz. Cascade. Cool and aerate. Pitch yeast at 70° F.

Ferment at 60° to 70° F. Add 1 oz. Cascade dry hops in the secondary and age for one to two months before bottling with corn sugar and fresh yeast.

OG = 1.090
FG = 1.022-1.028

Gold Finger
(5 gallons, grain and extract)

This unconventional barleywine is light in color but noncompromising in strength. It could also be called James Blonde.

Ingredients:

- 7 lbs. domestic two-row malt
- 1 lb. cara-pils malt
- 6.5 lbs. light liquid malt extract
- 1 lb. orange blossom honey
- 1 oz. Perle hops (10% alpha acid) for 60 min.
- 2.5 oz. Tettnanger hops (4% alpha acid): 1.5 oz. for 30 min., 1 oz. for 15 min.
- 1 oz. Crystal hops at end of boil
- Wyeast 1056 (American ale yeast)
- 1/2 cup priming sugar

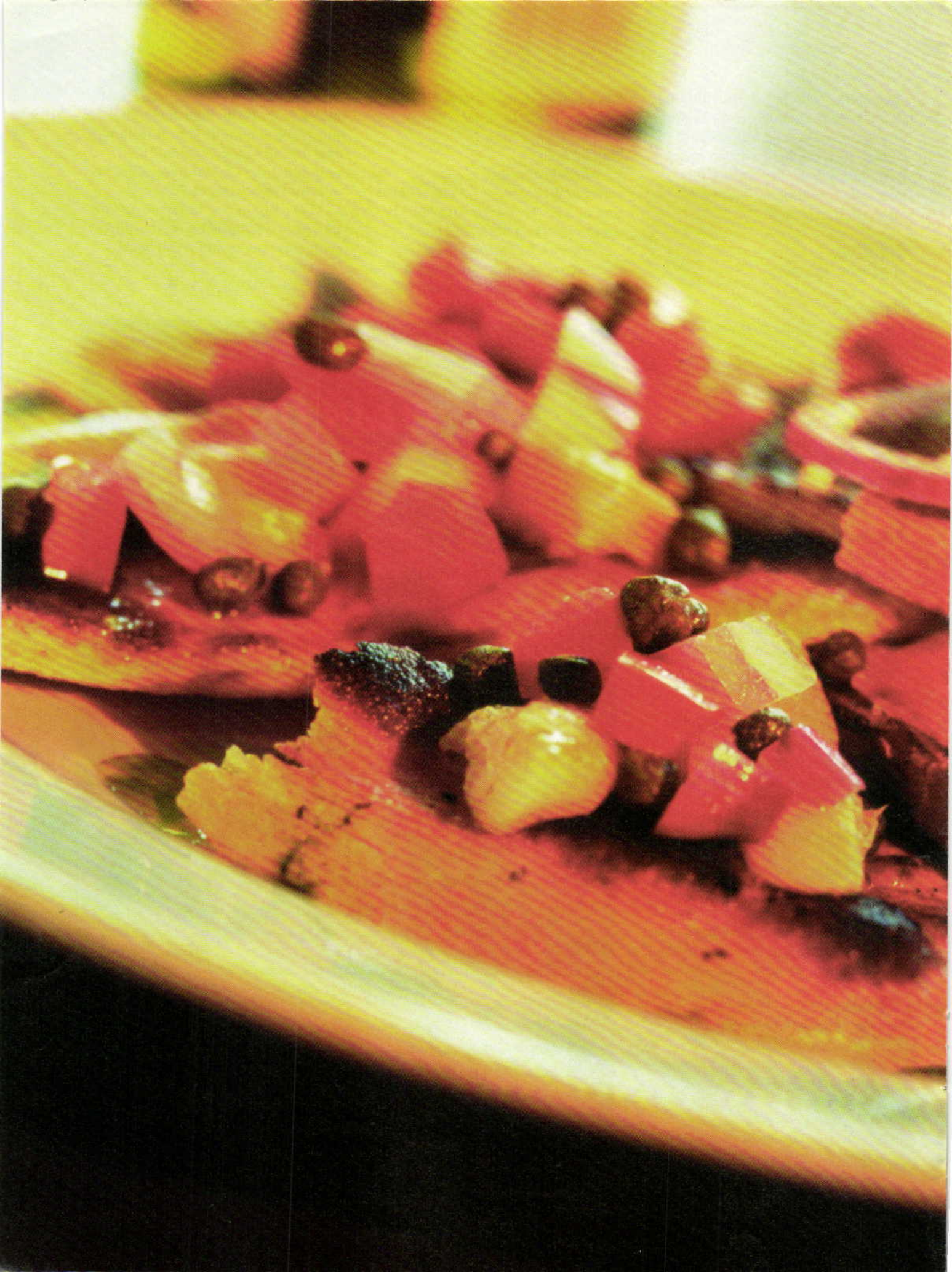
Step by Step:

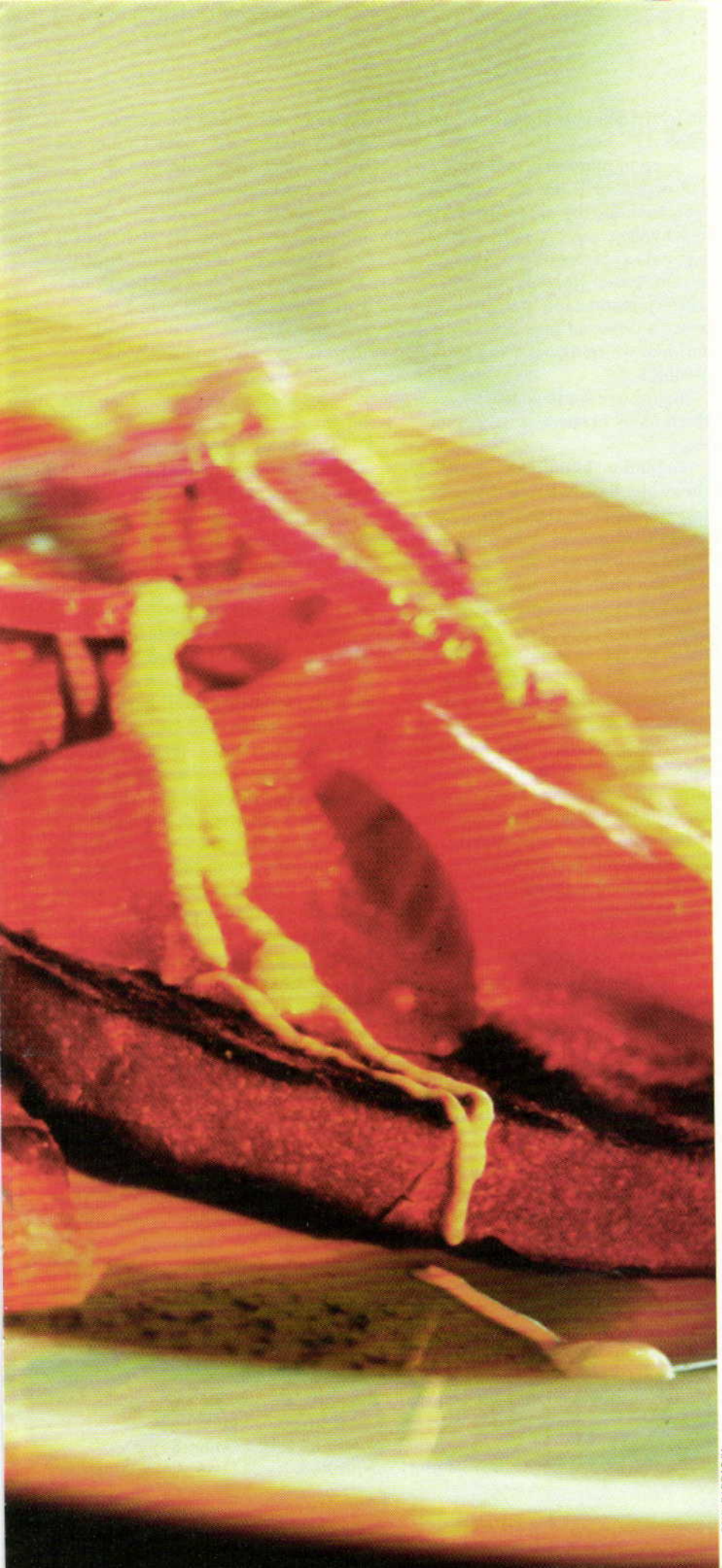
Mash grains into 2.5 gal. of water and hold for a 60 min. conversion at 152° F. Sparge with 168° F water collecting 5 gal. of runoff.

Bring to boil while dissolving malt extract and honey. Total boil is 90 min. Boil 30 min. and add 1 oz. Perle hops. Boil 30 min. more and add 1.5 oz. Tettnanger hops. Boil 15 min. more and add 1 oz. Tettnanger. Boil 15 min. more, turn off heat, and add 1 oz. Crystal hops. Cool and aerate. Pitch yeast at 70° F.

Ferment at 58° to 70° F. Age for one to two months before bottling with corn sugar and fresh yeast.

OG = 1.092
FG = 1.020-1.024 ■





PAUL BARDAGJY

Cooking with Homebrew

When Timothy Schafer, chef and owner of Tim Schafer's Cuisine in Morristown, N.J., sets out to create an elegant dish featuring beer, he starts with the beer first.

"It's not like you go, 'chicken,' and I go, 'porter,'" Schafer says. "I go, 'porter,' and I think 'mushrooms...rosemary...maybe chicken will go with this.'"

Likewise, Tom Peters of Monk's Beer Emporium in Philadelphia plans a beer dinner by sitting down at his desk with beer in front of him. "I'll pop a beer, take a sip, and start to think about what food will work with this," he says.

Articles and books about cooking with beer and serving beer with food usually emphasize the food first, the beer second. But as homebrewers, you can no doubt see the logic in starting with the beer, since

by Daria Labinsky

you've probably got quite a bit of it on hand.

Open up your "beer refrigerator" or head down to the beer cellar and start planning your menu. That raspberry wheat ale that made you realize one pint of fruit beer is plenty? Mix it with some vinegar and herbs for a salad dressing. The smoked porter that drew raves in the club-only competition? Perhaps barbecue is in order tonight. A three-year-old barleywine? Serve it with a plate of strong cheeses to cap off the meal.

"Beer cuisine" is a phrase that gets tossed around a lot. While it usually refers to food that's made with beer, beer can be the ideal companion to many beer-less dishes as well.

Deciding which foods taste best with which beers is a delicious, ever-evolving experiment. But how to start? The most important thing to remember is simply to think about what you're tasting. Sip a beer slowly and determine the dominant flavor characteristics. Is the maltiness sweet or dry? Are the hops flowery or citric? Does the yeast contribute a distinctive flavor? Does the sharpness of alcohol coat your tongue?

Next, think about how you would like the beer to relate to the food. The goal is to find a balance, and the key words to keep in mind are cut, complement, and contrast. You may want to cut a dish that is very rich or buttery by serving it with a light, hoppy beer such as a pilsner. A perfect complement to anything chocolate-flavored is a cream stout or strong stout. And a pale ale will contrast nicely with the hearty, smoky flavors of a barbecue dish.

Just as you cannot follow certain kinds of beers with others in a beer tasting, drinking the wrong beer with certain foods will detract from both the food and the beer. Most often, the flavors in the beer overwhelm those in the food, but the reverse can also occur. Even a malty beer such as a Scottish ale will lose its flavor next to an astringent salad dressing such as a vinaigrette. Likewise, a bite of Limburger cheese will overwhelm all but the strongest beers.

Keep in mind that matching food with beer is not an exact science, even for the pros. "There are no set rules," says Alan Skversky, regional executive chef for the Arizona-based Hops! Bistro & Brewery restaurants. "Every time we try a different beer with a different food, we're blown away by the possibilities."

Below are some suggestions on which foods to serve with certain beers.

Golden or blonde ale, American wheat ale, lightly hopped lagers. Since these beers lack both maltiness and hoppiness, they work best as thirst-quenchers. Try them with super-hot food, such as blackened redfish. Once your tongue has been assaulted with hot spices, it will no longer be able to appreciate an intricately flavored beer, anyway.

Weissbier, dunkelweiss. You want to be able to enjoy the flavors of the yeast, so stick with delicate foods, such as a light soup (consumme or mild bean soup) or pasta in a delicate sauce or mild cheeses. These beers also work well with lightly flavored vegetarian dishes, such as grilled vegetables, or light chicken dishes.

