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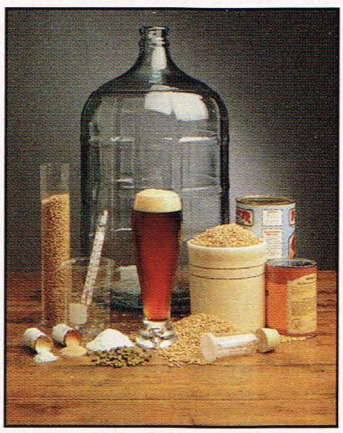

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Brew Your Own™
THE HOW-TO HOMEBREW BEER MAGAZINE

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Brewer's Personality Test

A friend of mine says you can tell a lot about people by what they do with their homebrew once it's ready.

Do you guzzle it? Do you hoard it? Do you give it away?

I freely admit I'm a hoarder. I brew it, I ferment it, I bottle it, and I hide it away in a cool, dark place, taking out one or two bottles at strategic intervals. Do I give it away? Forget it! Hint around all you want; I'm a stone wall.

Okay, I haven't always been like this. But lately it's been long enough between batches that I worry about drinking the last bottle of one brew long before the next batch is ready. And our recent misguided effort at a certain specialty beer—let's just say we winged it and guessed wrong—aggravated the problem.

My friend is a guzzler. He'd like to be a hoarder, but he just can't help himself. Once the beer is ready, he's got that bottle opener working overtime.

My wife is a giver. She enjoys having other people taste our brew. But before you start jumping to unfounded sociological conclusions about her being a giver and me being a hoarder and the consequences for the future of our marriage, let me say she's a hoarder, too. She's a giver/hoarder. She'll give it away, or she'll keep it in the garage. Drinking is done only on special occasions, and only with the proper reverence. And if she doesn't like a beer we've made, it stays in the garage. She won't give it away. She won't dump it (no way!). And she won't drink it. Just keep it out of sight, thank you.

My friend's wife also brews with us. She's a giver/guzzler: She drinks it as soon as it's ready, except what she's already promised to give away.

So what does all this say about us as brewing partners, the Hoarder, the Guzzler, the Giver/Hoarder, and the Giver/Guzzler? Beats me. I told you this was my friend's theory, not mine. But the truth is despite our personality quirks, we all love beer, we love brewing, and we love the results (usually). We brew for the social aspect of it. We brew because we enjoy it.

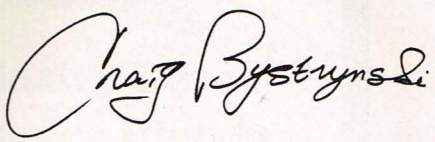
And that's the point of this magazine. We're here to celebrate the art and science of brewing. We write about brewing because it's fun. We won't preach at you, get bogged down in brewing "politics," or describe beer like it's the latest release from Chateau Le Snooté. Our stories are aimed at beginning brewers and experts, extract brewers and full mashers.

We're committed to providing accurate information in a readable format. We've hired some great writers, and we think you'll like their styles. Every article is reviewed by at least two members of our editorial board, made up of professional brewers and highly experienced homebrewers.

Most of all, we want to create a forum for you to share your ideas. Send us your comments and complaints, your brewing stories and photos, your suggestions. Tell us what you want, and we'll do our best to provide it.

Drop me an e-mail at BYOmag@mother.com, send a fax to (916) 758-7477, or give me a call at (916) 758-4596.

If I'm not there I'm probably at home, catching up on my brewing.



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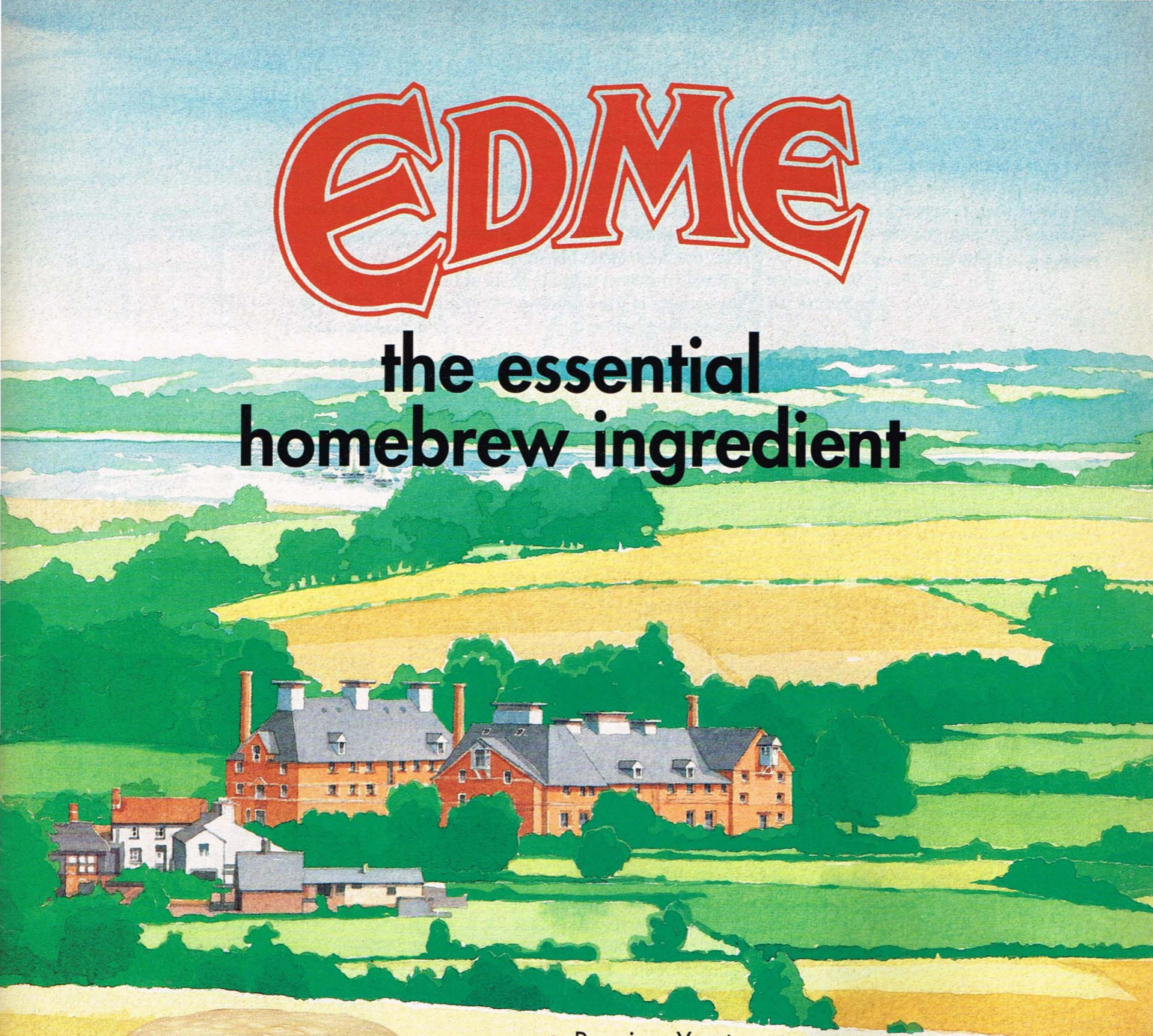

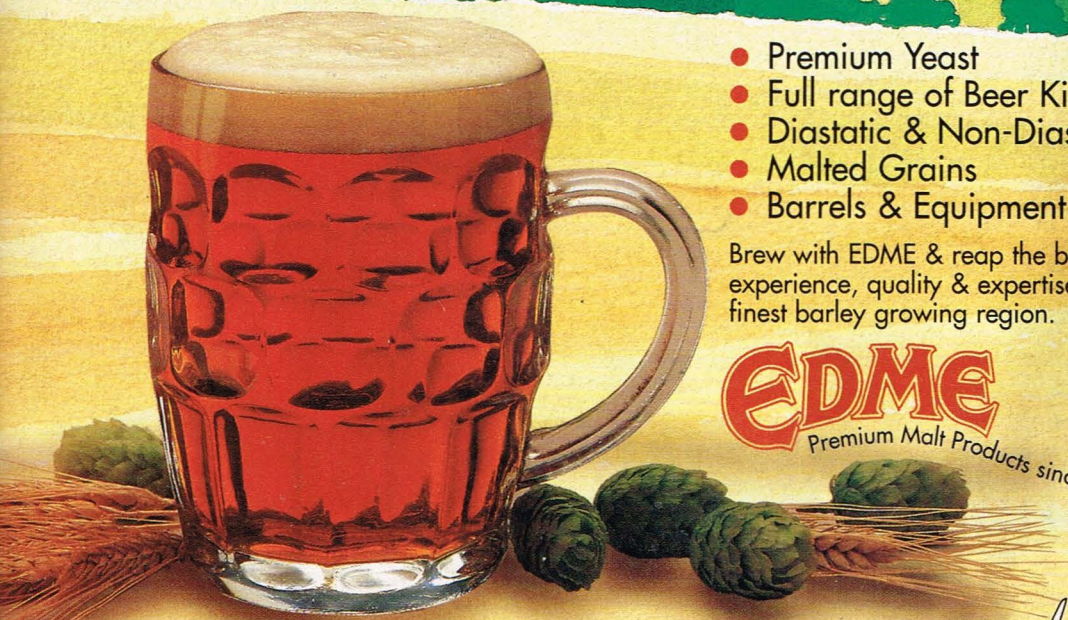

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B1

MaiL

Dear Brew Your Own,

I don't get it. I mean, I don't know much about the magazine business, but this is your first issue. How can you have letters to the editor? Do you guys make these things up?

Ethel Snoopridge
Terre Haute, IN

Yes we do. Thanks for writing. Read on...

Dear BYO,

Congratulations on launching a substantive magazine that will be a wonderful addition to the literature of this great country. I'm confident that you will make a significant contribution to the fabric and social structure of American life as well as to the public policy debate.

I have taken the occasion of your first issue to declare June National BYO Magazine Month.

By the way, I'm thinking of having a three-vessel brewhouse installed in the kitchen.

Bill Clinton
The White House

Thanks for the kind words. It's every editor's dream to publish a substantive magazine—I knew we'd do it one day. I'd like to thank all the people who made it possible. My family, my friends, the newsstand owner who sold me my first magazine...

Oops, sorry. Guess I got a little carried away.

By the way, that's just what this country needs, a brewer in the White House! President L. Stout Porter. What do you think?

Dear BYO,

How do I get a subscription to your magazine? I'd like to sign up, and so would my 72 friends, all of whom are homebrewers. We just know your magazine is going to be great!

John Jones
New York

John, you're the best! We're offering a special charter subscription rate of $29.95 for 12 issues. Send a check for $29.95 to Brew Your Own, PO Box 1504, Martinez, CA 94553. Please note that this address is for subscriptions only. If you want to write to us about the quality of the letters to the editor, see the box below.

Dear BYO,

I've always known you were going to have a great magazine. In fact I knew it was going to be great long before you even knew you were going to start a magazine. It all came to me in a dream I had in 1974. My new book, *Visions for the Future*, predicts continuing success for BYO.

Madame Leticia
American Psychics Society

Thanks for your insight. One thing I've always wondered: When psychics have a convention, do they have to send out flyers announcing the date and time? Or do you just know?

Dear BYO,

Congratulations on your wonderful new magazine. I'm especially impressed with your editor. He's smart, handsome, and he calls home once a week.

E. Bystrynski
Westfield, MA

Thanks, Mom

Stop Us Before We Write Again!

Okay, we admit it. We've enjoyed writing to ourselves—we think we're pretty good correspondents. But enough is enough. Don't make us do this again! Write to: Letters, c/o BYO Magazine, 216 F Street, Suite 160, Davis, CA 95616. Or send us e-mail: BYOmag@mother.com.

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Pot Shots

When It Rains...

One cold day I was at the stove stirring the wort. Everything was going along fine when, about half an hour into the boil, I felt a drip from above. Nothing seemed to be out of the ordinary, so I didn't pay any attention. Probably just a random drop of wort that escaped the kettle, I thought.

Then I felt a few more drops. And a few more.

Eventually, I was caught in a rainstorm of sticky brown goo dripping from just about everything overhead.

That's when I realized that the steam was hitting the cold air in the kitchen and condensing on every surface. Ceiling, cupboards, countertop, floor, stove, appliances were all covered in a thick, gooey mass resembling pancake syrup.

Undaunted, I grabbed a raincoat and continued the brew.

Fortunately, I managed to scrub every surface clean before my wife came home, or my brewing hobby may have come to an untimely end right then and there. I have been brewing for 12 years now, always with the lid on the kettle, and am happy to say that I have not been the victim of any more indoor "showers."

Ken Hohmann
Wallowa, Oregon

Where There's Smoke...

One October day I awoke to an acrid smell.

When I opened the bedroom door, I discovered the house was filled with smoke. I immediately called the local fire department, and they said they would be right over.

What I did next is the reason I am often teased by friends. I grabbed my fermenter with five gallons of maple oatmeal porter and headed for the door! Never mind the computer, TV, stereo, family albums, or the two terrified cats—that maple syrup cost $20!

After the fire department arrived and ruled it "dust in the heater vent," the beer and I went inside and found the cats shivering under the bed. I ain't a proud man, but that beer was one of the best I ever made.

Doug Bachman
Roswell, Georgia

CONFESS!

Share your darkest brewing secrets with your fellow homebrewers. Show off your homebrew set-up, and brag about it, too. Send your photo/story to Pot Shots, c/o Brew Your Own, 216 F Street, Suite 160, Davis, CA 95616. E-mail: BYOmag@mother.com. Be sure to include your address and phone number.

Don't Eat the Yellow Snow

I just began brewing in December and don't have any fancy equipment. I use our spaghetti sauce pot to boil in, and I use other frugal sources of material. During the winter I stored my five-gallon glass carboy in a snow bank before adding the hot wort. I then left it there, figuring the liquid would cool down quickly.

Dennis Brown
Pleasant Hill, California

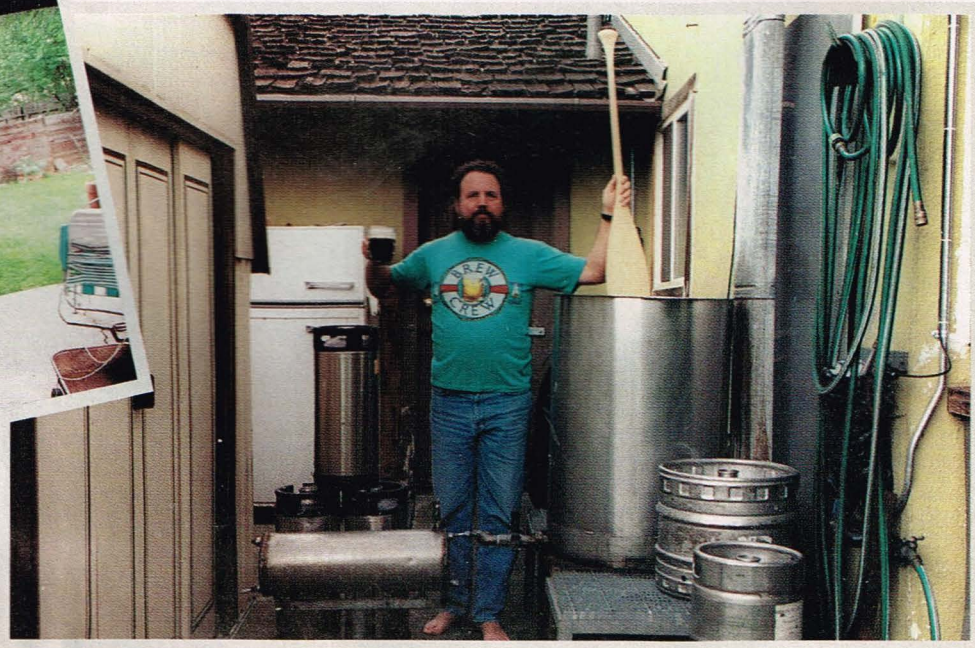
I have been homebrewing since 1969 on a regular basis. I started with five gallon batches and moved up to 60 gallon batches about 12 years ago, when friends wanted to learn. I have been doing two- or three-way splits on the batches since then.

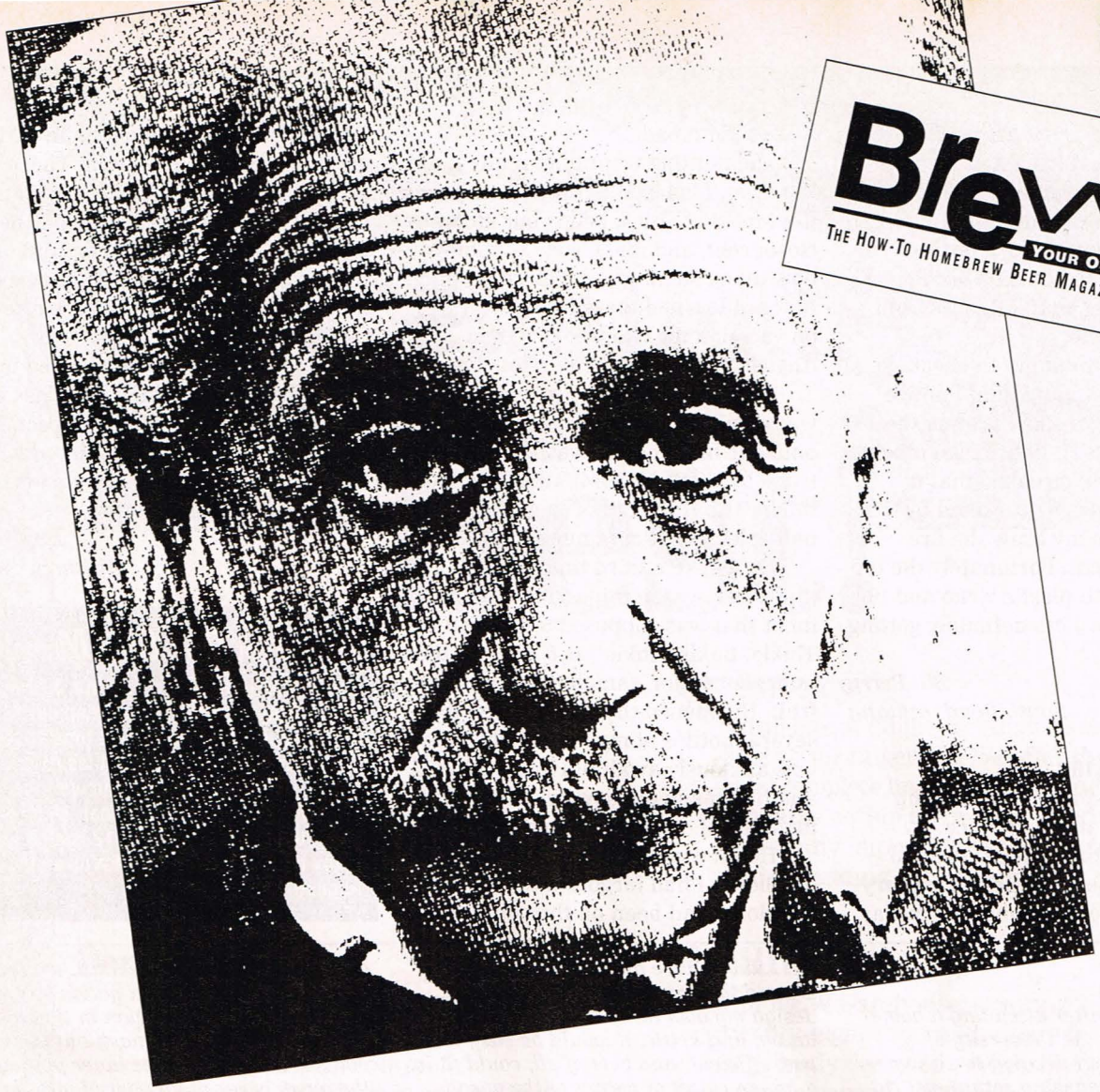
Our first three or four years we bottled all 60 gallons, approximately 30 cases. What a lot of work—it took all day!

We changed to full-size kegs for a year, then tried 15 gallon kegs, 7.9 gallon wine kegs, and five gallon kegs. We get eight pony kegs per batch. The five-gallon is great for Jeep trips, and we use the ponies for camping. We use a jockey box to get cold beer.

We boil in a stainless 50 gallon kettle, then pump through a stainless cooler into the primary. Generally we make extract with grains. I like to brew chocolate stout, oatmeal stout, nut brown ale, and many other types of ale.

We can brew a batch in five hours, including clean-up. We can keg a batch in two hours, including clean-up. Cost averages $130 to $225 a batch depending on complexity.





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- Homebrew setups
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- Controlling fermentation temperatures
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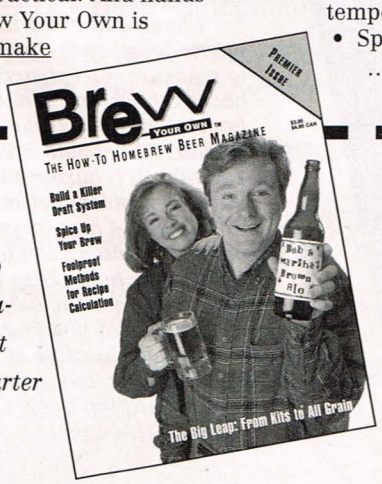

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HP15

That worked great for my first two batches. For the third batch the boil went fine, and I strained the wort as I put it into the fermenter. I'm not the best pourer when it's 15°F out, so I spilled some on the outside of the glass container. No big deal, I figured, and left it there to cool.

A bit later I went out to check on it. Strange, I thought. I didn't notice that yellow-brown snow around the fermenter before. It didn't take much closer inspection to realize that a neighborhood pooch, attracted by the smell, had given my brew the fire hydrant treatment. Fortunately the top was covered with plastic wrap and not spoiled. But now I am definitely getting a wort chiller.

Bill Perry
South Bend, Indiana

On the Firing Line

It was late spring, and I set up several mead batches at once. By mid-July all of them were ready to bottle. I had a few recipes: raspberry-lime, orange-clove-ginger, lemon-bay, and raisin mead.

The bottling went fine, really it did. However, I learned a few things: Never use Molson bottles, keep your storage closet cool, and make sure you know how much sugar is left before bottling. Before I learned these lessons, I went on vacation for two weeks in mid-August. My roommate did not.

One morning at six, just as the sun was coming up over the tree line and onto our building, he was awakened twice by a soft "BOOM! Tinkle, tinkle, tinkle." He thought nothing of it, being half asleep, and continued his slumber.

He awoke a third time, realizing that there was nothing in the apartment that was supposed to go "BOOM! Tinkle, tinkle, tinkle" at 6 a.m. He then noticed an odor, something like rotting fruit. He opened the closet to see that several bottles of my mead (which he was anxiously awaiting) had exploded and had taken out several others. The melange of recipes created the odor.

He then went to the kitchen. The one bottle I had forgotten to move to the closet had been on the counter. Had. It had also exploded, and all the glass went in one direction. There was a small line of glass leading from the kitchen counter, ricocheting off the wall, across the living room, and onto the couch (at least 30 feet). He was unable to find glass anywhere else (other than the closet...)

Friend that he is, he cleaned up the sticky liquid and left the glass in the blast radius for me to inspect. He was a little upset at first, but we opened a few bottles of what survived and he soon calmed down.

Don Levey
Waltham, Mass.

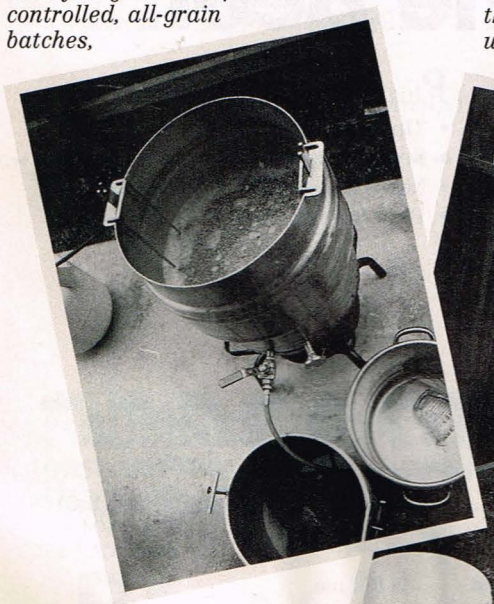
Brew Your Own Goes Monthly!

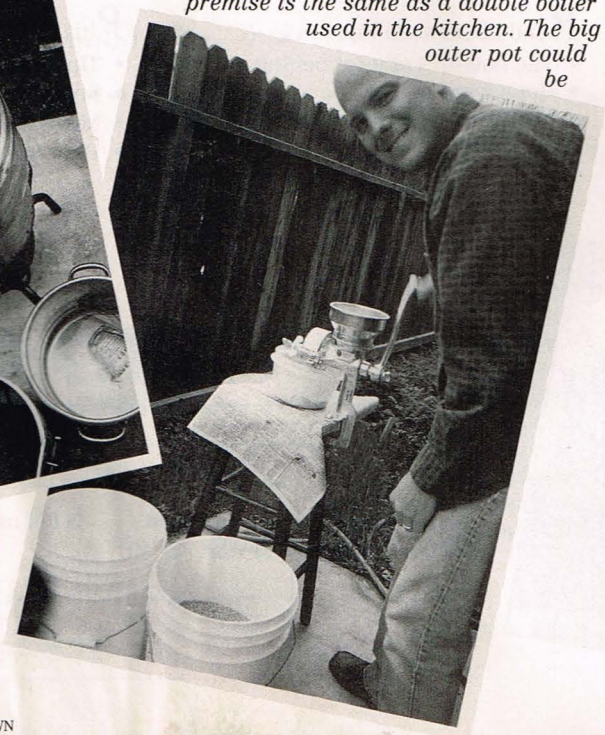
Yes, we're a monthly magazine. However, we're skipping a month between our first and second issues to give us time to gather reader feedback. Our next issue will carry an August dateline, and we'll be printing every month after that. (A one-year subscription includes 12 issues.) So enjoy this issue, and look for us again in August!