Amber ale. A good all-around beer for any food that isn't sweet — something sweet will detract from the maltiness in the beer. It complements sandwiches, hearty soups, and pizzas. Also a good thirst-quencher for barbecue or Mexican food.

Bitter, pale ale, India pale ale, German/Bohemian pilsners. While hops can kill your taste buds when paired with many foods, they do make for some particularly good matches — fried seafood, for example, because hoppiness cuts through rich flavors, or anything with vinegar as a main ingredient. They also complement smoked, boiled, steamed, or broiled seafood. And they can enhance the spiciness of highly spiced cuisine. The fruitier pale ales also will complement lamb, beef, and game, or try them with liver paté.

English or American brown ale. Hamburgers and sausages are hearty enough for either kind of ale. The English brown may match nicely with smoked fish, while game dishes can stand up to the hoppiness of the American brown.

Porter, dry or oatmeal stout. Think hearty foods — meat dishes with gravy, barbecue, shepherd's pie, stew. Oysters are also ideal. Both these beers and the brown ales will stand up to stronger cheeses such as sharp cheddar and blue.

Cream or sweet stout, imperial stout. These are made for chocolate, and imperial stout pairs especially well with dark chocolate. Also try chocolate-and-fruit desserts, such as stout cheesecake with raspberry sauce, or something with caramel or pecans.

Vienna lager/Oktoberfest/Märzen, dark lager, bock. Like amber ale, these are good all-around food beers, and they're not as filling as ales. The lagers will cut some of the richness in sauce-based meat dishes — chicken paprikash, goulash, or pork rouladen, for example — and will stand up to their strong flavors. The perfect beers to serve with pretzels and mustard. Sweeter bocks, such as doppelbocks, can complement heartier, spicier desserts, such as pumpkin pie or spice cake.

Fruit beers, lambics. Sweeter fruit beers and fruit lambics can be paired with light fruit desserts, such as soufflés or chiffon cake, but sour beers will probably overwhelm fruit flavors. Some people like to drink lambics with dark chocolate. Entrees that are prepared with fruit — raspberry-glazed duck breast, for instance — can pair nicely with fruit beers. Consider enjoying these alone at the end of the meal.

Old ale, barleywine. Most foods don't stand up to these stronger beers, and you'll probably lose the maltiness in the beer as well. Try a really strong cheese or a piece of super-dark chocolate, or serve them alone or with a cigar.

A few more guidelines:

Don't always match like with like. As you can see from the

suggestions above, lighter beers tend to go well with lighter foods, heavier beers with heavier foods, but that's not a hard-and-fast rule. And if you're cooking with beer, you don't have to serve the same beer you cooked with alongside the dish. Often, you'll want to serve a beer that has the opposite characteristics of the one with which you cooked. For example, chef Skversky finds the yeasty hefe-weiss that he uses in his potato soup too "palate-coating" to accompany the soup, and he prefers to serve it with a light, golden ale.

Think ethnic. Try German bratwurst with grilled onions and horseradish with a German dark lager, English stout with steak-and-kidney pie, English brown ale or bitter with mild sausage, or a hoppy American pale ale or pilsner with raw or steamed New England clams.

If you're planning a beer dinner with a different beer for each course, you need to consider not only how each beer will go with each food item but how the different beers will follow one another. Don't serve rich, heavy beers or beers made with herbs and spices with your first few courses. It's better to serve beers that are lower in alcohol with first courses, and keep the old ales or imperial stouts for the end of the meal.

Often, you'll want to serve a beer with the opposite characteristics of the one with which you cooked.

Stick to small portions of beer; many chefs suggest about four ounces per course. Otherwise, you may find your guests snoozing over the entrees. "People lose focus," Schafer says, "plus, beer is so filling."

Once you start experimenting with beer and food pairings, you'll quickly discover that not only does beer enhance the flavor of food, but food enhances the flavor of beer. You will start to pick up the many complexities beer has hidden within it, and as you educate your palate, you will begin to develop ideal beer and food pairings on your own.

The following recipes are from *The Brewpub Cookbook* by Daria Labinsky and Stan Hieronymus, © 1997, Time-Life Inc.

Beer Cheese Spread

Wynkoop Brewing Co., Denver, Colo.

This is a great cheese spread that's quick and easy to prepare. Wynkoop suggests using its Railyard Ale in the spread, but any full-bodied ale can be used. The cheese spread's strong flavor can stand up to the biggest, hoppiest beers, even a barleywine. Serve it with crackers, warm pretzels, or beer bread.

Ingredients:

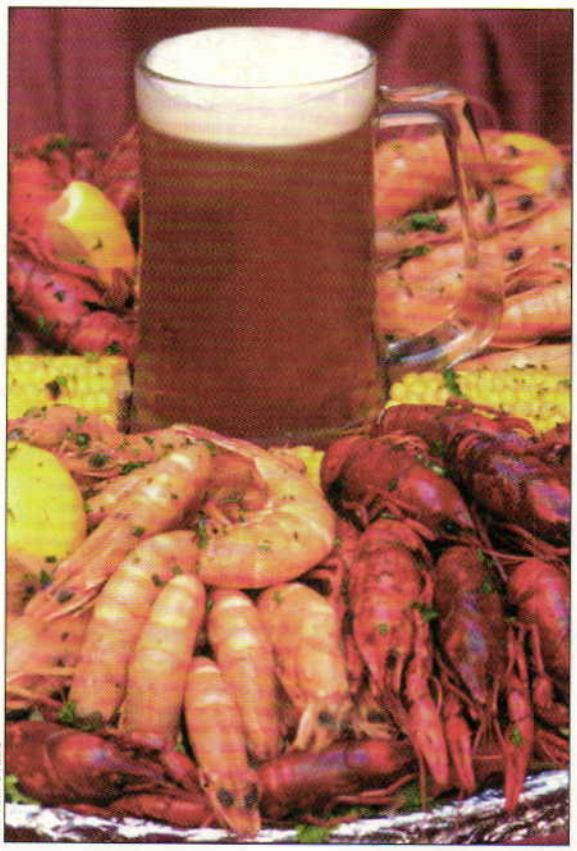
- 6 oz. cream cheese, softened
- 6 oz. blue cheese, crumbled
- 12 oz. sharp white cheddar cheese, grated
- 1/4 cup minced green onions
- 1 tsp. paprika
- 1/2 tsp. celery seed
- 1/2 tsp. ground black pepper
- 1/2 tsp. Tabasco sauce
- 1/2 cup ale

Step by Step:

1. Combine all ingredients except beer in the bowl of a food processor or electric mixer. Mix or blend until everything is well incorporated.

2. Slowly add beer while processor or mixer is running. Place mixture into a crock or serving bowl, and chill for at least two hours.

Yield: 1 1/2 pounds



BURTON STEEL

Bitter, pale ale, IPA, and other beers with prominent hop flavors complement seafood.

Shepherd's Pie

Gritty McDuff's Brew Pub, Portland, Maine

This hearty main course is a favorite of customers at Gritty McDuff's. Serve it with a dry stout (perhaps the one you prepare it with) or with a porter or brown ale.

Ingredients:

- 1 1/2 lbs. lean hamburger
- 1/3 cup diced onion
- 1 stalk celery, diced
- 2 tsp. minced garlic
- 1/2 tsp. thyme
- 1 tsp. oregano
- 1 1/2 tsp. crushed red pepper
- 1 cup stout
- Salt and pepper to taste
- 3 lbs. potatoes, peeled and cut into big chunks
- 1/4 cup butter
- 1/3 cup milk
- 1/3 cup sour cream
- 2 Tbsp. chives
- 1 16-oz. can whole kernel corn
- 2 16-oz. cans creamed corn
- Paprika

Step by Step:

1. Sauté hamburger, onion, celery, garlic, thyme, oregano, red pepper, stout, and salt and pepper until meat is brown. Place sautéed burger mixture in large, shallow casserole dish.

2. Meanwhile, cook potatoes in water. Mash and season with butter, milk, sour cream, chives, salt, and pepper.

3. Preheat oven to 350° F. Drain corn and mix with creamed corn. Layer corn mixture on burger mixture and spread evenly. Layer on mashed potatoes. Sprinkle paprika lightly over top.

4. Bake for about 20 min.

Yield: 8 to 10 servings

Chocolate Calzone

Vino's Brewpub, Little Rock, Ark.

This is definitely not for the low-cal crowd, but the chocolate-loving sweets eaters will certainly dig in! You can use a premade pizza dough (enough for one 16-inch crust) or pastry dough, or make the pizza dough below. A hazelnut brown ale complements the chocolate perfectly, or try an imperial or cream stout.

Ingredients:

- 1 ball pizza dough (see recipe below), or your favorite pizza or pastry dough

- 1/4 cup sugar
- 3/4 cup semisweet chocolate chips
- 1/2 tsp. vanilla extract
- Pinch cinnamon
- 2 tsp. shredded coconut
- 1 cup ricotta cheese
- Garnish: chocolate syrup, chopped pecans, powdered sugar

Step by Step:

1. Preheat oven to 450° F.

2. Place dough on a lightly floured surface. Press down and form into a circle. Using a floured rolling pin, roll dough into a 16-inch circle, about 1/8- to 1/4-inch thick. Sprinkle with a pinch of sugar and press it into dough. Cut circle in half.

3. Mix sugar, chocolate chips, vanilla, cinnamon, coconut, and ricotta cheese. Place half of mixture on each dough piece. Fold dough over filling. Cut edges of dough so that they are even.

4. Seal edges well with the tines of a fork. Fold approximately 3/8-inch of the edge back over itself. Seal again with the fork to be sure it's sealed well (or you'll have a real mess).

5. Place on lightly greased baking sheet, and bake until golden brown, approximately 8-10 min.

6. Place on plate, and drizzle chocolate syrup in zigzag pattern over calzone. Top with chopped pecans and powdered sugar.

Pizza Dough Ingredients:

- 1 cup warm water (110°-115° F)
- 1/4-oz. package dry yeast
- 3 1/4 cups flour
- 1 tsp. salt
- 1/4 cup olive oil (less 2 Tbsp. measured out separately)

Step by Step:

1. Place water in small bowl. Add yeast and stir — a beige mixture should form. Let stand until a light layer of foam forms, approximately 5 min.

2. Combine 3 cups flour with salt in large mixing bowl. Make a well in the center, and add yeast mixture and oil. Stir flour into the liquid until it is mixed well and a soft dough forms. Turn the dough onto a floured work surface and knead, slowly adding remaining 1/4 cup flour until the dough is no longer sticky. Knead just until the dough is smooth and elastic and all visible flour is incorporated. (If using a bread machine, instead of steps 1 and 2: Place water in pan in machine. Add 2 Tbsp. olive oil, flour, salt, and yeast, in that order. Start machine, remove dough when dough cycle is completed.)

3. Shape the dough into a ball, and place into another bowl oiled with the 2 Tbsp. remaining oil. Roll ball around to coat evenly.

4. Cover bowl with plastic wrap, place in a warm, draft-free location, and let rise until doubled in size. Punch down and knead another minute on floured board before using.

Yield: 4 servings

Lagering Without a

Refrigerator...

...and Other Tales of Temperature Control

SHAWN TURNER ILLUSTRATIONS

The possibilities for upgrading a homebrewing setup are endless. With enough cash you can purchase a pilot brewery equipped with a stainless steel mash tun and rakes to turn the mash, a brew kettle with a whirlpool, a lauter tun, a liquor back, temperature-controlled conical fermenters, and more. The list of cool homebrewing stuff never seems to end.

While stocking the house with homebrewing equipment can be fun, you can brew superb beer without designing a bulky pilot system. Many brewers generate excellent beer year-round without even a beer refrigerator to control the environment during the temperature-sensitive fermentation period.

Armed with knowledge of beer styles, yeast sources, and a few tricks, these brewers produce fresh, tasty beer in their kitchen, wrapping carboy fermenters in parkas and stashing them under a house, in a river, or between blocks of dry ice. Successful brewing in the heat of summer

by Douglas E. Fuchs

or lagering without a refrigerator at any time of year requires the ability to control temperature sufficiently to assure that a particular yeast strain generates just enough flavor characteristics appropriate for the target beer style.