Scott Lowry
Davis, California

A year ago, after attending a homebrew seminar at the University of California, Davis, I decided to do something about my mashing setup—get rid of it. I knew I wanted a setup that could brew five gallon temperature-controlled, all-grain batches, but I didn't have a whole lot of room around the house. I decided I would design my own three-in-one mash tun, lauter, and kettle. It would be easy to use, efficient, and best of all, could fit in a broom closet or corner of the garage when not in use.

The idea was to build a mash tun that could be submerged in hot water used to regulate the temperature. The premise is the same as a double boiler used in the kitchen. The big outer pot could be constructed of an old beer kit, while the inner pot would be a six gallon stainless steel pot. The mash occurs in the inner (six gallon) pot. After mash-out the outer pot is removed from the inner pot and the mash is carefully poured into the outer pot, which contains a 3/8-inch ball valve located just below a false bottom.





This outer pot (the converted beer kit) now functions as the lauter tun. The inner pot is quickly cleaned and serves to collect the run-off. After collecting the run-off, the converted keg is rinsed and used to boil the six gallons of wort down to about five gallons. When the boil is complete, the ball valve is opened and the wort flows from the bottom of the kettle directly through the wort chiller, where it arrives at about 60°F.

I have had great luck with my three-in-one brewhouse. I used the first batch to measure the extraction efficiency at about 60 percent. Since this first brew I have altered my techniques and it is now around 68 percent. I use a camp chef 200,000 BTU burner to heat the keg and have no problem getting a very quick rolling boil. I also included a dairy thermometer, which I welded next to the ball valve. This helps keep track of mashing temperatures. The only drawback to the system is that you have to know someone who welds stainless steel. It took me a lot of looking, but if you have an idea and are willing to spend some time, this shouldn't stop you.

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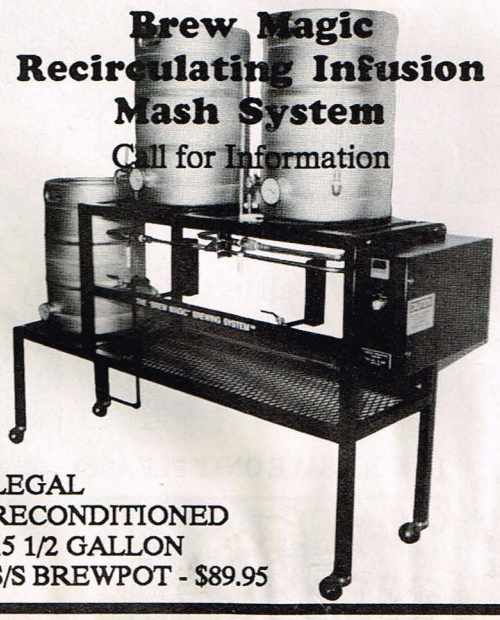

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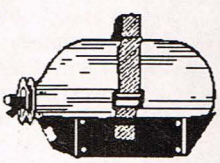

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CIRCLE 29 ON READER SERVICE CARD

Busted at the Brewery Tour

Mr. Wizard

My buddies call themselves yeast pirates because they visit breweries and swipe yeast samples. Is this legal?

Ron Grimaldi
Denver

Mr. Wizard wants to go on record right away that he doesn't approve of the term "yeast pirate." As far as the practice goes, your friends are not committing any federal offenses. However, I have seen some brewery job applications that ask: "Have you pirated yeast?" Mr. Wizard's affirmative response to that question probably explains why he didn't get the job. So if you want to "pirate yeast" be cool about it; no need to irritate anyone.

Now that we know it is legal, how does one swipe yeast? My marauding kit consists of one cigarette lighter, one sterile mason jar, one plate of wort agar, and one metal microbiology loop (all micro stuff available from supply houses like Brewer's Resource). The mason jar is used to store some beer containing the yeast of interest in case the plating on site goes awry.

As far as the heist, I calmly order a pint of unfiltered beer and inconspicuously break out my mobile yeast lab. I first flame the loop, dip it into my beer, and then streak it out on the wort agar plate. The plate is then sealed with Parafilm (a wax tape) for transport. The sample in the mason jar is my backup.

One word of caution: Call ahead to make sure the yeast-containing brew is on draft. My first expedition took place in Colorado. I drove three hours through a blizzard only to find that the prized elixir wasn't on tap. That was a real bummer. I did go night dipping in the natural springs surrounding Steamboat, but got no yeast!

An easier way to get yeast from a brewery without permission is to culture it from a bottle-conditioned brew. I recently read a conversation on-line regarding how to get yeast from Sierra Nevada Porter or Stout. The answer to the question had something to do with buying Wyeast 1056.

My immediate thought was to culture it from the bottle. I mean if you want yeast from Sierra Nevada Porter, why buy it when you can culture it from a bottle of Porter! If you do this, be careful. If the brew has any bacteria in the bottle, your yeast propagation process will also increase the bacterial population—not exactly the idea.

Some breweries, like Sierra Nevada, are known for clean yeast in the bottle. Ask around to get a feel for the quality of yeast in bottle. Be careful with some of the more exotic bottle-conditioned beers—many are filtered and dosed with a yeast strain that is different than the fermenting yeast. Chimay from Belgium and many hefe-weizens from Germany use this practice. Although these yeast may produce good beer, they are not what fermented the host beer.

So the short answer is that culturing a brewery's yeast without their permission is legal. It's sort of like buying livestock; you don't need permission to breed two animals that you bought. In the case of beer, when you buy unfiltered beer you get the yeast along with it.

Just remember, however, that many brewers protect their yeast because of the special character it gives their products. I don't recommend going on brewery tours and opening tank valves or sticking your paw into open fermenters to swipe yeast while your gracious host is not looking. That kind of behavior is illegal as well as rude. It also tends to give us homebrewers a bad rap!

Mr. Wizard

I'm a homebrewer working on my B.S. in microbiology. What I'm learning in the classroom sometimes conflicts with what I know about brewing. Specifically, I understand that the "Crabtree Effect" should prevent respiration in a brewery fermentation, but I have read many articles that refer to respiration in the early stages of fermentation. Respiration rationalizes the importance of oxygen in wort, but the "Crabtree Effect" says respiration doesn't happen. What gives?

Jeff Bigelow
Ames, IA

First we need to clarify what respiration is and define the "Crabtree Effect" for those of us not studying microbiology. Respiration is one of two ways a yeast cell can use simple sugars to produce energy to sustain life. When cells respire (grow aerobically), they most efficiently use glucose to produce a lot of energy and carbon dioxide and water as waste. When people (not Mr. Wizard) go to aerobics they try to keep respiring so that they most efficiently burn off fat.

Yeast cells can also ferment glucose. In fermentation (anaerobic growth) glucose is converted to alcohol and carbon dioxide, and some energy is produced. Since less energy is produced, fermentation is less efficient than respiration. When humans use glucose anaerobically, we build up lactic acid in our muscles, and it hurts. That's why when we pump iron (or pick up heavy mugs of beer repetitively) our muscles sting.

Now onto the Crabtree Effect. According to my Brewing Science Desk Reference, the Crabtree Effect inhibits respiration in brewing yeast, even when oxygen is present, if there is more than 0.4 percent glucose weight/volume (w/v) in the solution. Since there is more than 0.4 percent glucose w/v in wort, the Crabtree Effect would inhibit respiration. However, brewer's wort does require oxygen, but not for respiration. Instead, the yeast use oxygen to synthesize sterols and fatty acids, two very important constituents of yeast cell membranes. They need these compounds because yeast reproduce in the early stages of fermentation, and to grow they need to produce new cell walls.

So the bottom line is that you must provide oxygen for yeast even though they do not use it for respiration. If you saturate cooled wort with air by splashing it into your fermenter or by some other means, then you will have enough oxygen for the yeasty beasties to produce more little yeasties. If they don't have enough oxygen, they still reproduce but don't give healthy offspring. Brewers need healthy yeast, soooo aerate that wort!

Mr. Wizard

I'm in the process of gearing up for my first all-grain batch and wanted your opinion on this somewhat intimidating first experience. My concerns mainly revolve around what mash style to use. I've read so much stuff: acid rests, protein rests, upward infusions, temperature profiles, decoction mashing, and RIMS. What would you recommend for my maiden voyage?

Kevin Sweeney
Binghamton, N.Y.

So you say you're a virgin and have read all kinds of crazy things about sex. Missionary is probably the most fool-proof.....

Basically I think keeping your mash simple the first several times around the block is the best way to go. Use three quarts of water for every two pounds of malt, hold your mash temperature at a constant 152°F for 60 to 90 minutes, and sparge with 165°F water. Use an infusion mash with no "mash-off" and you'll be fine. If your malt is at room temperature and your mash tun pre-heated, then your mash water needs to be at about 164°F to reach your mash temperature of 152°F. Just make sure your mash tun is pre-heated! Mixing room temperature malt with your hot water will get you right in the ball park.

Now you're probably wondering about that water chemistry stuff, a most ugly topic. Water is, without question, extremely important. However, all great beer cities of the world used their natural waters. I recommend trying out your town's water and determining the type or types of beer for which your homebrewery should become famous. Once you have the basics down, then start experimenting with more fancy systems, if it suits you. Just remember that some of the most well-respected microbrews and British ales use a single temperature with no mash-off for all of their products.

One of the real advantages to starting off simple is that you get to concentrate on the important details of mashing. For example, remembering to cover your false bottom with water before mashing in, perfecting the lautering process, knowing when to stop adding sparge water, hitting your target gravities, and so on. These skills are required for all types of mashing

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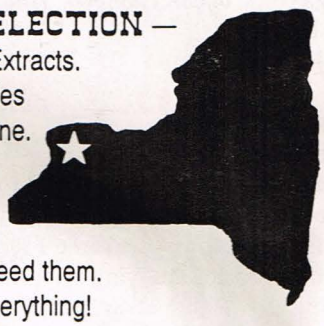

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CIRCLE 51 ON READER SERVICE CARD

and are easier to focus on when you don't have a triple decoction cooking away!

Mr. Wizard

I've noticed that many microbreweries are starting to put "Best Before" dates on their beers. How does a brewery go about determining shelf life? Can I estimate the shelf life of my homebrew the same way?

Dee Chrzanewski
Rockford, Ill.

To begin with, we need to recognize that most brewers agree that as soon as beer is filtered and put into a bottle its quality starts to decline. It is the brewer's job to slow the decline by good filtering and bottling practices. Now that the reality is out of the closet, we can proceed.

Shelf life is one of the many things associated with beer that is estimated. Most brewers use a forcing test to predict how long their beer will stay fresh in the market. In a forcing test beer is held under unusual circumstances to accelerate aging. Depending on how well the beer stands up to the forcing test, we can predict its performance in the market. There are different forcing tests for the different properties of beer. These include tests for oxidation, haze, and bacteria.

The weak link in this freshness issue occurs between the brewery and your refrigerator. Distributors and retailers often treat beer inconsistently, to put it kindly. Some distributors keep beer cold at all times while some have oven-like warehouses that can reach temperatures in excess of 120°F in the summer. Retailers can be just as bad, especially when they put beer in floor displays next to store-front windows that focus solar radiation on beer like a magnifying glass igniting a dry leaf.

I learned this lesson too well one day when returning from a beer tasting yearning for one more cold one. My pal and I went to a local store to seek out some Anchor Steam, a beer that is always stored cold—at least that's what it says on the case. When we got to the store we found the case sitting warm on the floor (proudly displaying in bold letters "Always Refrigerate"). We had a word with the manager. The only thing this Neanderthal could say was "those guys live in a f—-ing dream world."

The point is that the shelf life of beer greatly depends on how the beer is handled after it leaves the brewery. During my life as a student I bought 70 cases of beer for my research. Two years later some of this beer still remains in a university refrigerator (it's a type of dopple bock, by the way) and still tastes remarkably good.

CIRCLE 22 ON READER SERVICE CARD

Another important consideration is the type of beer being stored. Dark beers contain a substantial quantity of Maillard reaction products (MRPs). MRPs are formed in the kilning of crystal and roasted malts and are natural anti-oxidants. Therefore, beers with higher concentrations of MRP's are less prone to oxidation. The ethanol content of beer also affects its durability. Ethanol inhibits bacterial growth and in stronger beers can lend a potent preservative effect.

Now as far as homebrew goes, the game is a little different because usually yeast is present. As long as some yeast is present, beer is not as sensitive to oxidation. The downside to yeast, however, is that it is quite capable of giving yeast-bite flavor to beer. This flavor defect pops up when yeast starts to autolyze; more yeast in the bottle means more yeast bite can show up. My best advice here is to minimize the yeast load prior to bottling by effectively racking your brew off of flocculated yeast.

Once your beer is bottled, autolysis will be delayed by cold storage temperatures. If you keep your brew cold at all times, then you can easily store most beer styles for up to one year. I usually have polished a batch off in a much shorter time period, so I don't worry about shelf life of my homebrew.

If you want to age strong beers, be careful. Once a beer has peaked in quality it deteriorates fairly quickly, especially if the deterioration in quality is due to bacteria. Therefore, I recommend periodically tasting your strong beers and consuming them when they taste excellent. If it tastes so good you decide to get greedy and store it for a little longer, don't blame me if it tastes terrible when you return to the cellar two months later!

The bottom line with beer freshness is this: If it tastes good, then drink it and don't fuss about it. If it tastes old, even if it's not, it still tastes old. When I'm out paying good money for expensive beer, especially imports, I never hesitate to send stale beer back. Whether it has junk floating in it or it's oxidized, my healthy beer gut doesn't need to be upset by bad beer!

Mr. Wizard's Address

Do you have a question for Mr. Wizard? Write to Mr. Wizard, c/o Brew Your Own, 216 F St., Suite 160, Davis CA 95616. You can also reach us by fax at (916) 758-7477 or e-mail at BYOmag@mother.com.

It's a bird! It's a plane! No, it's Mr. Wizard. Mr. Wizard, Brew Your Own magazine's resident expert is a leading authority in homebrewing whose identity, like the identity of all super heroes, must be kept confidential. ■

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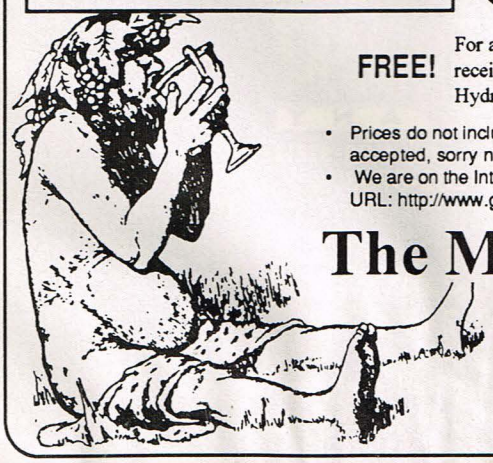

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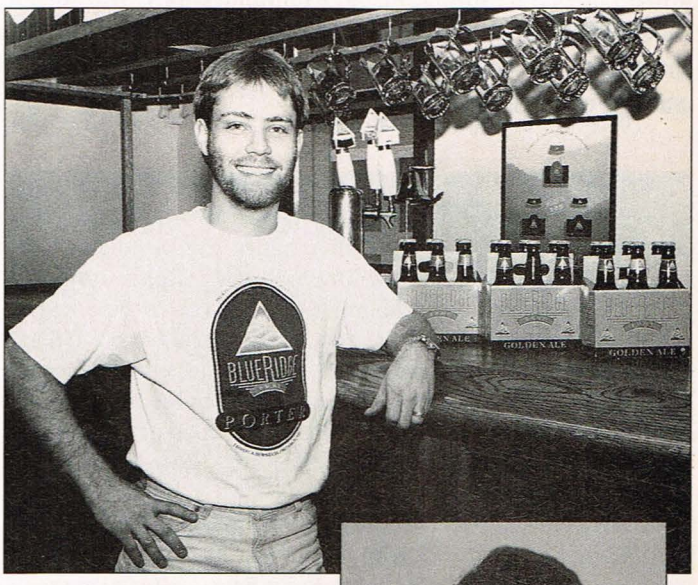
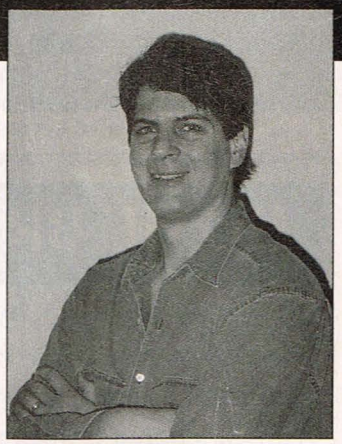
CIRCLE 41 ON READER SERVICE CARD

Pick the Best Yeast for Your Brew

by Martin Nachel

One of the biggest challenges for all brewers, novice and experienced alike, is figuring out which yeast to use to get the best results in their homebrew. We asked pros from three microbreweries how they go about choosing yeast strains for their brews and what, if any, testing is done. Here's what they had to say.





Steve Nordahl of Frederick Brewing Co. (above) and Lakefront Brewing's Russell Klisch (at right) both emphasize performance when they're looking for a new yeast strain.

Brewer: Grant Johnston
Brewery: Marin Brewing Co., Larkspur, California
Years of professional experience: Six
Schooling: Started homebrewing in 1986; Master Brewers Program at University of California, Davis; Siebel Institute; and American Brewers Guild.

Grant Johnston looks first for a yeast with "great flavor." When formulating a new beer, he works around the flavor of the yeast he is using, choosing malt and hops that will "meld" with it.

Johnston also looks for a yeast strain that is easy to use. "I want a strain that behaves well, works quickly, and flocculates well," he says. He chose his current strain by tasting many real ales in England. Eventually he found one that had the yeast character he wanted.

Before bringing the strain into the brewery, he homebrewed 12 different ales with it to make sure it could be used in a variety of styles. Many of the ales brewed at Marin Brewing are of fairly high gravity, and the same yeast is used to ferment all of them. That's why it's important that the yeast's fermentation characteristics are consistent across all brewing styles (Johnston also has to increase pitching rates accordingly).

As a homebrewer, Johnston used to propagate the yeast cultures he gathered from the bottom of Sierra Nevada's bottled ales. When he made the leap into professional brewing, he hoped to find a yeast that emulated the clean, fruity character of the Sierra Nevada products.

Marin Brewing started out with a Whitbread dry yeast recommended by the Siebel Institute in Chicago. After deciding the Whitbread yeast was not performing satisfactorily, Johnston consulted Dave Logsdon at Wyeast Labs in Mt. Hood, Oregon. Logsdon supplied a top-fermenting culture consistent with Marin Brewing's stable of English-style ales.

Johnston used the Wyeast culture for two years, then switched to an English ale strain. He says he likes working with English strains because they ferment quickly, there isn't much ester production, and the flavor profile is to his liking. (His interest in English beers has led him to travel extensively in the U.K. He recently returned with a not-yet-identified Burton yeast culture).

Any experimentation with yeast cultures is carried out by Johnston in his home with the same five-gallon brew system he started with nine years ago. Marin Brewing Co. is not set up with a lab for yeast microscopy, so there is no cell counting or other technical testing done. Johnston says that he is meticulous about sanitation procedures and although he harvests and repitches his yeast, he never repitches more than 10 generations—the level at which yeast mutations become more apparent.

He recommends that homebrewers produce a standard beer to check out yeast strains. He uses a pale ale that contains one crystal malt, Godling or Styrian hops, and the particular yeast strain he is testing. Using a standard formula helps him pick up the nuances of the strain, he says.

Brewer: Russell Klisch and Jim Surwillo
Brewery: Lakefront Brewing Company, Milwaukee, Wisconsin (Klisch is owner and president)
Years of professional experience: Klisch, Eight; Surwillo 2 1/2
Schooling: Klisch started homebrewing in 1984; degree in chemistry; short courses at Siebel Institute. Surwillo is a 1989 graduate of the Siebel long course.

When Russ Klisch decided to start a lager brewery, he knew he wanted to find a yeast that was durable, easy to use, and flavorful. He settled on Schmidt 118, as suggested by the Siebel Institute. According to figures supplied by Siebel, one in three American lager breweries were using this strain. Its characteristics included an ability to ward off bacterial infection, a good flavor profile, and a consistency that allowed it to withstand occasional "hiccups" in the brewery. Because the Lakefront brewery does not filter its products, good flocculation characteristics were also of great importance.

After years of successfully producing all bottom-fermented products, Klisch wanted to expand his stable to include some ales. Intent on finding a fruity, estery yeast, Klisch, like Johnston, contacted Wyeast Labs for their input. He ended up with a London Ale strain for his pale ale. Lakefront eventually introduced a weissbier and now produces nine regular and seasonal beers using three different strains of yeast. "Proper sanitation," says Klisch, "is the bottom line."

Because Lakefront Brewing does not have a robust process for testing yeast, regular tasting of the product is their method of quality control.

For homebrewers Klisch suggests research: for a complete understanding of the style of beer you intend to make, consult reliable homebrew suppliers and authoritative publications. Armed with this knowledge, consider the positive and negative flavor characteristics of the style that may be accentuated by the yeast. When setting out to find the right culture, brewers should keep in mind attenuation and flocculation characteristics of the yeast.

"Be bold and experiment. Experimenting with yeast is part of the fun of homebrewing," says Jim Surwillo. The final thing he would recommend, Surwillo says, is picking one strain and using it for every brew. He likes to grow yeast from a packet or slant and use it for several brews over a period of many weeks. "That way you get a real feel for the strain," he says. "Also, you eliminate yeast propagation time after the first brew. You can harvest the yeast from the first brew, store it for a couple of days, and reuse it when it's time to brew again."

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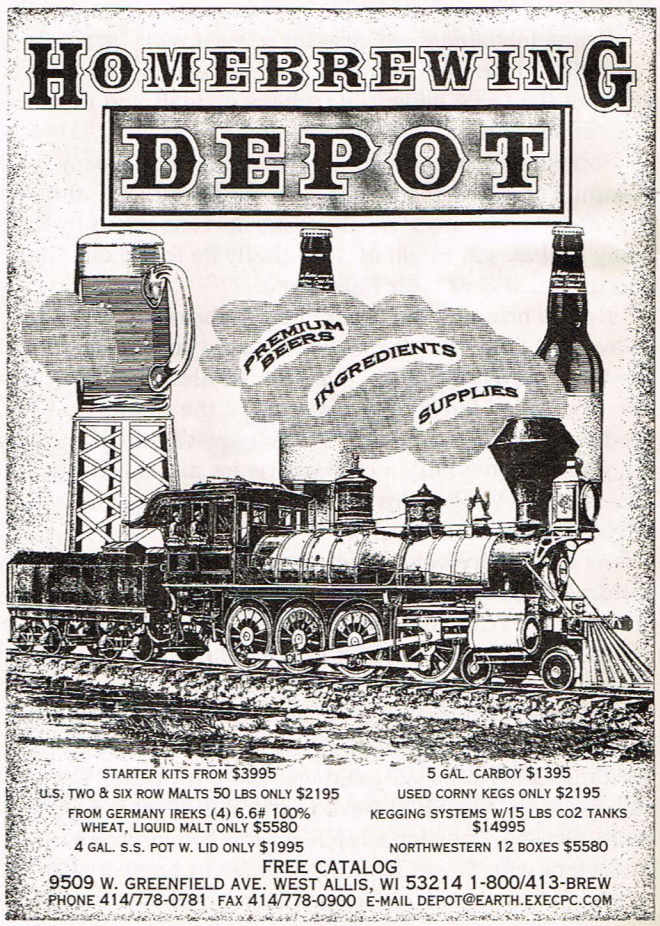

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CIRCLE 30 ON READER SERVICE CARD

Brewer: Steve Nordahl
Brewery: Frederick Brewing Company, Frederick, Maryland
Years of professional experience: Three
Schooling: Master Brewers Program at University of California, Davis

Steve Nordahl understands how closely homebrewing and professional brewing are related. When he chose an ale yeast strain for the new Frederick Brewing Co. in 1992, it was one he describes as his "personal favorite from homebrewing."

Nordahl calls the strain "user friendly" because it flocculates and attenuates well and produces subtle flavors.

That strain is still being used today in addition to several others at Frederick Brewing. When Nordahl wanted to include a lager beer among their line, he chose Weihenstephan yeast 3470 based on past experience. To produce a traditional weizenbier he, like his fellow brewers, consulted Dave Logsdon at Wyeast Labs. Logsdon recommended two separate yeast strains that are split-batch fermented and then blended.

When it came time to brew a doppelbock, Nordahl added yet another yeast strain to the brewery after reading a book on bock beer and deciding that the resident lager strain would not perform true to style.

For professional brewers, says Nordahl, "performance is number one." He also looks for a flavor that is "different enough to set our products aside from the rest but that doesn't put our beers too far out there."

Nordahl admits that he has been spoiled with an extensively outfitted lab and a full-time microbiologist on staff. The brewery also maintains master culture slants in an on-premise yeast bank. Nordahl says he is constantly trying various yeasts.

For testing he uses a five-gallon pilot brewery. Most often, however, yeast performance testing is done with

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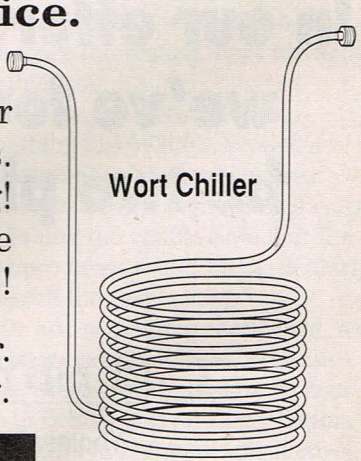

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sweet wort taken from a full batch of beer. The raw wort is split into four or five carboys that are pitched with different yeasts. Using identical wort under identical conditions creates perfect control test conditions.

Microbiological testing is done randomly on any of the 18 fermenters at the Frederick Brewing Co. On the second day of fermentation for ales and the third day of fermentation for lagers, an H.L.P. Medium test is conducted. This analysis is designed to detect colony growth of two common bacteria strains, lactobacillus and pediococcus. After each fermentation cycle is complete, the yeast is harvested, wild yeast plates are done, cell counts are made, and the healthy yeast is saved for repitching.

Homebrewers near Frederick are fortunate to be on the receiving end of a lot of free yeast. The brewery shares much of its excess yeast with the local homebrewing club, and Nordahl is often on hand at club meetings to answer homebrewers' questions.

Nordahl advises homebrewers to get into liquid yeast for improved flavor and performance. As far as choosing a yeast type, he believes in "using a strain that fits the style being brewed." To determine which strains work with which styles, he recommends doing one-gallon test brews with as many yeasts as possible.