Importance of Temperature Control

Temperature directly affects yeast. If the temperature of the fermenting beer becomes too cold, the yeast will become dormant, resulting in beer with fermentable sugars still in suspension. If the temperature becomes too warm, the yeast will have higher levels of ester production and over attenuate, knocking the beer out of style. The target temperature for any beer should remain within a range that will result in enough yeast-generated flavors appropriate for each particular beer style.

One of the by-products produced by high temperatures is diacetyl well above the flavor threshold. Diacetyl tastes buttery, adding a butterscotch quality to the beer. Assuring that the wort is as close to 60° F as possible before pitching the yeast will reduce diacetyl production, as will a rolling boil, rapid cooling of the wort, and correct temperature control of the fermenting and conditioning beer.

High temperatures generate fusel alcohols, which produce a solvent-like flavor and a bad headache when consumed. During conditioning these flavors can mutate into assertive banana flavors. While some fruity flavor contributes a beneficial sensation in most pale ales, high fermentation and conditioning temperatures may allow the pear, green apple, banana, and strawberry estery taste to dominate the brew.

While pale ales require a certain amount of fruity esters, possibly with some diacetyl, pilsners require a crisp, clean taste devoid of any fruity, buttery flavor. The best strategy when designing a certain beer must include a prediction of the temperature range the beer will reach in the carboy when fermenting and conditioning. Try filling the carboy with water, then placing a thermometer inside. Leave the carboy in the spot where you will be fermenting the beer. Over a period of a couple of days, take several thermometer readings. The point is to determine the high and low range of fermentation temperatures. Wort is not water, of course, so the actual fermentation temperature will vary somewhat from your readings, but this experiment should give you usable data.

Whatever beer style you decide to make, high-temperature bursts should be avoided much more than possible temporary chilling.

Understanding Yeast

To predict and plan for fermentation temperatures, you must first comprehend the strengths and limitations of any possible yeast source. Some yeasts are considered "forgiving" because they allow for a wide range of temperatures during fermentation and conditioning. Ale yeast ferments best at 50° F, lager yeast at 40° F provided there is enough healthy, active yeast to carry out maturation. Lagering at high temperatures can increase the risk of yeast cell death and thus the off-flavor referred to as "yeast bite." Both ales and lagers may benefit from a diacetyl rest in which the temperature is raised so the yeast can condition out any remaining diacetyl.

As an example of a forgiving yeast, say you brew a pale ale in summer and pitch Wyeast 1056 (American ale) yeast that fermented at 68° F. A heat wave strikes, and the beer conditions during warm bursts of 76° F. While the pale ale will certainly be fruity, Wyeast 1056 can handle a few warm bursts. The beer should be appropriate for style.

By experimenting and keeping exact notes over time, you can discover which yeasts are somewhat more forgiving than others. Unlike professional brewers who pitch the

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same house yeast for almost every beer, homebrewers can pick and choose from an endless supply.

Another important aspect of yeast to keep in mind is that during fermentation, the action of certain yeasts may raise the temperature of the beer 10 degrees or more. Many homebrewers at this stage have carboys covered with heavy parkas and blankets, only to discover rapidly fermented beer with a high levels of solvent-like, fruity, and buttery flavors. In summer brewers can float the fermenting beer in a bucket of water in the coldest place in, under, or around the house to assure that the rise in temperature caused by fermentation will be minimal.

The Importance of Lagering

Lager means "to store." During lagering the beer is kept cold for long periods to assure that a minor fermentation settles out any unwanted flavors. Homebrewers without a refrigerator for conditioning must transfer the beer from the primary fermenter to a sanitized secondary fermenter with minimal splashing. Racking the beer from one vessel to another removes the beer from degenerating yeast cells and trub. The secondary conditioning process then allows for the slow reduction of any remaining sugars by healthy yeast still in suspension. During the reduction phase, yeast absorb many off-flavors below the flavor threshold.

Lagering beer at temperatures that are too warm for the style and yeast can increase the possibility that unwanted flavors stay active in the finished beer. Homebrewers must use every trick in the book to assure that the beer stays at least below 50° F for ales and 40° F for lagers during this phase. Only the forgiving yeasts will complete their conditioning task at this final temperature. Optimally, lager and ale yeasts should be put to sleep through very cold temperatures — at or near freezing — at the end of the conditioning cycle.

Tricks of the Trade

The first trick to maintaining accurate temperatures without purchasing additional refrigerators is following the traditional notion that fruity ales should be brewed in summer and malty lagers should be brewed in winter. Generating a beer schedule that allows for particular beers to be brewed in times when certain flavors will either rise well above the flavor threshold or settle out through constant cold conditioning makes good sense. For example homebrewers in the Pacific Northwest brewed lagers all winter because the calm weather caused by El Niño maintained garages at an average of 45° F (7° C), perfect temperature for lagering pilsners, bocks, and doppelbocks. Of course this strategy works best in temperate zones. Homebrewers living in the tropics or the Sahara desert should either brew only ales, purchase a beer refrigerator, or employ as many of the following tricks as possible.

Winter doesn't provide as many obstacles to maintaining a correct temperature range for fermenting and conditioning beer as does summer. As long as the house is warmer than outside, temperature control can be obtained through experimentation throughout the house. Many homebrewers keep their coats and umbrellas on an unused chair and fermenters chugging away in closets. The heat waves of summer can cause a homebrewer many unnecessary headaches.

A popular trick includes placing a carboy partly on a central air-conditioning vent. A garbage bag fitted over the carboy with the ends of the bag taped to the vent creates a constant flow of cold air. Carboys may fit under the house in a cold place, in a river without a strong current, or in a root cellar. Some homebrewers stash their conditioning beer carboys deep inside a woodpile stocked for winter. No

matter which method is used, any cold-conditioning trick must assure strict sanitation. Make sure that dirty air and water will not enter the carboy at any time.

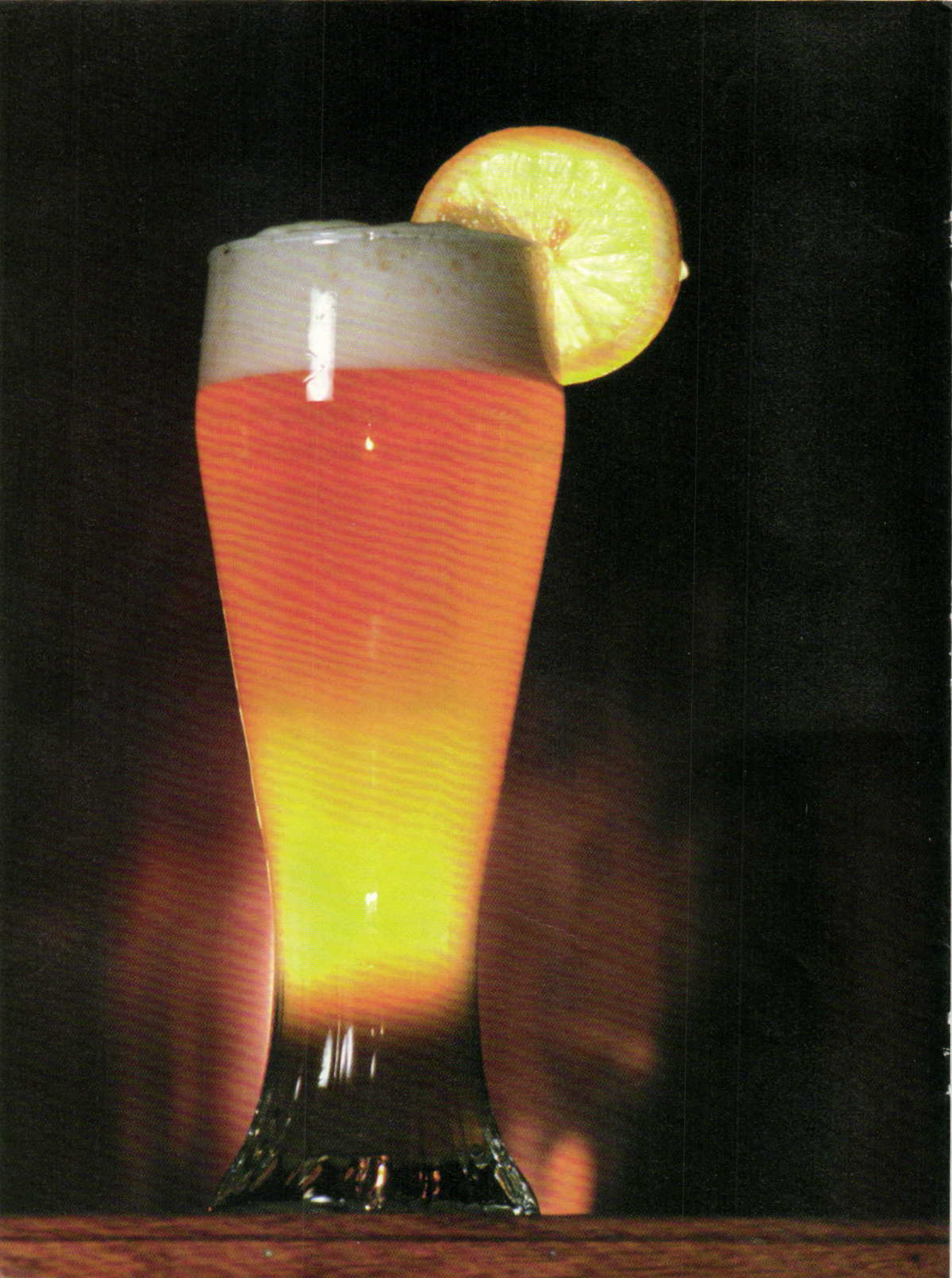
During the worst of summer's heat wave, stock the freezer with plastic liter soda containers filled with water each night, place the carboy in a large tub of cold water like those used to hold kegs, and throw the frozen containers in the tub each morning. A quick check during the heat of noon should assure optimal conditioning temperature.

Many homebrew stores sell carboy parkas and cloaking devices with handles to insulate and maintain temperature control. The material can be made of terry cloth, polyester, or some strange unpronounceable stuff invented by NASA. Some homebrewers will not use the covers during fermentation because the insulation will keep the heat of yeast activity in the carboy instead of allowing the cold water to maintain cool fermenting temperatures. As soon as the yeast starts to drop, when primary fermentation is almost complete, rack the beer into a sanitized secondary fermenter already dressed in a cover. Place the carboy back into the tub of water and start adding the frozen containers. All conditioning tricks benefit from the use of covers of some kind.

Some brewers also use dry ice to cool the beer. Seal the carboy in a parka first and then a garbage bag. Place the carboy in the middle of a large, empty cardboard box lined with another garbage bag. Add the dry ice. Wear good, strong rubber gloves. The dry ice should keep the beer cold for days.

Some heat waves may win out, and the beer will taste too fruity for style. Don't dump the batch of beer. Rack the beer into a third vessel off the secondary yeast bed. Stash the carboy in a cool place. Wait until fall when the heat waves subside and brew another pale ale with a low hop rate. When this beer is finished fermenting, blend the two brews into a single racking vessel and bottle. Unless the beer tastes absolutely horrible, the entire batch can always be blended with another, producing a "unique" example of pale ale.

A last trick is to keep any fermenting beer a secret from other homebrewers until it's finished. There once was a homebrewer who brewed a pale ale in summer that fermented during a vicious heat wave in eight hours. The beer tasted awful, full of higher alcohols and powerful fruity flavors. The brewer didn't give up, added lots of cherries to the beer, and re-pitched with a variety of Belgian yeast strains. He bottled the beer, conditioned the entire batch for two years at any and all temperatures, and submitted it to a well-attended homebrew contest as a Belgian beer. He won best of show.



Hefe-Weizen: Mostly Cloudy

by John Oliver

Besides being delicious and unique, hefe-weizen is a classic show-off beer. You want something to serve to uninitiated friends who swear by American lager, the whole American lager, and nothing but American lager? You want to demonstrate to them that there's a world of beer out there, a world they never imagined beyond their sliver of slightly hoppy and crystal clear? Brew them a hefe-weizen.

It smells different.

It's kind of spicy.

It's *cloudy*, ferhevinsakes!

But it sure is refreshing on a hot summer day.

What kind of beer did you say this is?