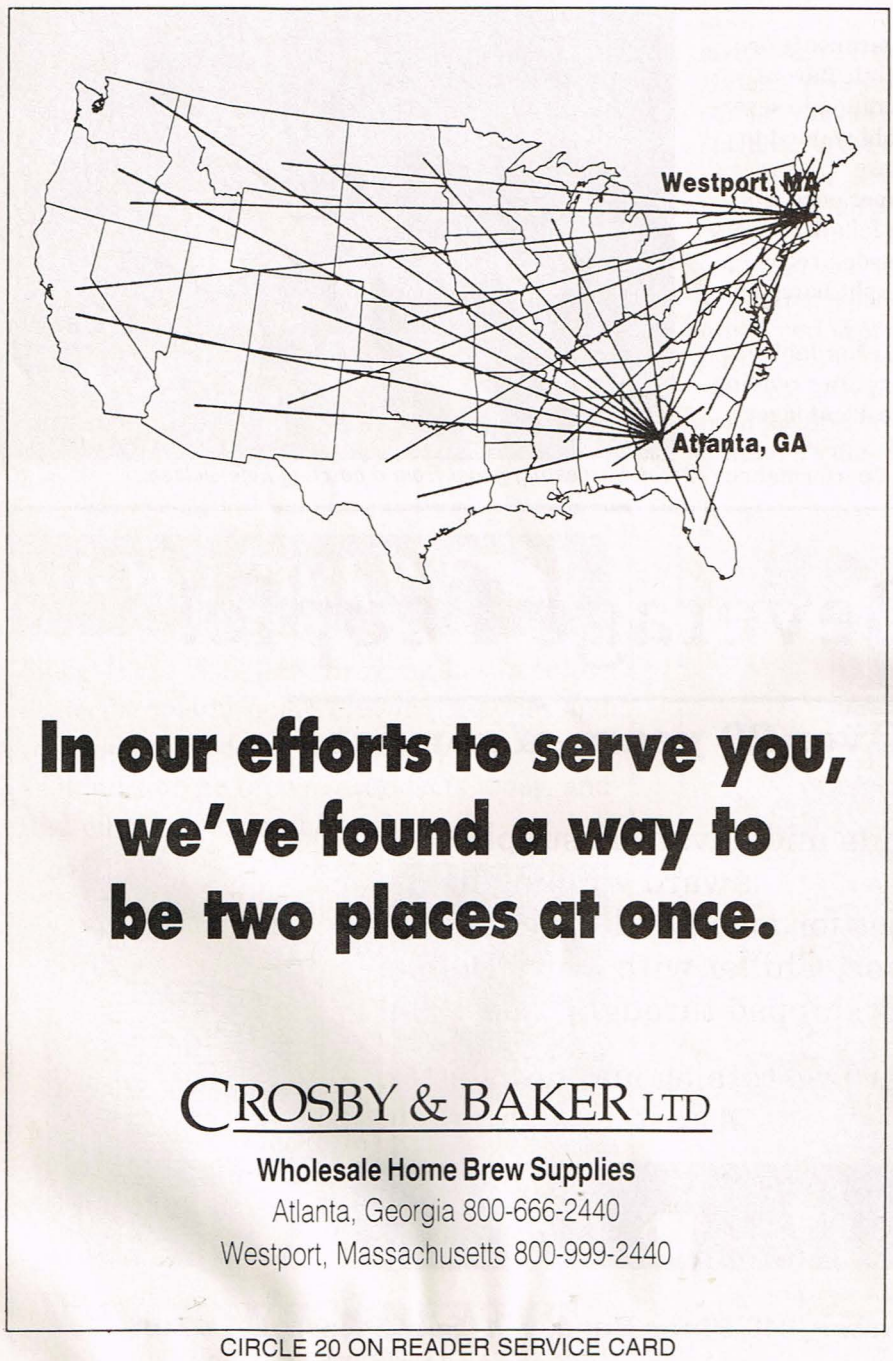
What It All Means

It is obvious that some brewers do more extensive testing than others and, likewise, not all brewers have access to the more sophisticated methods of testing. Much the same can be said for homebrewers. One thing is certain: It is important to take advantage of all of the information sources at your disposal.

The first plan of attack is to gather brewing publications and other relevant reading material and to digest all the information before proceeding. Networking with your fellow homebrewers is an excellent way to get helpful feedback, including the beer and brewing forums on the Internet.

Finally, many microbrewers consult professional yeast producers in the industry for help. While consulting fees are paid for this sort of advice, this is not to say that homebrewers cannot access the same level of expert information. Since all three brewers mentioned Wyeast Labs, we called Dave Logsdon, owner of Wyeast. He said that he and his staff routinely field questions from homebrewers.

The difficulty, he said, is that these questions are usually in the vein of "damage control"; trying to find a solution to a problem that has already occurred. Logsdon recommended querying the Wyeast retailers and wholesalers—all of whom have direct access to the parent company—prior to experimentation. Requests for additional information are given full attention, he added. Write to Wyeast Labs, P.O. Box 425, Mt. Hood, OR 97041. ■



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The Art of Non-Grain Brewing

by Jeff Frane

I have an old photograph at home, taken at the Weinhard Brewery here in Portland in 1906. The brewmaster is posed in front of the brew kettle in high collar, tie, and jacket, handlebar mustache brushed and waxed. The jacket, tie, and his bowler hat are clearly symbols of rank; the other brewery workers are in shirtsleeves, suspenders clearly visible (although proud mustaches are shared by all).

Frankly, the guy looks pretty serious, pretty stern. It's easy to imagine him supervising every step of the operation, judging the quality of the hops, the malt, the maize—probably a tough man to work for and a hard taskmaster. In all likelihood, he was thoroughly steeped in German brewing traditions; his common technical language with other brewers was German, not English, and his notion of beer was German, with some American pragmatism thrown in. It's a great photograph; I don't have any trouble imagining any of this.

What I can't for the life of me imagine is calling this brewmaster into the corporate office and informing him that we've decided to add a new beer to the line: Weinhard Marionberry Pilsner. Did he have a sense of humor? Would he chuckle heartily and then go back out to his kettle? Or would he fix me with a fierce Prussian glare and assure me that there was no Marionberry in Pilsner. In fact, there was no fruit in beer. Period.

Fruit doesn't get much respect, even as wine. Wine snobs—er, connoisseurs—refer to them (the non-grape variety) as "country" wines, and one rarely finds these poor sisters, with their clodhoppers and matted hair, at the table with the cabernets and chardonnays. And if fermented fruit doesn't get any respect in wine, where it technically belongs, how are we to view it in beer? Beers are made from malted grains, barley, or sometimes wheat, but fruit?

While it's possible that fruits were occasionally added to beer in its early history (along with all manner of herbs and spices), the only surviving fruit beers are found—unsurprisingly—in Belgium. Most commonly, these are made from a lambic base; a unique style of spontaneously fermented beers in which an array of yeasts and bacteria—and the combination of barley and wheat—provide a riot of flavors. The best of these combine the tartness of the beer with the sourness of the fruit in a lively, effervescent brew that has more in common with champagne than with pilsner.

Couldn't Be Easier "Framboise"

for 5 gallons
O.G. = 1.048

Ingredients:

- 3.3 lbs. Munton & Fison Extra Light Malt Extract
- 2.2 lbs. Morgan Master Blend — wheat (extract)
- 1 lb. Corn sugar (No, really!)
- 1 oz. Mt. Hood hop pellets
- 4 oz. Raspberry "Natural Fruit Flavor"
- Red Star Ale yeast

Step-by-step:

This recipe calls for no grains, which is one of the things that makes it so simple. The Master Blend is a new liquid extract product from an Australian firm and is a blend of wheat and barley malt. The sugar was added to bring up the starting gravity a bit and to keep the beer very light and refreshing at the same time. The malts and sugar are boiled together in 2.5 gallons of water for 90 minutes, with the hops added after the first 15 minutes. At the end of the boil, the concentrated wort was added to 2.5 gallons of pre-boiled and cooled water.

I like to use an open fermenter, and the new, improved Red Star ale yeast is a good, clean yeast—not a lot of character, but it's simple to use. One of the advantages to an open fermenter is that I can sanitize a stainless steel kitchen whip and beat a lot of oxygen into the wort before pitching the yeast. Shazam! This beer finished out in about five days.

At bottling time I added 3/4 cup corn sugar to enough water to dissolve it, boiled that syrup for 15 minutes, and added it to the beer when I racked into my bottling carboy. I also added the raspberry fruit flavor. This particular essence came from HopTech, but other stores carry them as well.

If you want to make this beer a little more interesting, here are some possibilities:

Use a more flavorful yeast. Something like W3068, Wyeast's Weihenstephan weizenbier yeast would add a lot of interesting flavors, and I think the vanilla note that the yeast produces would be particularly nice with the raspberries.

Or add something really wild, like a Brettanomyces culture. Brettanomyces are a "wild" yeast, once common in British ales and very important factors in Belgium's distinctive lambic beers. Be prepared, however, to wait months for the Brettanomyces to work through the beer and add its distinctive character.

In most of these beers, whole, macerated fruit is added after the initial fermentation is complete, and a second fermentation of the fruit sugars begins. Frequently, the beer is then blended once again, with an un-fruited lambic. Very dark, intense cherries (for kriekbier) and raspberries (for framboise) bursting with flavor were the prevalent choice for years, but recent interest in lambics has caused some experimentation and the introduction of new variants, such as peche (peach) and cassis (currant). In the pursuit of a faster brewing process, some breweries have turned to concentrates, syrups, or essences in lieu of whole fruit.

Whole cherries and raspberries are likewise added to a remarkable tart brown ale at the Liefman's Brewery in a different region of Belgium. Unlike the pale lambics, Liefman's beer has a tremendous color and depth of its own. When combined with the intense dark cherries, Liefman's Kriekbier goes down like Black Forest cake when first bottled. Over time the beer dries out and the sour/tart flavor comes to the fore.

Even the staunch Purity Law Germans are not above taking some liberties with fruit, although "fruit beers" as such are verboten. At Munster's Pinkus Muller brewpub, the dry, crisp altbier (made, like the lambics, with a large portion of wheat) is served with seasonal fruit. The fruit is macerated and then soaked in syrup; the beer is added to the glass and the Pinkus Alt is poured over.

Here in the US fruit beers are exploding on the microbrewery scene. In the mid-'80s, as Portland, Oregon's brewery scene was gathering momentum, the McMenamin brothers gave their first brewpub a novel cast by adding odd ingredients to the beer: chocolate and fruit. Fruit? The Bureau of Alcohol, Tobacco and Firearms, which has to approve everything about alcoholic beverages, was not amused. No, fruit went into wine. Grains went into beer. They took a lot of convincing, and for a time each new addition was viewed with suspicion and hostility.

Today fruit beers are everywhere, at least here in the Pacific Northwest. Like their Belgian counterparts, American fruit beers tend to be constructed from a wheat beer base, but the American versions, with much less wheat, are generally blander. In general American brewers get their beer's pep from hops, and hops make a very poor companion to fruit. While the Belgian versions gain complexity from odd fermentations, most American brewers have stuck with simple, clean ale yeasts.

Like their Belgian counterparts, American fruit beers tend to be constructed from a wheat beer base.

American brewers tend to ignore another Belgian concept, the use of very tart, acidic fruit. Fruit extracts and syrups, because of their simplicity of use, have found the greatest favor, and their contributions are mostly those of sweetness, some fruity flavor, and fruit aroma. Raspberries, perhaps the most aromatic of fruits, gained an early foothold. Of late, apricot seems to be gaining ground. The Boston Beer Co., badly misusing the term "lambic" for its Samuel Adams beer, did stick to some classic precepts: a wheat beer base and a very tart fruit, cranberry.

In the early microbrewing years, Washington State's Thomas Kemper Brewery produced something they called a "helles," ostensibly a pale lager beer. Their original yeast choice, however, had been an odd one and the beer was far fruitier than a lager should be. Curiously, the beer tasted of blueberries, although none were added, and the "helles" gained something of a cult following as the "blueberry beer." After a new brewer was

Blackberry Porter

for 5 gallons
O.G. = 1.045 (plus a bit)

Ingredients:

- 6 lbs. Amber malt extract syrup
- 1 lb. British caramel malt
- 1/2 lb. Chocolate malt
- 5 lbs. Crushed blackberries
- 1.5 oz. Northern Brewer hop pellets

Step-by-step:

In this case the crushed caramel and chocolate malts are steeped for one hour in one gallon of 150°F water. Then they are rinsed with hot water (about 170°F) and the liquid collected. Enough water is added to bring the volume to 2.5 gallons and the whole shebang is boiled for 90 minutes. The hops are added at the 15 minute mark.

The hot wort is poured over the blackberries in an open fermenter, then 2.5 gallons of preboiled, cooled water is added. The blackberries are held in a coarse mesh bag designed for making wines. While not absolutely necessary, it does help keep down the mess. As always, the wort is vigorously aerated and a starter culture of good ale yeast is pitched.

Everything else follows normal fermentation and bottling procedures. The open fermenter is really essential for this process, using whole fruit. After the primary fermentation is completed, the beer is racked into a carboy for clearing and then bottled with 3/4 cup corn sugar.

installed and the brewery started producing true lagers, the blueberry flavor was lost, to some fans' dismay. Recently, the brewery added art to life by reintroducing their blueberry helles, this time with real blueberries!

Tips for Homebrewers

Generally, American brewers have taken to the convenience of fruit extracts and essences. Few breweries can tie up fermentation vessels for extra weeks on crushed fruit—and fewer still would be enthusiastic about the accompanying mess. For the homebrewer the possibilities are endless. Fruit beers are among the cases in which there simply are no rules. They can be brewed from any base, using virtually any technology. Good fruit can be picked in season, found frozen or in syrups or extracts.

Fruits and fruit syrups can be added in the kettle, but care should be taken not to boil them, so as to avoid pectin haze. If care has been taken to choose undamaged, clean fruit, sanitation should be of limited concern even when the fruit is to be added for a secondary fermentation. Bear in mind

Cherry Brown Ale

5 gallons
O.G. = 1.055

Ingredients:

- 7 lbs. British ale malt
- 1 lb. Aromatic malt
- 1/2 lb. Belgian CaraMunich malt
- 1/4 lb. Toasted malt (see note)
- 1/4 lb. Belgian Special B malt
- 1/2 lb. Demarara sugar
- 1 oz. Northern Brewer hop pellets (at 15 min.)
- 1/2 oz. East Kent Golding hops (at 60 min.)
- 5 lbs. Bing cherries (crushed)
- 1 lb. Pie cherries (crushed)

Step-by-step:

Toasted malt is made from pale lager malt, spread on a cookie sheet and toasted in the oven at 300°F for one hour.

All grains mashed in at 130°F for 1/2 hour. Raised to 154°F and held for one hour. Six-and-one-half gallons of wort were drawn off and boiled for 90 minutes. Wort was chilled and aerated, and a vigorous ale yeast culture was added. I'm partial to ale yeasts with a noticeable diacetyl (butter) flavor, such as Wyeast's W1968 London ESB.

After primary fermentation was completed, the beer was racked onto the fruit in an open fermenter. A new, vigorous fermentation kicked in (lots of sugar in those cherries!) and was allowed to finish out. The beer was racked again into a carboy and allowed to finish. After that, all procedures were normal.

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CIRCLE 37 ON READER SERVICE CARD

that adding a lot of fruit will also add a lot of alcohol to the beer, and be prepared for a vigorous and messy fermentation when the fruit sugars kick in. Give yourself a lot of room in an open fermenter; enclosing the fruit in a mesh bag or a clean stocking can save a lot of trouble cleaning up.

Fruit and hops do not mix. Whatever the base beer, it's best to keep the hopping rate very low, both in the bittering and the flavor additions. A very late, very flowery hop addition might marry with the fruit's aroma but is more likely to mask the delicate nose.

Use your yeast. Really interesting fruit beers have something working in combination with the sweetness of the fruit. Some yeast strains that might have produced overpowering esters for a lager or a simple ale will actually enhance the character of a fruit beer.

Carbonation levels should be elevated. A good pale ale is fairly quiet, not too gassy, but a really aggressive level of carbonation can help push the aromatic notes up the scale.

Generally, crisp is good. Some of the most interesting fruit beers I've tasted are very dry and snappy. High carbonation helps, as does a very attenuative yeast (one that ferments out virtually all of the available sugars). Generally, too, pale beers work best as showcases for fruit. They allow more fruit flavor to appear, as well as permit the delicate hues of raspberry or cherry (or blueberry!?) to shine.

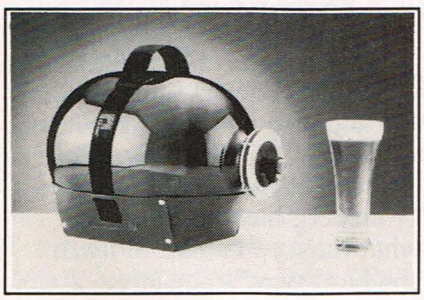
And yet I've tasted some terrific beers that violate that rule. Blackberries grow in profusion along country roads here in Oregon, and every year the state fair homebrewing competition has a huge selection of blackberry porters and stouts. Somehow, the acidity of the black malt works well with the rich sweetness of the berries. Like I said, there are no rules in fruit beers.

Quantities of fruit to be added vary widely. Generally speaking, the heavier the beer, the more fruit is necessary, but the type of fruit makes a tremendous difference.

Raspberries are remarkably aromatic, and it doesn't take a lot of raspberries to make an impact (and a good thing, too, given how much they cost!). Peaches, on the other hand, don't have a big punch, like most of the stone fruit. If you can find really intense, dark, tart cherries, by all means use them, but the usual table fruit will need some help.

Perhaps the simplest technique, and an excellent starting point, is to use a fruit extract. Retailers like California's HopTech carry concentrated fruit flavors in small containers. The great thing about these is that they can be added directly to finished beer during bottling. Not only does it simplify production, but the brewer can experiment with small quantities of beer and small quantities of fruit flavor until a suitable addition for the entire batch can be determined. ■

Keg beer without a keg!



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CIRCLE 50 ON READER SERVICE CARD

Brew Al Capone's Beer!

By Kathy Kincade

A Colorado brewer has resurrected a lager originally brewed during Prohibition in an illegal Chicago distillery owned by Al Capone.

"When you think of what people were drinking in those days, you tend to think of bathtub gin," says Sandy Jones, president and brewmaster of HC Berger Brewing Co. "But the beer was really pretty decent."

Jones, who claims to have one of the world's largest collections of memorabilia from the 1930s (Bonnie and Clyde, John Dillinger, etc.), proved this to himself and those who frequent his Ft. Collins microbrewery when a fellow collector from Chicago sent Jones a 1924 recipe for the lager. "It supposedly came from the Sieben Brewery, which was owned by Capone," he says. Wanting to see what beer was like "back then," he decided to homebrew a batch before committing his microbrewery to the task.

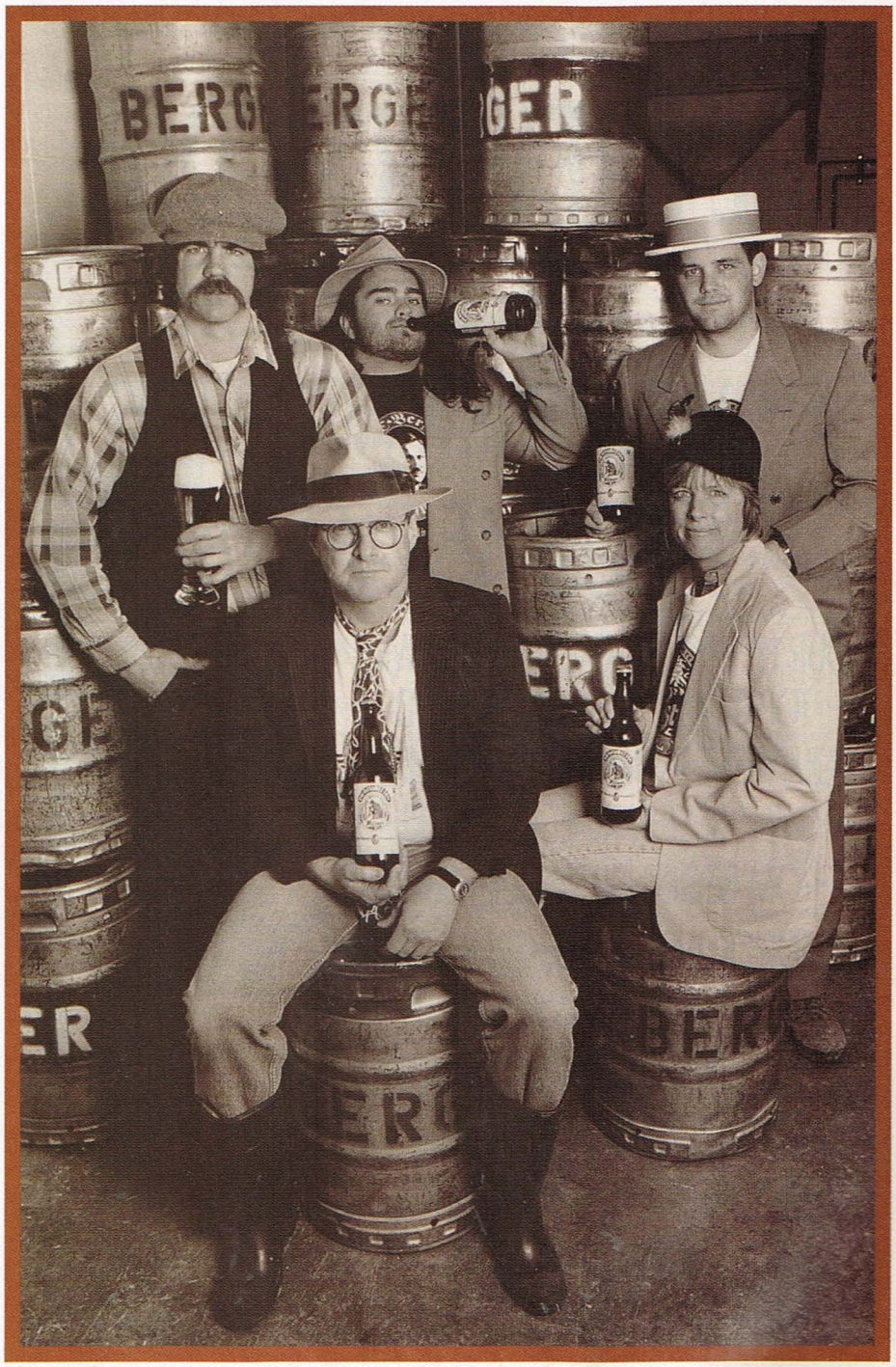
Brewing that first batch, he says, was "unmitigated hell."

"We have a single-infusion mashing system, and the recipe calls for a step mash. So we had to step mash in a single-infusion system, which we did very successfully."

In addition to six-row malt and rice, the recipe calls for another ingredient that is, well, different. "Soy beans," says Jones. "Back then, in the Midwest, they were probably used as a filler. And because it was Prohibition, bringing in truckloads of soy beans to a warehouse in Chicago probably didn't attract as much attention as bringing in truckloads of malt would have."

His test batch of what would later come to be known as "Prohibition Pilsner" turned out to be a pretty good lager, he says. "It was a typical speakeasy beer, with overtones of a German pilsner."

The big test came when he took a



DAVID BJORKMAN—NATIONAL NEWS SERVICE

The gang at HC Berger Brewing Co. gets carried away with their research, setting the scene for Al Capone's Prohibition Pilsner.

bottle from that first batch to a gentleman in Ft. Collins who had consumed the beer during Prohibition. "He said, 'Yep, that's it—tastes just like Canadian Ace,'" says Jones.

With that vote of confidence, he decided to add the beer to his brewpub menu. "We wanted to brew a historical beer that the public could taste and realize was better than what they thought beer was like back then."

When brewed commercially, it turned out to be a really good lager, he adds. "It sold well. We even had some 'Prohibition Pilsner' freaks." Many customers liked the fact that it was a lager rather than an ale. "So many of us microbrewers just do ales," he says.

The brewery no longer makes Prohibition Pilsner, but if you want to try this beer originally brewed by gangsters, Jones has shared his recipe and homebrewing instructions.

Just don't forget the soy beans. ■

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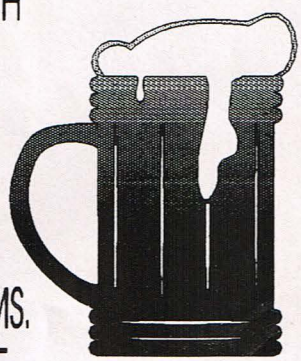


CIRCLE 13 ON READER SERVICE CARD

Al Capone's Beer

Recipe from Chicago 1924
5 Gallon Batch

Ingredients:

- 6 lbs. six-row lager malt
- 2 lbs. rice (ground)
- 1/2 lbs. soy grits (from health food store)

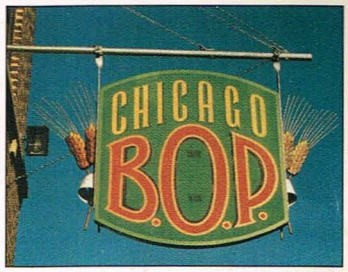
Step by Step:

1. Cook rice in 1 gallon plus 3 cups water for 30 minutes.
2. Preheat mash tun and add 1 3/4 gallons of 120°F water.
3. Adjust rice temperature to 190°F with 1 gallon of hot water.
4. Add rice to mash tun and immediately mash in malt and soy grits.
5. The temperature should end up between 150 and 155°F.
6. Hold at 150-155°F for 1 hour and 30 minutes.
7. Sparge with 165°F water to collect 5 1/2 gallons of wort.
8. Boil wort for 1 hour using the following hop schedule:
   - 60 minutes - 1 1/2 oz. of 6% alpha-acid Hersbrucker
   - 30 minutes - 1/2 oz. of 5% alpha-acid Hallertauer
   - 10 minutes - 1/8 oz. of 6% alpha-acid Hersbrucker
9. Add 1/2 oz. of Hallertauer after turning off the boil and cover brew kettle.
10. Cool to 55°F.
11. Pitch with about 14 grams Red Star lager Yeast (remember this is 1924).
12. Ferment & Condition at 55°F.
13. O.G. - 1.040, T.G. 1.010
14. Bottle with 3/4 - 1 cup of priming sugar.