TODD HAMMOND

Where It All Began

Wheat was one of the first grasses cultivated by man, so it is probably safe to assume

that early attempts at brewing included it as well. In many areas of the world wheat is a much more plentiful crop than barley, and local brewers probably sought to take advantage of the local supply of readily available grain. Combine this with the fact that wheat was usually less costly than the same measure of barley malt, and thus many a frugal brewer could extend his brewing and improve profitability by adding a percentage of wheat into a standard, barley-based brew.

The use of wheat in beer was so popular that the majority of harvested wheat was used in beer instead of bread (one of the reasons behind the German purity law).

However, it was in 17th-century Bavaria where whole breweries began to be developed that were devoted to the production of the beverage that we have come to know today as weizen beer, in which wheat malt makes up the majority of the grist bill. The use of wheat in brewing is popular in Bavaria, throughout Germany, in Belgium where wheat is incorporated into several indigenous styles, and in America where most microbreweries and brewpubs today offer some form of wheat beer.

Wheat-Yeast Beer

Germany is the origin of most of the predominant styles of wheat-based beers. The most popular and well known of the modern-day wheat beers is hefe-weizen, a beer in which the presence of yeast in the final product is a necessary and critical component of the style. Originating in Bavaria, the style takes its name from the German words for yeast (hefe) and wheat (weizen). Hence, hefe-weizen is a wheat beer with yeast.

A glass of hefe-weizen is usually very pale gold to copper, with a cloudy fogginess from the yeast and protein present in the finished beer. Highly carbonated, hefe-weizen has a strong and long-lasting head, leaving Brussels lace clinging to the sides of the glass all the way to the last swallow. The aroma and flavor are distinctively fruity and phenolic, with banana and cloves being two of the most prevalent characteristics. Nutmeg and vanilla notes are also common, and it is not unusual to find other characters such as a sherry flavor or a mild smokiness as well. These characteristics are strictly a result of using wheat and the unusual yeast strains associated with hefe-weizen. Spices or additives to accentuate these unique flavors and aromas should never be used.

The malt bill contains around 50 percent wheat in the grist, and some commercial examples are higher in wheat content. The high protein levels accorded by wheat malt also provide for an ample number of long-chain proteins in the finished beer. These serve to enhance the head retention of the finished product and, along with the yeast, further contribute to the beer's cloudy appearance.

Some wheat beers, called kristal-klar, undergo filtration prior to bottling or kegging to remove the yeast and suspended proteins. And as their name indicates, they are conspicuous by their clarity. As the yeast is an integral component of the flavor profile of wheat beers, vast flavor differences are prominent between the hefe and kristal versions, even when they involve the same beer in its filtered and unfiltered states.

Since the flavors in wheat beer are primarily derived from the wheat and the yeast strains, hops are not a major flavor or aroma component. The hops used in hefe-weizen are there to balance the malt and nothing more. Bitterness levels are usually low, and hop flavor and aroma should be low or nonexistent to allow the spiciness of the wheat and yeast to come through unobstructed. The hop varieties used should be traditional European strains such as Northern Brewer or Perle for bittering and low levels of Hallertauer, Hersbrucker, or Tettnanger for flavor and aroma.

Also, the addition of fruit or other flavoring to the beer in its brewing, fermentation, or final stages is very popular in American-style hefe-weizen. True Bavarian hefe-weizen should not be adulterated with fruits or any other ingredient that interferes with the rich flavors and aromas of the beer itself.

Another wheat-beer style, dunkel weizen, can be either hefe-weizen or kristal-klar, and in addition to the usual characteristics of either of these beers the dunkels (German for "dark") incorporate dark specialty malts such as caramel, chocolate, or black patent to shift the color profile into the dark amber end of the spectrum (16 to 23 SRM).

Weizenbock combines the characteristics of two different styles of beer: the higher maltiness and alcohols that are present in the bock style, along with the flavors imparted by using wheat to provide the majority of the fermentables in the grist bill. As with standard weizen beers, weizenbock can be helles (light) or dunkel (dark), hefe (with yeast) or kristal-klar.

The Dynamics of Wheat

Wheat is a cereal grain that responds to basically the same malting and mashing methods as barley. However, there are a few major differences that need to be taken into consideration to ensure a trouble-free brewing session when using wheat.

Wheat kernels tend to be somewhat shorter and plumper than barley. It is not uncommon when milling wheat to have to adjust the roller gap of the mill to prevent pulverization of the grain and thus excess flour that can reduce mash and runoff efficiency. As with barley malt, run a sample through the mill and inspect it for kernels that are lightly cracked into large fragments. You should find no uncracked kernels and little or no flour dust.

Wheat kernels lack the husk that is essential to creating a filter bed for smooth lautering. Most

wheat beers incorporate a percentage of barley malt in their composition, usually 30 percent or greater. While several articles have been written recently regarding using 100 percent wheat malts in the grist bill, these beers almost always incorporate some type of lautering aid such as oat hulls or rice hulls mixed into the mash to help provide the filter bed that would normally be created by barley husks.

True Bavarian hefe-weizen must have at least 50 percent of the grist as wheat but rarely more than 70 percent. As a result, the majority of wheat malt extracts available on the market today are also blends of wheat and barley, usually a ratio in the neighborhood of 65 percent wheat to 35 percent barley.

For mashing and lautering wheat beers, as the percentage of wheat used in the recipe increases so will the difficulty of sparging and lautering. To avoid stuck or slow runoffs make sure that the mash is evenly mixed, keep the sparge temperature as warm as possible without exceeding 170° F, and maintain an even layer of water on top of the mash bed to prevent compacting of the grains.

In recent years, as with many products that are available to the brewing industry, the quality of wheat used in brewing has improved. However, since some barley is usually required to provide an efficient lauter bed, the additional enzymes supplied by today's two-row or high-enzyme six-row malts offer a level of insurance that starch conversion will be complete.

Wheat Proteins

Wheat was primarily developed as a food crop. While many enthusiastic homebrewers would list beer as one of the major food groups, the requirements for a grain to work well in a brewing environment are quite different from those that provide optimum performance in other applications, such as bread, baking flour, or orange boxes of breakfast cereal with sports figures on them. As a result, wheat tends to have a higher level of proteins than its brewing barley counterpart. Proteins have many effects on finished beer, but they are not without both pros and cons.

The six classes of U.S. wheat vary by hardness, color, and planting time (clockwise from top left): Hard Red Winter, Durum, Hard White, Soft White, Soft Red Winter, Hard Red Spring.

Proteins tend to be long molecular chains that are difficult to break. The presence of these long-chain proteins in the finished beer can be seen in the thick, creamy head that is usually found on a well-made wheat beer and lasts all the way to the bottom of the glass. This is one of the best reasons to incorporate a small amount of wheat, usually 3 percent to 5 percent, into any recipe. The additional proteins will improve the head retention of any beer without otherwise affecting the flavor or color.

Unfortunately most of the chill hazes that arise in finished beer are the result of tannins interacting with — you guessed it — proteins. This reaction can be minimized by incorporating a protein rest in the mash at 120° to 125° F for 20 to 30 minutes. This allows the proteolytic (protein degrading) enzymes in the malt to begin to break down many of the long-chain proteins into elements that will not affect the finished beer as dramatically. After the protein rest the protein levels will still be sufficiently high to provide good, healthy fermentation, strong head retention, and lacing capability.

Using only a small amount of wheat in a regular barley mash to try to accentuate the head retention usually makes a protein rest in the mash unnecessary. Brewing with just a small amount of wheat malt extract or steeping some wheat with the rest of the specialty grains doesn't require a protein rest, and should yield sufficient results to ensure the finished beer will have a strong, thick head that lasts all the way to the bottom of the glass without excessive haze. In any brew a good rolling boil, along with the use of Irish moss in the last 15 minutes, will help to create a strong hot break in which many of the larger proteins will coagulate and drop out

at the end of the boil.

Wheat responds well to most mashing methods. As the quality of wheat available to the homebrewer today has become better, the ways to utilize it in the mash have become more versatile as well. Historically, hefe-weizen was produced using traditional Bavarian brewing techniques — primarily decoction style mashing. Since accurate temperature control of the mash was difficult in early brewing, the brewmasters of the time knew that if they drew off a volume of the mash into the kettle, brought it to a boil (a fixed temperature that varies based on altitude, but approximately 212° F) and then reintroduced it to the main volume of the mash, the temperature would be raised a fixed amount. For each step or raise in temperature, a successive decoction would be drawn off from the main mash, brought to a boil, and then reintroduced, with the number of steps taken giving the brewing process its name: single decoction, double decoction, and so forth.

Breakdown of the wheat during the boiling process only served to increase the efficiency of the mash by allowing a more thorough hydration and mashing of each wheat kernel. This came without a corresponding increase in lauter difficulty, since there was very little contribution to lauter efficiency by wheat to begin with.

Temperature program or step mashing, wherein the entire mash is raised through successive, temperature-controlled steps, is the easiest way to reproduce many of the advantages of decoction mashing without a lot of the headaches. Today's accurate thermometers, along with the ability of most homebrewers to heat their entire mash while stirring to ensure consistent, even heating throughout, allow the temperature steps to be achieved consistently and accurately in one vessel, without the laborious and time-consuming drawing off of a measured portion of the mash, boiling, and remixing. In this manner it is easy to achieve the protein, beta-amylase, and alpha-amylase temperature rests.

For those brewers who are unable to heat the entire mash for step mashing, don't despair. Wheat will convert well even when used in a single-step or infusion-style mash. While efficiency may suffer slightly, the presence of approximately 30 percent barley in the mash will ensure that enough enzymatic power is present to give good results.

The Wild World of Yeast

A true Bavarian hefe-weizen wouldn't be the distinctive beer that

it is without the presence of the very unusual yeasts that are used to brew it. While any ale yeast can be used to brew a wheat-based beer, it is the phenolics generated by the specialized wheat-beer strains that provide the clovelike spiciness, banana character, and vanilla-adhesive-bandage aromatics that are the complexity of a truly well made wheat beer. Wyeast 3068 (Weihenstephan Weizen) and 3333 (German Wheat) are two excellent examples of true weizen strains that will provide these characteristics, and other yeast suppliers have strains that will give similar results as well.

Wheat-beer yeasts tend to be extremely temperature sensitive during the fermentation, more so than standard ale yeasts. Fermentations in the warmer end of the optimum range (68° to 72° F) tend to accentuate the banana character produced during the fermentation, while cooler ferments (64° to 68° F) tend to lead toward more of a clovelike, spicy character.

For those brewers who are fond of culturing their own yeasts from bottled commercial products, a word of caution. Unless you are extremely familiar with the product in question, attempts at culturing the yeast in a hefe-weizen bottle may very well be a waste of time. Due to the unstable nature of some of the more dynamic weizen strains, combined with the relatively long distribution chains that are required to get many fine European styles onto American store shelves, the brewers dose the finished beer with a yeast that has been chosen specifically for its ability to provide good long-term stability in the bottle. Most of the time these are not the yeasts that are used to actually ferment the beer. While a successful culturing of such a yeast may very well yield an excellent brewing strain, it may not impart the characteristics found in the bottled product.

Serving Hefe-Weizen

As there are many widely varying styles, there are many widely varying methods for pouring and enjoying wheat beers. The wheat beer glass is just one facet of this, with its tall, slender, curvy shape accentuating the head retention of the product. The slightly curved-in top of this glass also helps to trap the rich aromas of wheat beer where they can be enjoyed by the nose with each successive sip. While it is acceptable to decant a wheat beer as one would do with a standard homebrew to retain the sediment in the bottle, true devotees of the flavors provided by the unusual yeasts in hefe-weizen styles will many times retain the last one to two ounces of beer in the bottle, swill it around to stir up the yeast sediment, and then pour these last dregs into the glass.

Many enthusiasts like to serve their wheat beers just a little on the cold side (40° to 45° F). Cold storage

helps the yeast in the bottle remain stable and as the glass warms, the rich spicy aromas of the beer begin to come out.

Hefe-weizens are often served with a slice of lemon. While the flavor combination is interesting, some homebrewers feel that the lemon serves to only cover up many of the flavors and aromas imparted by the ingredients used to brew the wheat beer.

Just as with any homebrew, hefe-weizen provides the opportunity for the brewer to exercise flexibility while producing one of the world's classic styles. The following recipes will help provide a starting point.