For a better brew:

- Underlet prior to sparge to make run-off easier.
- Use soft brewing water (this is a Pilsner-style beer, after all).
- Add 1 tsp. Irish moss 20 minutes before the end of boil.
- Transfer to secondary keg for natural carbonation when gravity is about 1.016.

Great Equipment, No Clean-up



by Alex Chase

Maybe all that sterilizing and sanitizing steams your patience. Or clean-up is such a drag you've vowed to just sell the damn stove and get a new one every three months. Maybe your apartment is so small that every time you get a good boil going it sets off the sprinkler system. Or perhaps you'd just like to have someone there to help you through a new process—your first fruit beer, say.

If any of this sounds familiar, you should check out a "brew on premise," the do-it-yourself operation that takes the "home" out of homebrewing.

After gaining popularity in Canada, brew-on-premise facilities, known as BOPs to regulars, are beginning to invade the US. A BOP is essentially a microbrewery where you are the brewer, brewing up a storm with their facilities and their ingredients.

Among the attractions of a BOP: expert on-site assistance, great equipment rarely found in a homebrewer's kitchen, and a relief team that takes care of clean-up while you attend to more important things such as taste-testing and picking out labels.

DAVID WEISBERG PHOTOS

BOPs are a good place for beginners to learn the brewing process, make good beer, and enjoy themselves at the same time, says Mark Hamelin, president of Custom Brew Beer Systems of Hamilton, Ontario. "The chances of making quality products are that much better for the individual not exposed to (brewing)," he notes. "It also becomes a real social event. People bring their friends; they trade beer and have a good time."

The Canadian company now has three outlets open in the US—in Orchard Park, N.Y., Philadelphia, and San Jose, California—as well as 53 others in Canada, China, and the United Kingdom.

BOPs became popular in Canada in the late 1980s largely because people wanted to avoid the country's 52 percent beer tax, according to Hamelin. Unlike beer purchased in stores, the suds brewed at BOPs are not taxed.

Another advantage to brewing on premise is avoiding any initial investment for the equipment. Because there is no start-up cost, a prospective brewer need not worry about being stuck with an array of brewing supplies if he loses interest. To an avid brewer this may seem incomprehensible, but it does happen.

Matt Allison, who was recently bottling a batch of beer he brewed with his friend Lori Meyers at San Francisco's Brew City, said he bought a brewing kit about a year earlier and brewed only once because he didn't like the way it turned out. But with his equipment still sitting at home collecting dust, there he was paying $110 for the opportunity to brew a 13.5 gallon batch.

"It's nice because you don't have to deal with the clean-up and all the siphoning mess," he said, operating the counter-pressure bottle filler and sipping his fresh beer from a tasting glass. "Then you come back in two weeks, and the beer's all done. It's a little pricey, but it's definitely worth it."

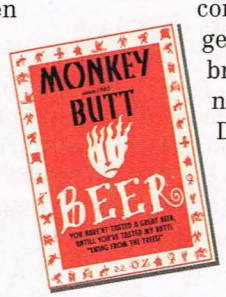
Along with the state-of-the-art equipment such as copper boiling vessels connected to a main line leading to a filter and heat exchanger, and novelties such as a selection of 20 label designs with any title printed on them, Brew City also guarantees the beer their customers make.

Allison and Meyers, pleased with the way their Rojas' Righteous Ale turned out, said they will be back. "I'll probably start (brewing) at home after a while, but I wanted to do this first to get back into it," Allison said.

Brewing at Brew City takes about two hours, after which the beer is stored in a keg for two weeks in a temperature-controlled fermentation room and pressurized with carbon dioxide. It's ready in two weeks. The customer then comes in, bottles the carbonated beer, and takes it home, ready to drink.

Brew City doesn't use natural carbonation, says co-owner Richard Dietrich, because customers wouldn't stand for it. "Most people don't want to wait four weeks," he laughs. "A lot of them come in after a week to check on (their beer)."

Using forced carbonation also allows customers to drink their beer while they bottle it, which often makes the experience that much more enjoyable.



Brew City offers a selection of about 40 different recipes, including both ales and lagers, but like most BOPs, the staff brewmasters will also work with the customer to develop a custom recipe.

This kind of flexibility may come in handy when someone wants to brew a creative concoction, but there is also a drawback to trying to make an experimental batch such as Mango Garlic Wheat Stout "If the recipe is too strange, I'm not sure we'll guarantee it," says Dietrich.

Brew City's 13.5 gallon batches cost between $85 and $120. Prices at Custom Brew Beer Systems range from $80 to $110 for a 13.8 gallon batch. Both Dietrich and Hamelin say their businesses cater mostly to beginners, but "after a while these guys become virtual pros," Hamelin adds.

Experienced brewers sometimes come in to try out the high-tech gear. "We definitely get homebrewers in here who are fascinated by our equipment," says Dietrich.

While BOPs are still new south of the Canadian border, Hamelin thinks the future looks bright. "The response has been very good," he says. "We're very surprised at how fast we're building a customer base, and we expect this to be a very good year.

"People always ask me how it will go in the US," he adds. "There's a renaissance going on with microbreweries, and this will go along with that. We certainly expect it to be here to stay." ■

BOPping in Chicago

The thick smell of hops and malt from a just-brewed batch greeted me as I walked into the Chicago Brew On Premise Inc. A bright red-tiled platform held six gorgeous copper brewkettles (15 gallon size; stainless steel inside). The stainless steel sinks and brew prep area made the place feel like a very large lab where important beer research is conducted.

The owner Hal Radtke, wearing t-shirt and shorts, was quick to let me know he wants to keep brewing a fun process for both beginning and advanced brewers. "Brewing your own beer doesn't need to be so serious," he said. He even wants to have a date night. Bring a date, brew a beer.

First, I sat down and went through a recipe book to pick one of their 95 different recipes. I could choose California Common, English Stong Ale, Pub Bitter, Tokyo Gold, Blackfly Stout, or Scottish Heavy to name a few. They were grouped by strength (i.e. original specific gravity) with the stronger beer also being more expensive to make.

Then they gave me a recipe form for the batch I selected. The form lists all the ingredients with the amounts clearly marked.

You can also bring in your own recipe, which they will help you reformulate to a 13 gallon brew size.

Next, they showed me where to find all the ingredients. "We want people to be comfortable with helping themselves," says Christy, Radtke's wife.

Don't know how to brew? No problem. There is a complete brewer's guide for those first-time brewers (or those needing a quick refresher).

After spending about two hours brewing, I went back two weeks later to bottle and label my batch. You can also keg your beer in your own equipment or rent keg equipment from them.

The staff is there to assist you with using the equipment and to help you brew a great beer. If the two beers I tasted, an Irish Stout and a Scotch Ale brewed at the BOP, are any indication of the quality of BOP beer, you will be able to match or even outbrew microbrewed beer.

— David Weisberg

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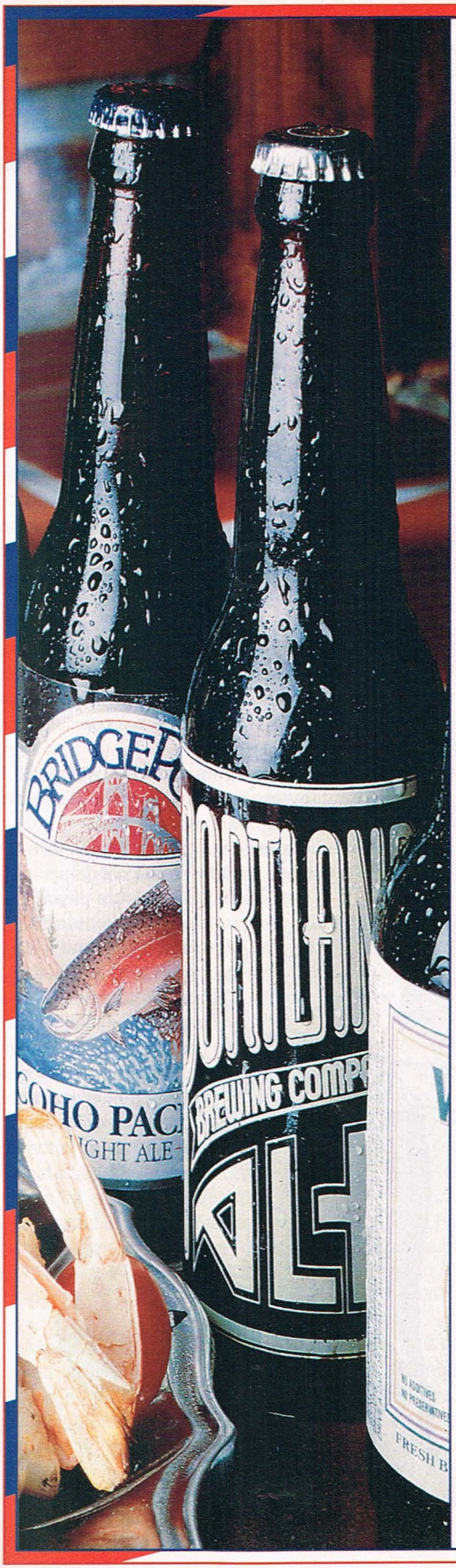

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CIRCLE 6 ON READER SERVICE CARD

TAKE THE PLUNGE

by Sal Emma

You've seen them, lurking in the refrigerator case at your homebrew store, next to the hops: shiny envelopes and tiny test tubes containing that mysterious elixir, pure culture liquid yeast.

What's the deal? Your dry yeast works fine. It's easy. It's cheap. It's nearly foolproof. Why would anyone want to mess with yeast in a seemingly expensive and temperamental liquid form?

As it turns out, for quite a few reasons, the most important being taste and control.

Most experienced homebrewers will tell you that, all things being equal, beer made with liquid yeast is usually cleaner and tastier than beer made with dry yeast. Beyond taste, however, liquid yeast cultures enable homebrewers to tailor their beer to the flavor profile perfectly appropriate to the target style, be it English ale, Czech pilsner, American lager, Canadian ale, or even Belgian and weizen varieties.

"Certain styles, like British or American pale ale, can be successfully made using dry yeast," says award-winning brewer and homebrew supplier George H. Hummel of Philadelphia. "Other styles, however, such as Bavarian weizen or Belgian ales have unique flavors and esters that can only be achieved using liquid culture."

Dry yeast usually comes in only two varieties, "ale" and "lager." Using dry yeast is like trying to touch up a scratch on your car with generic paint from the hardware store. Sure, it's good paint, but it won't match your car color perfectly. For that you have to spend a little more money and get the exact coded shade from the right manufacturer.

Today's dry yeast is well made. Dry yeasts from reputable firms perform well under homebrewing conditions. But if you really want to control your brew, you need to matriculate to the school of liquid yeast.

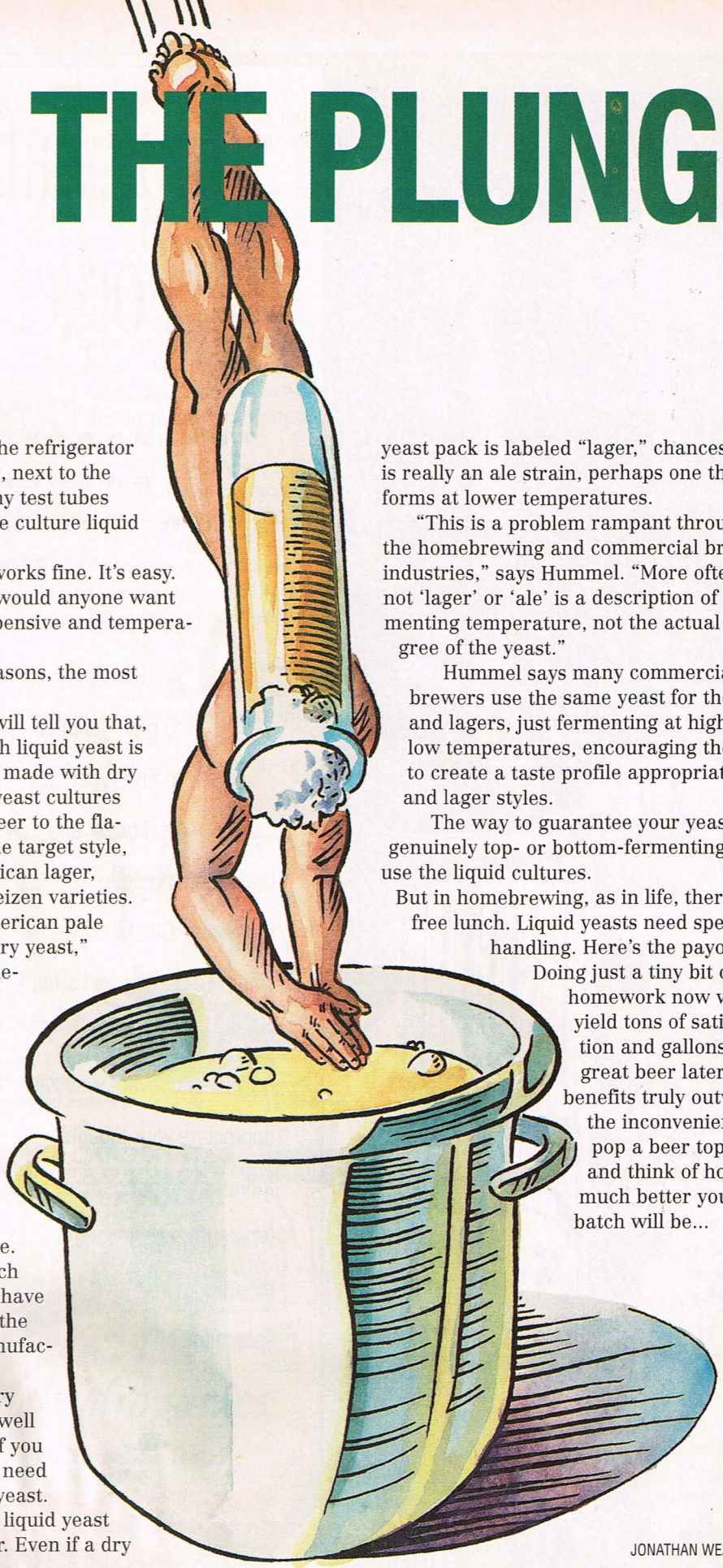
Many a brewer made the jump to liquid yeast when attempting to make a true lager. Even if a dry yeast pack is labeled "lager," chances are it is really an ale strain, perhaps one that performs at lower temperatures.