Forest Falls Hefe-weizen
(5 gallons, extract with specialty grains)
Bavarian-style wheat

Ingredients:

- 0.25 lb. crushed crystal, 20° Lovibond
- 0.5 lb. crushed cara-pils (dextrin) malt
- 4.5 lbs. dry wheat extract
- 0.5 oz. Perle hops (7.2% alpha acid) for 60 min.
- 1 oz. Hersbrucker hops (3.8% alpha acid) for 20 min.
- 1/2 tsp. Irish moss for 10 min.
- Wyeast 3056 (Bavarian Weizen Blend) or similar yeast
- 3/4 cup corn sugar for priming

Step by Step:

Bring 5.5 gal. water to a boil. While heating the water, add a small grain bag containing the crystal and cara-pils malts. When the temperature reaches 160° F, remove the specialty grains, continue to bring to a boil. Total boil is 60 min. At the start of boil, add the dry wheat extract and Perle hops. Boil 40 min. and add Hersbrucker hops. Boil 10 min. more and add Irish moss. Boil 10 min. more. Chill and top up to 5 gal. with cool, pre-boiled water. At 70° F pitch yeast.

Ferment in primary at 70° F. After high kraeusen falls, transfer to secondary fermenter and condition for 10 days. Prime with corn sugar and bottle.

OG: 1.045
FG: 1.010

Rubidoux Dunkel
(5 gallons, partial mash)
German-style dunkelweizen

Ingredients:

- 3 lbs. American white wheat malt
- 2 lbs. pale two-row malt
- 0.75 lb. dark crystal, 90° Lovibond
- 0.5 lb. black barley (not black malt or black patent)
- 3.3 lbs. unhopped wheat extract syrup
- 0.75 oz. Perle hops (6.8% alpha

acid) for 60 min.
- 1.5 oz. Hallertauer hops (4.0% alpha acid) for 15 min.
- 1/2 tsp. Irish moss for 15 min.
- Wyeast 3333 (German Ale) or similar yeast
- 3/4 cup corn sugar for priming

Step by Step:

Mix American white wheat, pale two-row, and dark crystal malts and black barley with 7 qts. water in brewpot and bring to 150° to 155° F. Hold for 45 min. Raise temperature to 170° F and sparge. After collecting 3 gal. of runoff, top up kettle as necessary with water.

Total boil is 60 min. Bring to a boil and add 3.3 lbs. extract syrup and Perle hops. Boil 45 min. and add Hallertauer hops and Irish moss. Boil 15 min. more. Cool and top up to 5 gal. with cool, pre-boiled water, and at 70° F pitch yeast.

Ferment in primary at 70° F. After high kraeusen falls, transfer to secondary fermenter and condition for 10 days. Prime with corn sugar and bottle.

OG: 1.053
FG: 1.014

Alles Cameraden Bavarian Hefe-weizen

(All-grain)
Bavarian hefe-weizen

Ingredients:

- 6.75 lbs. DeWolfe Cosyns Belgian wheat
- 3.5 lbs. pale two-row malt
- 0.75 lb. cara-pils (dextrin) malt
- 0.75 oz. German Northern Brewer hops (7.2% alpha acid) for 60 min.
- 0.5 oz. Tettnanger hops (4.8% alpha acid) for 30 min.
- 1/4 tsp. Irish moss for 15 min.
- 1/2 tsp. yeast nutrient for 2 min.
- Wyeast 3068 (Weihenstephan)
- 3/4 cup corn sugar for priming

Step by Step:

Mix Belgian wheat, two-row malt, and cara-pils malt into 11 qts. water. Use a step mash: Raise the temperature to 123° F and hold or 15 min. Raise the temperature to 148° F and hold 15 min. Raise the temperature to 155° F and hold for 35 min. Raise the temperature to 170° F and sparge to collect 5.5 gal.

Bring to a boil and add German Northern Brewer hops. Total boil is 60 min. Boil 30 min. and add Tettnanger hops. Boil 15 min. more and add Irish moss. Boil 13 min. more and add yeast nutrient. Boil 2 min. more. Cool and pitch yeast at 70° F.

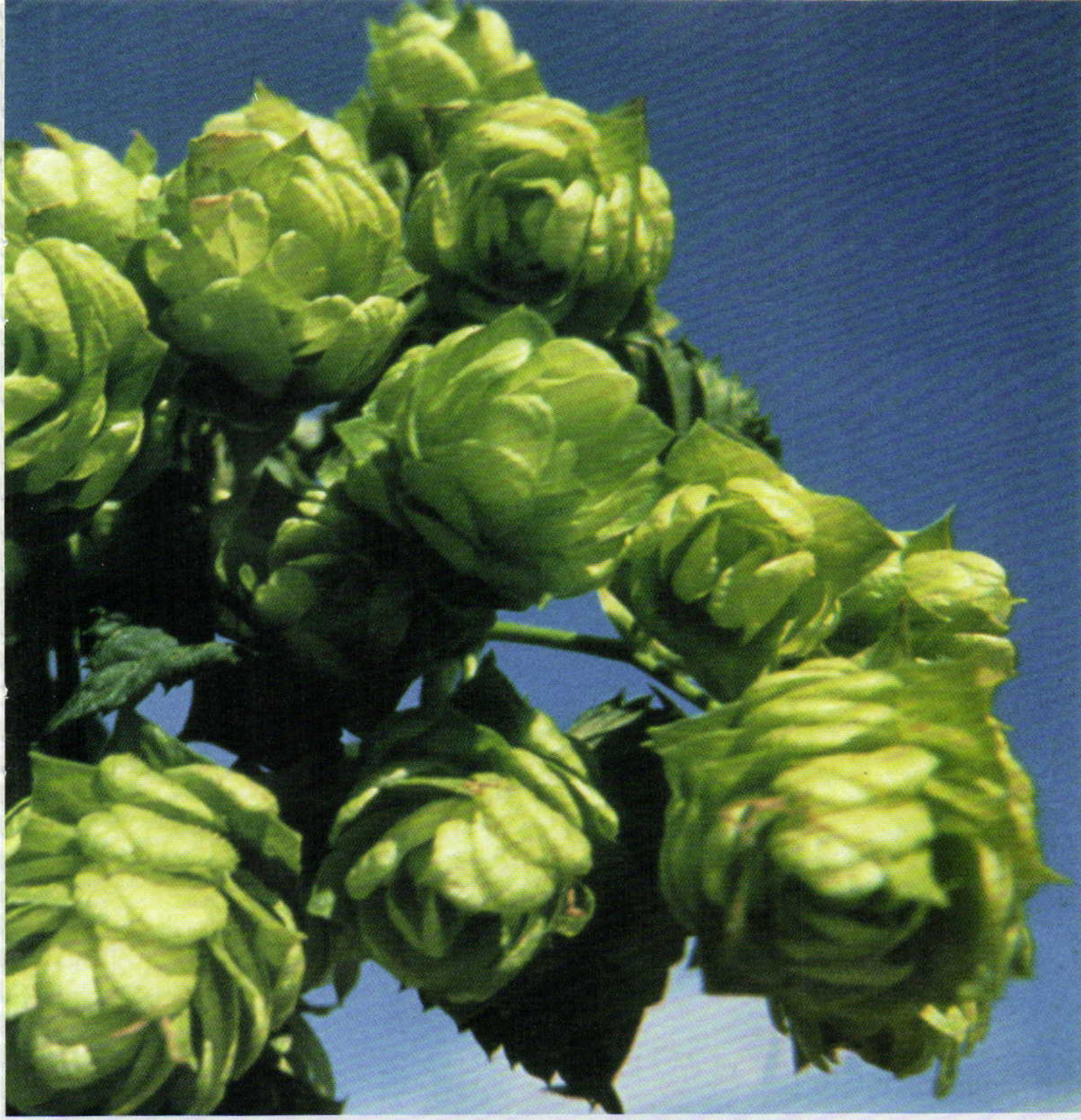
Hold fermentation temperature between 66° and 68° F. Transfer to secondary after kraeusen falls and condition for 10 to 12 days. Prime with corn sugar, bottle, and condition further at room temperature for two weeks.

Serve with the yeast in a wheat beer glass, close your eyes, and slip away to Bavaria!

OG 1.056
FG 1.015

Design Your Own Brewer's

by Paul R. Dauphinais



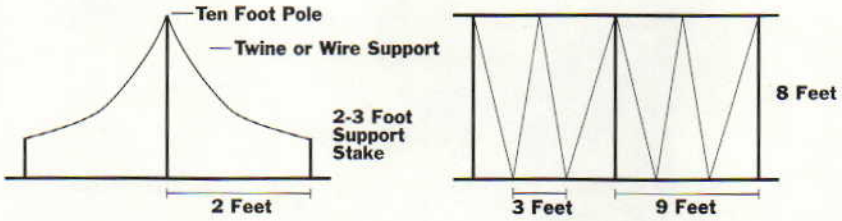
GARDEN

Every homebrewer likes to try new recipes. The brewer who is also a gardener increases his opportunities to unite two hobbies by using home-grown produce to create new and different flavors. The vegetable or fruit ingredients for pumpkin ale, chile beer, raspberry wheat, and other libations can be grown in your own backyard. The scope of your brewer's garden is only limited by the imagination.

In some cases it may take imagination to design a garden that will produce sufficient ingredients of good quality for inclusion in homebrew. Generally, from urban areas to the plains, even beginning gardeners can obtain reasonably good results with a little planning and common sense. There are a few rather basic things to take into account before setting spade to earth that will help ensure a measure of success.

First, have some large paper, a ruler, and pencil available. Many of us are not artists or designers, so expect a few early false starts. Then select an area that receives plenty of sun. If you think it may get too much sun in the heat of the summer don't worry, you can design around that issue a bit later. Select an area you intend to use as a garden and ask the following questions: What goes on near the proposed site? (Lawn treatments?) Are there any chemicals there? (Pool runoff?)

Hop Supports



What was there before? (An old coal bin, leakage from an old oil tank?)

If there are no problems with the area you selected, measure the plot and draw it on a piece of the paper. A scale of one inch to one foot is generally quite helpful, but use whatever scale with which you feel comfortable. Then think about what you want to grow. If you want to plant in beds, allow up to four feet for the beds and two feet for walkways. You can probably do with less, but if this is your first attempt, plan big, learn from experience, and modify next season.

What Does Your Garden Grow?

After a suitable area has been selected and sketched, it's time to decide what to grow. This decision will be influenced by what your plot has to offer in the way of soil conditions, sun, and drainage. Soil may be light and sandy, rich red, or anything in between. In general if your soil is relatively dark and will grow grass, you have something to start with and that you can modify relatively easily if you either need or want to. Various additions such as manure, compost, bone, or blood meal will help your garden soil. All of these additives are available at a local garden center. Compost and mulch are called "gardener's gold" for good reason. Organic material helps both clay and sandy soils. In general it is best to have relatively rich soil that is well composted and manured.

Obviously planting time will vary with geographic location and local conditions. Generally, wait until after the last danger of frost has

passed. In New England they usually waited until Memorial Day. In Oklahoma folks will sometimes plant as early as two weeks after Easter. It all depends. Remember that the weather varies from region to region and year to year. Ask someone who has lived in the area for a few years or someone who gardens.

The plant most brewers want to grow is hops. The ability to grow hops is somewhat limited by geography but more so by the ability to produce conditions comparable to 30° to 55° north latitude. Normally planted after the last danger of frost has passed but not later than late May, the plant will reach its full height of 15 to 25 feet in late June and then begin to produce side arms and flowers. At least 120 frost-free days are required for flowering. Direct sun is needed (as much sun as possible combined with a lot of watering), as is a wet spring followed by a warm summer.

Roots should be planted two per hill, with buds pointing up and covered with one inch of soil. Hills should be at least three feet apart if the hops are of the same variety and five to seven feet apart if they are of different varieties. The first year will produce a small crop as the plant expends most of its energy establishing a large root system. The second year will produce more flowers for drying and brewing. Because the plants grow rather large, a strong support system is needed. Look for space along a fence, garage, or out-building. If none of these is available, a support system may be constructed out of twine, baling wire, and a stake or pole as shown in the figure on page 42. Some experts recommend that hops vines be allowed to grow up to their full height; the important point is to keep the vines high enough to keep the flowers from touching the ground and make harvesting possible. Keeping the plants up six feet or so will generally be sufficient.

Hops, the Center of Attention

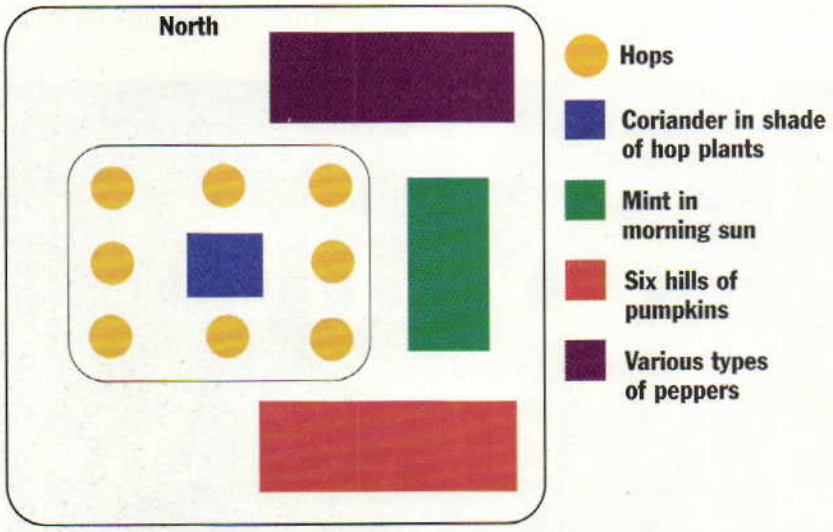
Because of the space and structure needs of hops, they are a good place to begin the design of your brew garden. If you are concerned about too much sun in the heat of the summer, the hops can be used to create shade for other plants. If you are constrained by space or the location of fences and/or out-buildings, hops can use those structures. If you are a renter who can't do much yard modification, you might try growing your hops along an old, unused clothesline in the backyard. Wherever they go remember that hop plants have a huge root system. Give them plenty of room in a well-drained area since the root system cannot tolerate being waterlogged.

Let's say that you have a 20-foot-by-20-foot plot that receives direct sun all day. One option is to start with hops and their associated

support structure and use them to provide shade during the hottest part of the summer when they are at their fullest. A possible design is illustrated below (Basic Design of a Brew Garden).

In a rural area a homebrewer with sufficient land and a well could conceivably provide or produce every ingredient in a batch of homebrew. Many of us live in urban or suburban areas and must content ourselves with growing only a portion of what we put in our beer. This basic design is one example of how the brew garden may be integrated. The hops provide some shade for other plants, such as tomatoes, that may not need direct sun all day. The hops can also provide some shade for herbs that require some level of protection from the full sun.

Basic Design of Brewing Garden



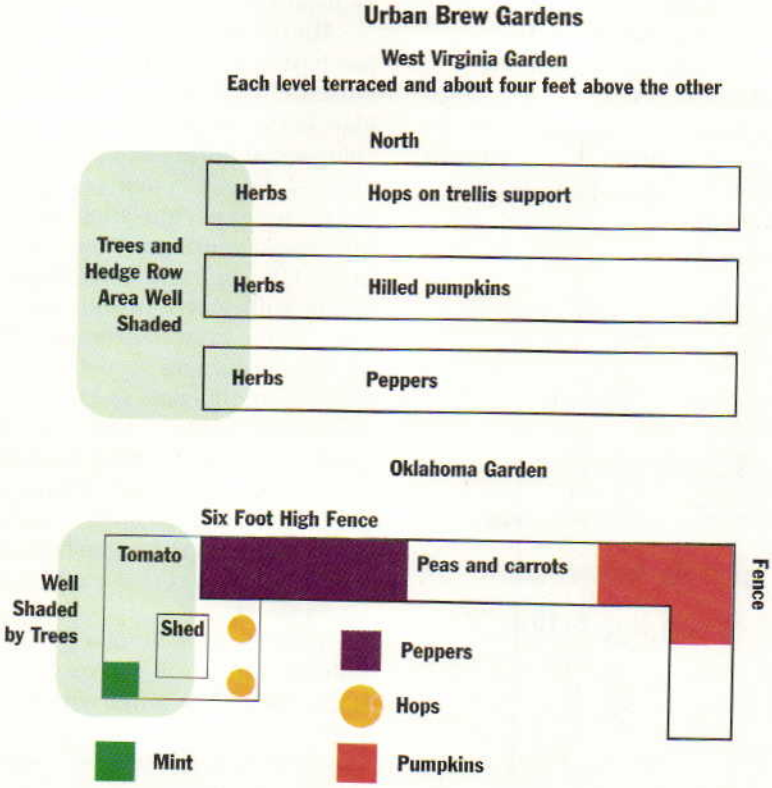
This design is one possibility, but many configurations for your garden are possible and should be considered. In particular those who rent and are not able to change the yard need to be a bit more creative. The Urban Brew Gardens illustration (opposite, page 45) shows two garden layouts based on limited physical characteristic of the yard and restricted modifications. The top is from West Virginia and the bottom is from Oklahoma.

Preparation Tips

During the winter place well decomposed compost and/or manure over the garden area. Let the sun and snow do the work; nutrients of the manure will get into the soil during the spring thaw. Do

Possible Home Brew Garden Plants and Their Requirements

Plant	Planting	Soil	Space	Water	Sun	Feeder
Hops	March-May	Very rich	5-7 Feet	Lots	Full	Heavy
Horseradish	Feb.-March	Very rich	1-1.5 Feet	Sufficient	As available	Heavy
Anise	Early April	Light & Dry	1 Foot	Sufficient	Full	Light
Coriander	April	Light & Dry	9 inches	Sufficient	As available	Moderate
Garlic	April	Moist & Rich	6 inches	Well, early	Full	Moderate
Pumpkin	April-May	Rich	1-2 Feet	Sufficient	Full	Moderate
Peppers	April-May	Rich	1 Foot	Well, early	Full	Heavy
Mint	April	Rich	3 Feet	Lots	Almost Full	Heavy
Berries	Spring	Rich	2-4 Feet	Sufficient	Full	Moderate
Horehound	Spring	Dry & Poor	9 inches	Light	As Available	Light



not work the soil until spring when the ground is well thawed and reasonably dry. Working it while it's wet will only compact the soil. Be careful not to shovel or plow snow containing de-icing chemicals or salt onto the garden area. They may harm your plants' root systems.

Hops are a good starting point for soil treatment. An area particularly well fertilized and manured is best for hops. From that starting point modifications can be made for other plants. Hops need good drainage, so a bit of sand will help keep the soil a bit loose and aid in drainage. Sand also helps coriander and horseradish. Check with your county Cooperative Extension office before adding sand. You may be better off improving the soil with compost. Most of the other plants you might grow in a brew garden will do well with the initial treatment for hops, just without the sand. After harvesting the flowers

don't forget the vines. Before they dry, the vines can be worked to make "grapevine"-like wreaths.

The Supporting Cast

Other plants need some special consideration but probably not on the same level as hops.

Pumpkins, for instance, need significant room, full sun, and a well-fertilized soil. Generally two hills of pumpkins placed side by side about three feet apart will need six to seven feet of room to allow the plant to grow. When planting pumpkins for a brew garden be sure to plant the sweet or pie variety. Some varieties are selected for making jack-o-lanterns; they would not be as good for brewing as the sweet type used for pies. Pie pumpkins usually have a smooth outer skin and are smaller than the type used for carving. Your kids can help you here. If you grow the smaller pie pumpkins, let your children paint them at Halloween. You only want the inside for your ale, so let them have fun with the outside.

Peppers like direct sun, the more the better. You can have much success with a variety of peppers in the same area (from Hungarian wax — very hot — and jalapeños to chiles and green bell peppers. But don't plant too soon. A late chill can be deadly.

Mint seems to like the morning sun best and shade in the afternoon. Mint will tolerate poor drainage and likes heavy watering. Grown for commercial purposes, mint can exhaust the soil in four years. For the purposes of cultivating for brewing, manuring the mint heavily in the fall and using some potash will be sufficient to provide enough mint for the brewer. Trimming the bushes encourages growth during the season. One note of caution with mint: It needs to be controlled. Mint plants can grow to unmanageable proportions and actually take over part of the yard. When this happens the plant needs to be significantly trimmed and part of the roots must be removed.

Berries are a bit of a different animal. Unless you are very patient it may be best to purchase small berry plants from a local garden center. Raspberry, blueberry, blackberry, and other similar bushes like

◆

Take it slow, start small, and have one of your homebrews when it gets hot.

◆

rich soil and require approximately three to four feet between bushes. They are light feeders; a good manuring in the fall will do them very well. Bushes may not produce immediately. Keep them well watered, weeded, and wait until next year.

If you decide to integrate your brew garden into the family plot, remember that different plants need different conditions. Placing hops, garlic, and pumpkin close to each other makes good sense, because they all like rich soil and full sun and need significant amounts of water. Mint also enjoys that type of environment but may spread so aggressively that it takes over. It may be best to keep mint separate from other garden items. Placing herbs that do not require full sun in the shade of the larger hop vines makes sense and saves room.

Be Organic

The more organic your garden is the fewer risks you take of ingesting potentially harmful chemicals. Preparing the garden with compost or manure is certainly more labor intensive than using chemicals, but the exercise will make last winter's brewing efforts taste even better.

Herbicides will get into the soil and on your produce. Using mulch will inhibit weeds, and pulling them when they appear is preferable to chemical treatments. Straw is a good mulch because it allows water through easily and breaks down relatively quickly. Another option is to place two or three sheets of newspaper around plants. The paper will stop weeds from growing by blocking out sunlight while allowing moisture to pass through. By the end of the season the paper will have composted enough to become part of the soil. The ink has little affect on the soil.

Pesticides should be avoided. Depending on the pest a mild soap solution or vinegar and water may be useful sprayed or lightly smeared on the plants. The juice of the habanero pepper has also been known to work as an insect (and spouse and dog) repellent. There are also good insects such as lady bugs that will get after the nasties in the garden. Lady bugs can be ordered commercially in the spring.

It is a bit of work to start the garden. The planning stages are fun. The turning of the soil can become tiring. Take it slow, start small, and have one of your homebrews when it starts to get hot. If you enjoy the first season, increase the size of the plot in the fall and then again in the following spring. Nothing says you need to get everything done in one season. After all, you didn't become an all-grain brewer after your first kit. Gardening, like brewing, is something to be enjoyed. It is another outlet and something your family can enjoy with you.

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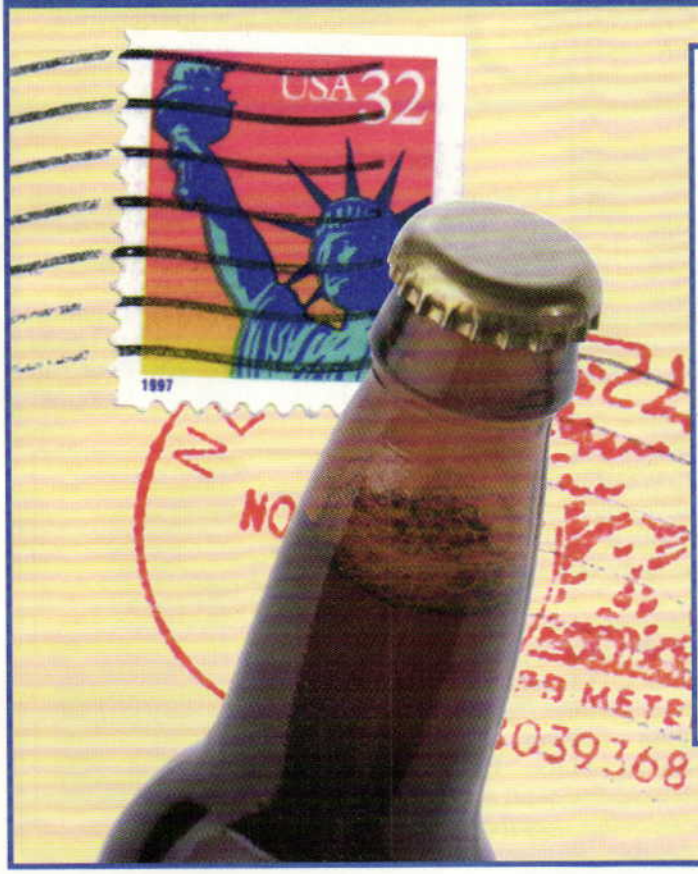


LOOK FOR THE *JUNE 1998* ISSUE OF BYO!

FEATURING THE RESULTS OF THE 3RD ANNUAL BYO LABEL CONTEST

Get Your Yeast Straight From the Bottle

by Tom Fuller

Culturing yeast from your favorite commercial beer can be a critical step to making your clone hit its mark.

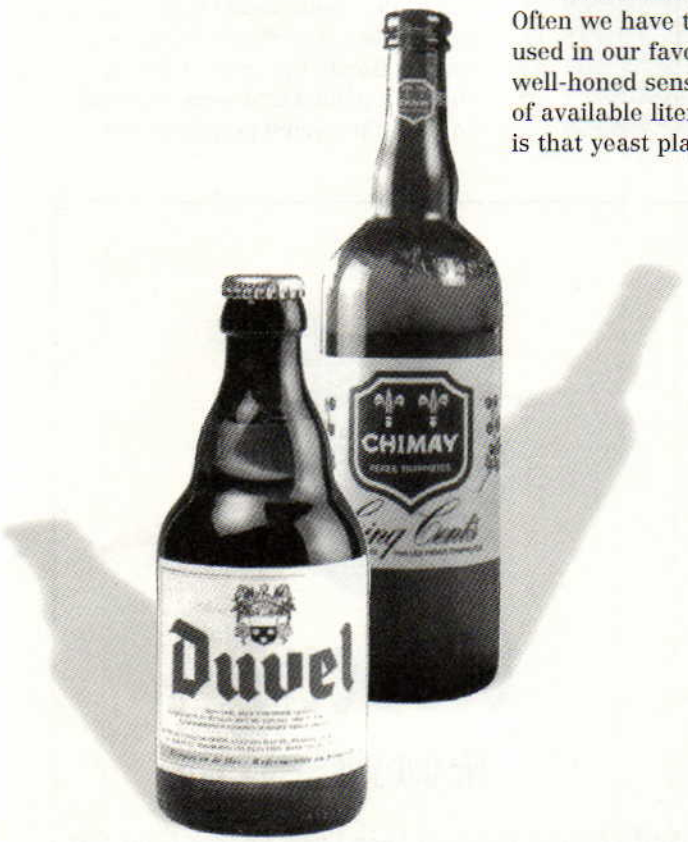
It's the homebrewer's lament. We come up with what we think is the perfect "clone" recipe for Guinness, Sierra Nevada, Anchor Steam. We labor our nasal glands with the aroma of the hops and try to define the exact malts used until our tongue becomes a piece of useless flesh. Still the final product of our intense study and labor fails to meet our exacting demands.

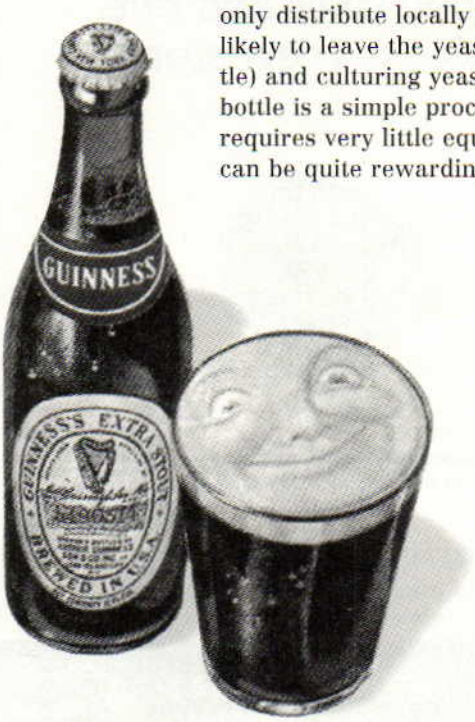
What could possibly be wrong? Often we have the same grain bill as used in our favorite beers due to well-honed senses and intense study of available literature. The problem is that yeast plays much more of a role in the finished product than many of us realize.

There are homebrews made with everything from bread yeast to Duvel yeast cultured off of a hanky from the brewery in Belgium (true story). Not all are good, but not all are bad. The whole idea is to match the recipe with the yeast. You could make the perfect Sierra Nevada clone but if you use the Duvel yeast, you're in for a big disappointment.

The point is, if you want to make a specific beer or get a specific distinct flavor characteristic, why not go to the source? You may be able to culture the yeast from a bottle of your favorite beer. The hard part is that not too many large breweries leave yeast in the bottle these days. It has become standard to filter the yeast and pasteurize the beer before packaging.

Fortunately, not all breweries filter (small microbreweries that only distribute locally are the most likely to leave the yeast in the bottle) and culturing yeast from the bottle is a simple procedure. It requires very little equipment and can be quite rewarding.





Hot Prospects

First, you have to find yeast in a bottle — not easy in this day and age. Look for the sludge at the bottom of the bottle. It looks similar to the bottom of your bottle-conditioned homebrew. Hefeweizens, if they are true hefes (with yeast), will contain yeast but are often bottled with lager yeast for priming, which is different from the yeast used to ferment.

While this is often true, it is not always true, so culturing from hefeweizens is still definitely worth a try. Sierra Nevada, Chimay, and most Belgians also contain yeast. Using the yeast from lambics is not recommended; the yeast strains are introduced at different stages of fermentation and often naturally (with wild yeast). You cannot culture yeast from any major brand such as Budweiser or Miller.

Your best bet is to look for yeast in the bottom of the bottles of beer from your favorite local microbreweries. Many microbreweries don't filter and, being local, the beer (and its yeast) should be fresh.

If you can't find yeast in the bottom of the bottle of a beer you are dying to clone, don't fret.

Your best bet is to look for yeast in the bottom of the bottles of beer from your favorite local microbreweries.

Many yeasts used commercially are available to homebrewers via Wyeast, Yeast Lab, White Labs, and other companies. These yeasts can also be cultured at home without hassle. Culturing these yeasts and repropagating them can provide many brews with just one yeast purchase. Often brewpubs or breweries will tell you what strain they are using for any given beer.

Culturing Bottled Yeast

Here is a simple method for yeast propagation and storage. This basic method is generally used to collect yeast for one brew, but the results may be stored for your own personal yeast bank for many future libations.

The advantage of this method is that it's simple and doesn't involve things like innoculating loops and petri dishes. The disadvantage is it doesn't isolate the yeast strain. If there's anything unwanted growing in the bottle, you'll propagate that,

too. The key is to culture the yeast as soon as you open the bottle. Don't give bacteria time to grow.

Equipment list:

- 12-ounce beer bottle
- Bottle cap
- Stopper to fit bottle
- Airlock
- Butane lighter or propane torch
- Can of Lysol or store-brand disinfectant
- Sanitizing bleach solution
- One-quart mason jar or larger non-heat-sensitive glass container
- Cellophane
- Rubber band

Method:

Step 1: If you come across that ever-so-hard-to-find bottle with a wisp of yeast floating on the bottom, consider yourself blessed. You may want to say a prayer.

Step 2: Boil about seven ounces of wort with an original gravity of 1.030 to 1.050. Add four or five hop pellets for their preservative value to inhibit bacterial growth. Boil 15 to 20 minutes. Strain out hops and return to boil for 10 minutes.

Step 3: Pour the boiling wort into a sanitized beer bottle, cap with a sanitized cap, and cool overnight or until pitching temperature is between 58° and 65° F.

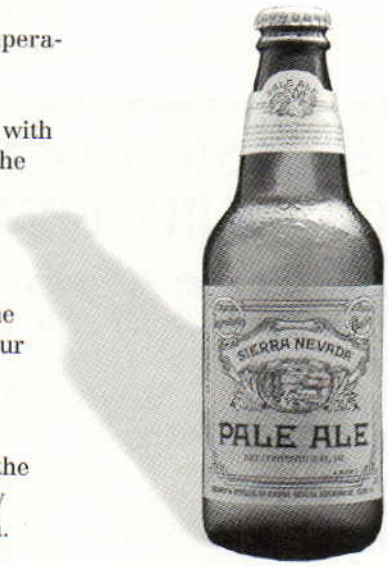
Step 4: Wipe countertop with a mild bleach solution. Spray the room with disinfectant 15 to 30 minutes prior to work period.

Step 5: Pop the top off the bottle-conditioned beer and pour all but the last inch and a half into a serving vessel to enjoy.

Step 6: Torch the top of the bottle containing the yeast very briefly with the lighter or torch.

Step 7: Carefully open the previously prepared wort and, with a cotton swab dipped in vodka (or isopropyl or grain alcohol), swab the bottle opening.

Step 8: Pour yeast into the wort.



Step 9: Reclean the bottle top with alcohol or vodka, seal it with a stopper and airlock, and allow it to ferment at room temperature.

Step 10: After fermentation is complete, the bottle may be capped with a sanitized bottle cap and saved in the refrigerator for later stepping up and use. The yeast can generally be stored for two to six weeks without further propagation. To propagate again use this same technique, taking a sample from the first propagation.

Stepping Up

After you have prepared the initial culture you will need to step it up for use. This can be done at a later date or at the initial flocculation time. A one-pint to one-quart yeast starter is the recommended pitching rate for a five-gallon batch.

Step 1: Wipe down countertop and spray room with disinfectant.

Step 2: Boil approximately 20 ounces of wort, 1.030 to 1.050 original gravity, and pour into a sanitized, non-shatterable glass container such as a mason jar.

Step 3: Cover with cellophane (attach to jar with a rubber band) and allow to cool to pitching temperature.

Step 4: Remove bottle cap or airlock from previous culture, torch the bottle top briefly, and pour into the cooled wort.

Step 5: Re-cover the container with cellophane (or airlock for growler), and allow to ferment.

Step 6: Pitch starter to five-gallon batch as fermentation starts to subside (flocculation period).

All of these techniques for increasing the culture can also be applied to commercial yeast or yeast from brewpubs. To use commercial yeast simply prepare the initial wort as described but increase the amount tenfold. The packet or vial is then pitched into the wort, fermented, and capped for storage.

Thinking Ahead

You can keep a store of sterile wort for propagation or starters by boiling wort and canning it in one-quart mason jars. You know that the canned wort is clean, cooled, and ready for use should the perfect yeast-in-the-bottom bottle come your way. To can wort use the water bath method: Boil the filled jars for 45 minutes, remove from water, and cool. You know that the jar is sealed if the center of the lid indents. A pressure cooker will also do the trick. Refer to your favorite cookbook for canning methods.

Have fun and be sure to drink your work with pride. ■

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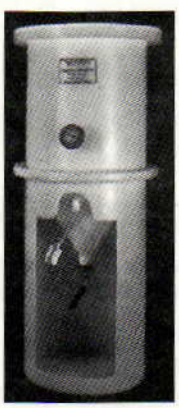

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CIRCLE 34 ON READER SERVICE CARD

True to Style at Climax Brewing

by Stan Hieronymus and Daria Labinsky

When Dave Hoffman needs a piece of equipment at Climax Brewing Co. in Roselle Park, N.J., he doesn't call a fabricator hundreds of miles away and wait for the UPS truck. He just gives his dad a yell.

Climax is in the same building where Dave's father and partner, Kurt, operates a machine shop. Together, they modified much of the equipment used to brew Climax beers, and they also make the distinctive tap handles for the 20 to 30 bars that carry their beer.

Dave Hoffman, left, and his father and partner, Kurt, keep their fermenter/conditioning tanks in a cool room.

While Dave Hoffman was studying chemical engineering in college, he also became a journeyman machinist. "When you are a machinist, you are a perfectionist," he says.

He is as meticulous about beer and brewing, keeping the brewery immaculate and disassembling and cleaning all the equipment after every brew. Although he makes only ales, he follows the Bavarian purity laws — only water, yeast, malt, and hops go into Climax beers, with none of the sugar or finings that British brewers use. British beer writer Roger Protz gave a glowing review to the Climax India Pale Ale served at the Real Ale Festival in Chicago, but British drinkers would call it too cloudy to be served as cask ale in England. "I'd rather brew hazy beer than put fish guts (isinglass finings) in my beer," Hoffman says.

He is just as adamant about following style. "When I make a beer I want it to fit exactly into style. Who the hell are you to try to create your own style?" he says. "Those styles have been defined over 200 years."

Hoffman developed a love of flavorful beer in part through his father, Kurt, who came to the United States from Germany in 1958. "Over there, beer is considered food," Kurt Hoffman says. For years he has made apple wine at his weekend retreat in Pennsylvania.

Dave Hoffman started as a homebrewer more than a decade ago. He brewed his first batch of beer from a kit ordered from Popular Science. It included corn sugar. "It didn't really taste like beer, more like cider," he says. After making three kit beers, he decided to learn more about the brewing process, and because liquid yeasts weren't available, he started culturing his own yeast. Soon his

BREWER'S MARKETPLACE

extract beers were scoring 38 to 42 in American Homebrewers Association competitions, and he was ready to move on to partial mashes. Not one to do things halfheartedly, Hoffman founded a homebrew club and, in 1992, opened the Brewmeister homebrew store in nearby Cranford.

The store made decent money when New Jersey had only three homebrew shops, but a dozen more opened within two years. "There were weeks I'd sit there and make $15 to $20," he says. While working at the Brewmeister, he also acted as brewer for a now-defunct contract brewery called Gold Coast Brewing Co. in Westfield. Hoffman reformulated and developed the brewery's recipes and traveled to a Pennsylvania microbrewery to oversee the beer's production.

Meanwhile, he made plans to open a brewery. He recruited drinking buddy and homebrewer Karl Mende as a partner, along with Kurt Hoffman, and they qualified for a small-business loan. Mende helped with much of the preliminary labor, including acid-washing the floors to remove paint. Mende works for Jaydor Corp., a beer wholesaler, and Jaydor originally distributed Climax's beers. Mende is no longer a partner in the brewery, and Climax now self-distributes. "I don't care what I'm doing — if they need beer, they get it," Hoffman says.

The four-barrel brewhouse has a mash tun and kettle made from Grundy tanks that Hoffman modified. He also built a platform and grain feeder to facilitate mashing and designed the fermenting tanks and keg washer, among other things. Kurt Hoffman made various gadgets for the brewery in the machine shop. The brewery went on line in February 1996.

Climax has an annual capacity of 1,000 barrels and currently produces 32 barrels a month. Each batch is 16 barrels and takes four days to make, so Hoffman brews two weeks out of the month.

His brewing schedule reflects his desire for consistency. On Monday he'll brew the first four-barrel batch and run it into an eight-barrel fermenter, pitching half his yeast. Hoffman uses only whole hops and follows a German hopping schedule, hopping each batch three times. A six- to eight-inch layer of hops builds up on a screen at the bottom of the brewing kettle, acting as a built-in hopback, and the kettle is drained through the hops. Hoffman figures his hop utilization rate is 32 percent. Although all the brewing is "fired" by electricity, and he does infusion mashes exclusively, he gets a good boil and a very good extraction rate. Ten pounds of grain in five gallons of wort give him an average original gravity of 1.060. Climax brews with local city water, which Hoffman says has "a perfect mineral content."

On Tuesday he brews another four-barrel batch, which goes into another eight-barrel fermenter with the other half of the yeast. He uses the same British ale yeast for all his beers, taking four days to build it from a packet to a 25-gallon batch of yeast. The yeast is highly flocculent, so it has to be roused after a couple of days. He does this by dumping Wednesday's four-barrel brew into the fermenter with Monday's batch, then Thursday's batch with Tuesday's.

Primary fermentation lasts about six days, then he chills the tank to get the yeast to settle further and transfers it to conditioning tanks. He harvests the yeast and will use the same yeast for about 10 cycles. The beer is chilled in 10-barrel tanks for about four days, then filtered at about 0.8 microns into the 16-barrel-plus finishing tank. Thus, each 16-barrel batch is a blend of four brews.

Beer spends about three days in the big tank, during which time it is force carbonated. Then it is bottled or put into kegs. Climax just began bottling last August and uses only brown-glass half-gallon growlers, but by December bottles accounted for 60 percent of sales. "Each of these is a walking advertisement," Hoffman says. "They are so big, and they stand out like a sore thumb in

a liquor store."

Selling the growlers took some work. He had to explain to retailers that they can make more selling a half-gallon growler for $6.99 to $7.99 than they can on a case of domestic beer, and he had to teach the beer-drinking public that, unlike brewpub growlers filled from a tap, Climax beers will hold their carbonation. Hoffman designed the counter-pressure growler filler — he has a patent pending — and can bottle 100 six-jug cases in 10 hours. He figures a growler will be good for two to three months at room temperature and up to 10 months in a refrigerator.

Climax produces four year-round beers. Climax Cream Ale is actually an American pale ale made with five malts and three hops, including a little homegrown Chinook. It is 5 percent alcohol by volume and 28 IBUs. It has a creamy mouthfeel, a pleasantly grainy flavor, and a crisp hoppiness.

Climax ESB is 5.5 percent alcohol and 36 IBUs. It is hopped with Willamette and Phoenix hops. Hoffman has to buy the Phoenix from Great Britain at the beginning of the hop season, because it is in short supply. The ESB is a traditional, well-balanced bitter, not highly carbonated, with a sweet caramel nose and sweet, hoppy flavor.

Climax Nut Brown Ale has 11 malts and is 5.2 percent ABV and 26 IBUs. Hoffman uses Willamettes in the boil and finishes the beer with Kent Goldings. A cross between an English and an American nut brown, it's sweet and tastes like something you could drink for breakfast, finishing dry. Hoffman describes it as "kind of deep — three-dimensional."

Climax IPA has 38 IBUs and an ABV of just under 6 percent (thus avoiding being labeled as a "malt liquor"). Michael Jackson described the IPA as "smooth with a layered malt background; very long, late, soft development of hop character. A hoppier beer but remarkably well balanced."

Hoffman is the first one to downplay any mystique concerning brewing. He has enough 16-hour days under his belt to last a lifetime. "People ask you what you do and you say, 'I brew beer,' and they go 'cha-ching,'" Hoffman says, making a sound like a cash register. "It's very hard; it's a very hard living" — both mentally and physically.

"We don't have big heads. We want to brew good beer. We came from homebrewing."

Climax Brewing Co. is at 112 Valley Road, Roselle Park, N.J. Call (908) 620-9585. Tours are by appointment only. ■

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

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Homebrew Beats Bud, 106 to 12

by Kurt Elia

When my wife, Catrina, suggested having an Oktoberfest party at our house, I had mixed emotions. On one hand I had just kegged a batch of my Ooomph Pa Oktoberfest homebrew and was eager to share it with our friends. But then again, since many of them were light-beer fans, I was a little nervous about how they might react to the flavorful brews in my cellar — especially given that most of the beers were of the homemade variety. A very scary prospect to the uninitiated.

In the end, thoughts of grilling up beer brats and sauerkraut in the crisp fall air with sounds of polka in the background and my own homebrew on tap won me over, and we sent out invitations to everyone we knew (and a few people we didn't) — figuring that only a few would show.

Boy were we wrong; almost everyone did RSVP. The final tally was about 55 adults and 18 kids! Fortunately, I had plenty of homebrew in the cellar and a king-sized grill on the porch. What I didn't have was enough potato salad, sauerkraut, German sausage, and pretzels to feed an army, much less a refrigerator large enough to hold it all.

After arriving home from making the single largest grocery purchase of my life, I realized we had another capacity problem. Everyone knows that the only "real" way to cook a bratwurst is to boil it in beer prior to throwing it on the grill. But how on Earth was I going to boil up 70 brats?

That's a little more than our "kitchen for two" was ready for, and I certainly wasn't going to sully my precious 10-gallon stainless steel brew kettle/mash tun with 20 pounds of boiling sausages — even if they were floating in beer. That old five-gallon lobster pot in the attic would have to do.

Given that I would be boiling up the brats the day of the party, I decided to fire up the propane cooker in the garage rather than abuse the kitchen stove.

As good as these sausages taste, the smell they release when boiled in a vat of beer for 45 minutes is a little, well, let's just say it doesn't say "welcome home" the way an apple pie does. Much to my amazement, the massive quantities of beer and sausages fit in the old kettle and, except for that one boilover on the garage floor, everything went like clockwork.

Throwing a big party is hard work. Here my wife, Catrina, and I enjoy someone else's beer. Not hard work!

When our guests arrived we greeted them at the door with a warm pretzel and, of course, a beer list. Why the formality? Well, given the fact that I would be offering 10 varieties of my homebrew and given the wide variation among our friends in appreciation for flavorful beer in general and homebrew in particular, I decided to prepare a list of descriptions to help guide folks through their many options.

From the copper lager to the oatmeal stout, this homebrew menu provided our guests with some general notes on each beer's flavor profile while also providing some tantalizing tidbits on the origins of some of the more historical styles offered.

I hoped that the beer list combined with the festive party atmosphere would help tempt the crowd to give my homebrew a try. But just to hedge my bets I also included a couple of blander options courtesy of the king of beers to provide a familiar alternative for the faint of heart. Which would people prefer? I knew the proof would be in the "empties count" at the end of the evening.

To my pleasant surprise it was no contest. Between the four empty mini-kegs and the 56 drained bottles of homebrew left on my kitchen counter, I calculated that a total of 106 homebrews had been consumed — and all but 12 of the bottles of Bud were still in the ice chest!

The final score plus the memory of countless comments like "Hey, this homemade stuff is actually really good!" made me feel proud to have struck a victory for homebrewers everywhere. Now my only problem is to figure out what to do with the case and a half of Bud Ice Light sitting in my garage! ■

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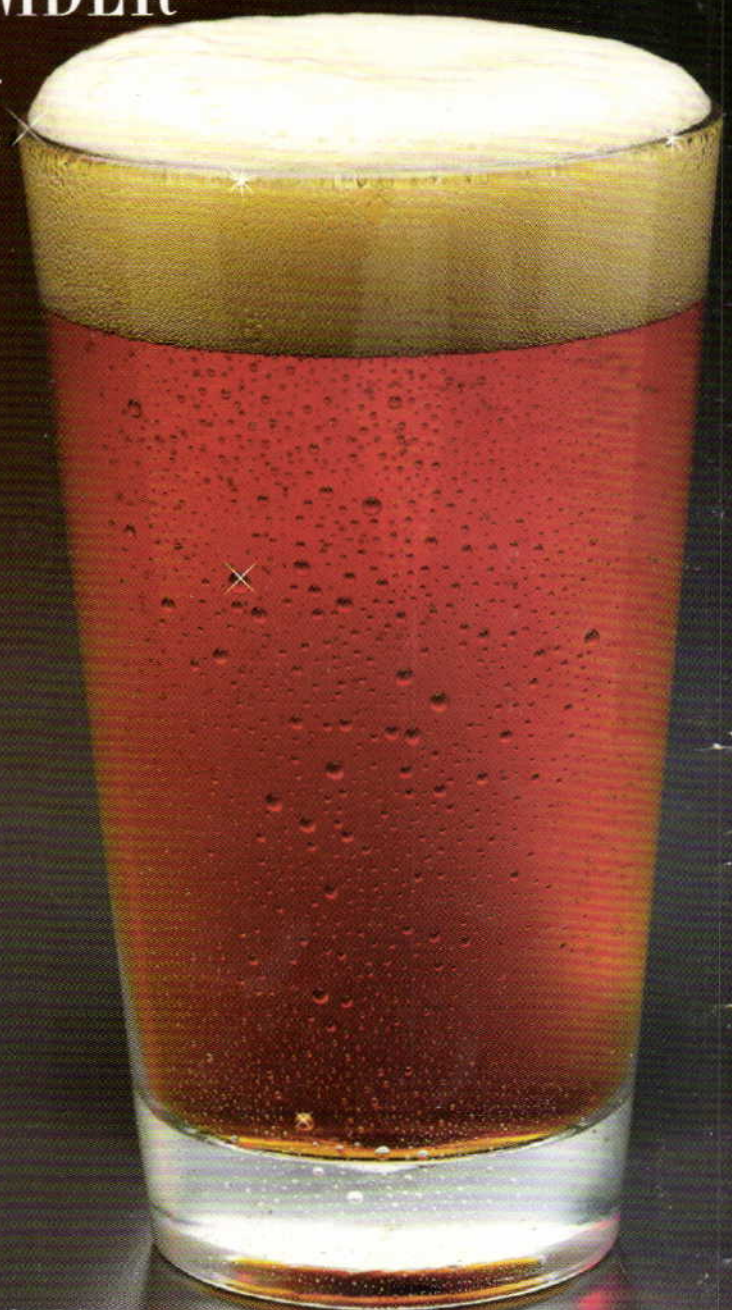

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