"This is a problem rampant throughout the homebrewing and commercial brewing industries," says Hummel. "More often than not 'lager' or 'ale' is a description of fermenting temperature, not the actual pedigree of the yeast."

Hummel says many commercial brewers use the same yeast for their ales and lagers, just fermenting at high and low temperatures, encouraging the yeast to create a taste profile appropriate to ale and lager styles.

The way to guarantee your yeast is genuinely top- or bottom-fermenting is to use the liquid cultures.

But in homebrewing, as in life, there's no free lunch. Liquid yeasts need special handling. Here's the payoff. Doing just a tiny bit of homework now will yield tons of satisfaction and gallons of great beer later. The benefits truly outweigh the inconvenience. So pop a beer top, relax, and think of how much better your next batch will be...



JONATHAN WEAST

INTO LIQUID YEAST

Getting Started

The liquid cultures are packaged in small test tubes or, in the case of Wyeast, in what are usually referred to as "smack-packs"—a bag within a bag. Sort of like a portion-control ketchup pack inside a one-pot coffee envelope.

Inside one pack is dormant, pure culture yeast. Inside the other is a small dose of sterile wort. When you want to activate the yeast, you break the small bag inside by applying pressure to the outside. This mixes the yeast and wort, safely inside the sealed outer bag.

The yeast then ferments the sterile wort, replicating, increasing in number, and getting stronger. After a day or two at room temperature, the pack swells up with trapped carbon dioxide gas. It really swells, too. You might think the whole thing will explode. But it won't. It's made to take the pressure.

You can pitch this teaspoon or so of actively fermenting yeast directly to your wort. In fact the package directions might tell you to do just that. Many brewers (including yours truly) did it that way on the first batch or two using liquid yeast. But experienced brewers caution against it. A better plan is to make a starter culture—to create a larger volume of active yeast cells for pitching. And making a starter is a must if you plan to use BrewTek, Yeast Culture Kit, or Yeast Lab products, packaged in the test tube without the sterile wort activator.

Using a starter culture will increase the number of viable yeast cells you pitch into your wort, decreasing your chances of infection by encouraging a fast start of fermentation.

To make a culture for your yeast cells, you need to make a "mini-brew" of sterile wort. Experienced brewers make a lot of it at one time. With proper home-canning techniques, your sterile wort will last a long time, so you can make dozens of mason jars filled with the stuff, maybe only a few times a year.

You can head down that road later, if you really get into it. In the beginning you can make small batches of sterile wort easily with equipment you already have lying around the house: beer bottles, caps, aluminum foil and dry malt extract. All you need to do is plan ahead. Your pure culture will need some time to get going in your sterile wort.

The Details

Following is the step-by-step, based on a target brew day of Saturday. This method will result in a good 12 ounces of active starter, plenty for the average homebrew situation.

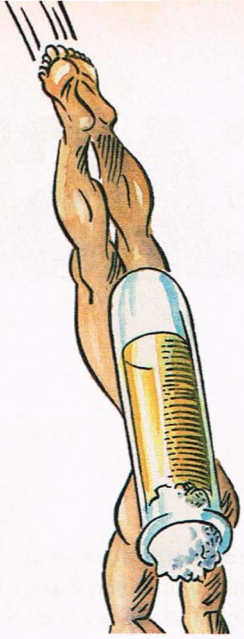
"By the book" you should start with as much as a gallon of active culture for five gallons of wort. But practical experience among homebrewers has shown positive results with 12 to 16 ounces of active culture for ale. For the slower, cooler lager strains you may want to consider using a large mason jar for your culture or inoculating two large beer bottles of sterile wort to increase the pitching volume to 20 or 30 ounces of culture.

You will need:

- The liquid yeast. Check the expiration date before you buy (if you are not buying by mailorder.) Get the freshest you can find. If you buy during warmer months, take a small cooler and some ice to the homebrew shop to transport the yeast home. And if you mail-order when it's hot outside, see if your supplier will pack it in ice for you. If not, find another supplier.
- A big beer bottle, 16- or 20-ounce size. My favorite culture bottle had Harp Lager in it. It is strong, squat and fat, and fits easily in my Dutch oven pot.
- Some light dry malt extract (DME).
- Hop pellets.
- A pot big enough to hold the beer bottle, covered with water.
- A smaller saucepan.
- Bottle caps and your capper.
- Sterile cotton or a sanitized airlock.
- A metal funnel.
- Hot-dog tongs.
- A cigarette lighter or Sterno can.
- Bleach.
- Scissors.

Most experienced homebrewers will tell you that, all things being equal, beer made with liquid yeast is usually cleaner and tastier than beer made with dry yeast

Monday or Tuesday evening: Make the sterile wort and, if you are using



the "smack-pack," activate it by breaking the inner pouch.

"Smack-pack" is a misnomer. You don't really want to smack it. A better way is to place it on a firm surface, feel for the internal pack, place both hands directly on top, and apply even pressure. The dinner pack will suddenly let go, and your yeast will start their feeding frenzy and party time.

After you break the inner bubble, shake the whole kit and caboodle to get the wort well oxygenated, encouraging the yeast to make little yeasties.

Place the activated pack in a warm place.

Then cook some wort:

Fill your large pot with water and bring to a boil. Immerse the bottle, a few caps, and a funnel to sterilize. Keep it boiling.

In the saucepan mix two cups water and four tablespoons DME.

Bring to a boil, watching carefully. Small-volume worts boil over just like the big ones. Add three or four hop pellets and boil for five to 10 minutes.

Turn off the heat under the saucepan.

With the tongs carefully remove the bottle and funnel from the boiler pot. Empty the water from the bottle, then fill it three-quarters full with hot wort and cap it. It's a good idea to boil more than one cap, because you may drop one trying to cap the hot bottle.

Now return the bottle to the boiling water and let it boil for 10 or 15 minutes. Turn off the heat and let the bottle cool with the water in the pot. This will prevent the bottle from shattering in a draft of cold air.

Your wort is sealed and sterile. Keep it in a dark place until Tuesday or Wednesday, when you will pitch your liquid culture.

Tuesday or Wednesday evening:

If you used the smack-pack, it should be swollen, indicating healthy fermentation. Now is the time to get the starter going. Wipe down the work area with bleach solution or rubbing alcohol.

Shake the sterile wort bottle vigorously for a moment to aerate.

Have the cigarette lighter ready. The next steps should be completed as quickly as possible.

Sanitize your yeast pack or tube in weak bleach solution and rinse well. Uncap the wort bottle and "flame" the neck to kill any bacteria or wild yeast hanging around the outside of the glass.

With clean scissors snip the corner from the yeast pack and pour the contents into the bottle, or carefully pour in the contents of the test tube.

Plug the bottle with sterile cotton or fix the airlock. Never, ever cap a bottle of fermenting wort!

Liquid Yeast "Buyer's Guide"

The major players in the pure liquid culture market are BrewTek, Yeast Culture Kit, Yeast Lab, and Wyeast.

Wyeast's claim to fame is it's Mylar activator pack, which allows the brewer to give the yeast a kick start within a sterile environment, without opening the package. The other brands are sold in tubes.

"All the liquid yeasts are excellent and when properly handled will perform well for the homebrewer. The Wyeast packaging offers a marked advantage because it allows the yeast to get up and running while minimizing risk of infection during handling. I recommend Wyeast for the novice for this reason," says George H. Hummel, award-winning brewer and owner of Philadelphia's Home Sweet Homebrew supply shop.

All the brands offer a wide range of ale cultures for American, Belgian, English, German, Irish, and Scottish styles. Many offer several varieties in each subspecialty.

BrewTek has three different Belgian ale strains and also sells a Canadian Ale and a Saison variety.

Yeast Culture Kit offers several highly alcohol-tolerant strains designed for barley wines and strong ales, and a strain appropriate for Trappist-style Abbey ales.

Yeast Labs brings both an Australian ale and Canadian ale strain to market.

And Wyeast produces a "general purpose" ale strain in addition to its pallet of English, American, and continental strains.

In the bottom-fermenting lager department, each of the manufacturers produces a variety of Czech-style pilsner strains, American and German varieties plus "California common" strains, tolerant of higher, ale-like fermenting temperatures.

Both Yeast Labs and Wyeast market Munich lager strains, and one of Wyeast's lager strains is called "Danish."

In the world of weiss, weizen, and lambics: BrewTek produces a Belgian wheat and American white variety in addition to its German weiss and weizen strains. BrewTek also offers a brettanomyces lambic yeast and even a strain of lambic bacteria for that weird and wonderful Belgian style.

Yeast Lab offers a Bavarian weizen strain. And Wyeast produces a Belgian white, a brettanomyces, and weiss and weizen strains.

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

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

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

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

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

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

Then I began to pour.

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

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

A real Triumph!

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

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

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

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

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

How I learned to brew without a teacher.

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

A Complete Catalog!

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

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

Favorite brewing styles

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

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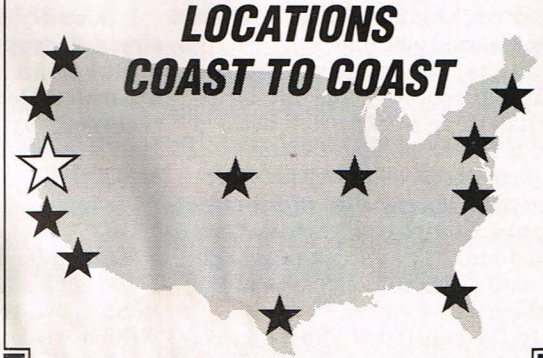

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You're finished.

Put this inoculated wort in a warm, dark place. The yeast will start the party, fermenting the sterile wort. By Saturday, brew day, you should have a bottle of healthy starter ready to pitch into your five gallons of wort.

If your brew plans get scrapped for any reason, just pop the bottle into the fridge. It will stay healthy for up to two weeks, chilled. Just bring it out to room temperature a few hours before pitching.

Another advantage of using pure culture is that it allows you to recycle yeast from your primary fermenter. (Most homebrew experts advise against recycling yeast sediment from a batch pitched with dry yeast.) Just pour sediment from your fermenting bucket or carboy into a sterilized bottle or jar. You can pitch this right away or refrigerate it for up to two weeks.

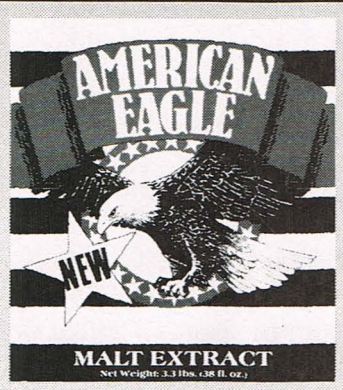
Another reason to learn the starter culture protocol is for retrieving yeast from the bottom of a bottle of homebrew or commercial bottle-conditioned brew, if it's a fresh bottle. In fact, that's how many homebrewers got their yeast in the pre-1978 dark days of underground homebrewing! But don't try to culture sediment from beer made with dry yeast!

If you recycle your sediment, you should get three or four healthy batches from each liquid yeast purchase, so it isn't really all that expensive. But you should buy a brand-new culture every so often to ensure well-behaved yeast of the correct strain for the style you are brewing.

And that's the beauty of liquid yeast. No matter what style you are making, you will find the exact strain you need for the job.

The printed literature and the computer networks are overflowing with information on yeast management for homebrewers. Learn more and brew better.

Take the plunge into liquid yeast. Your next brew will taste so good, you won't recognize it!



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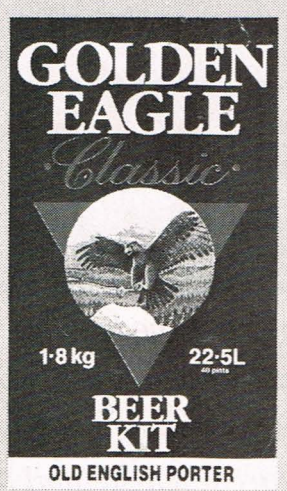

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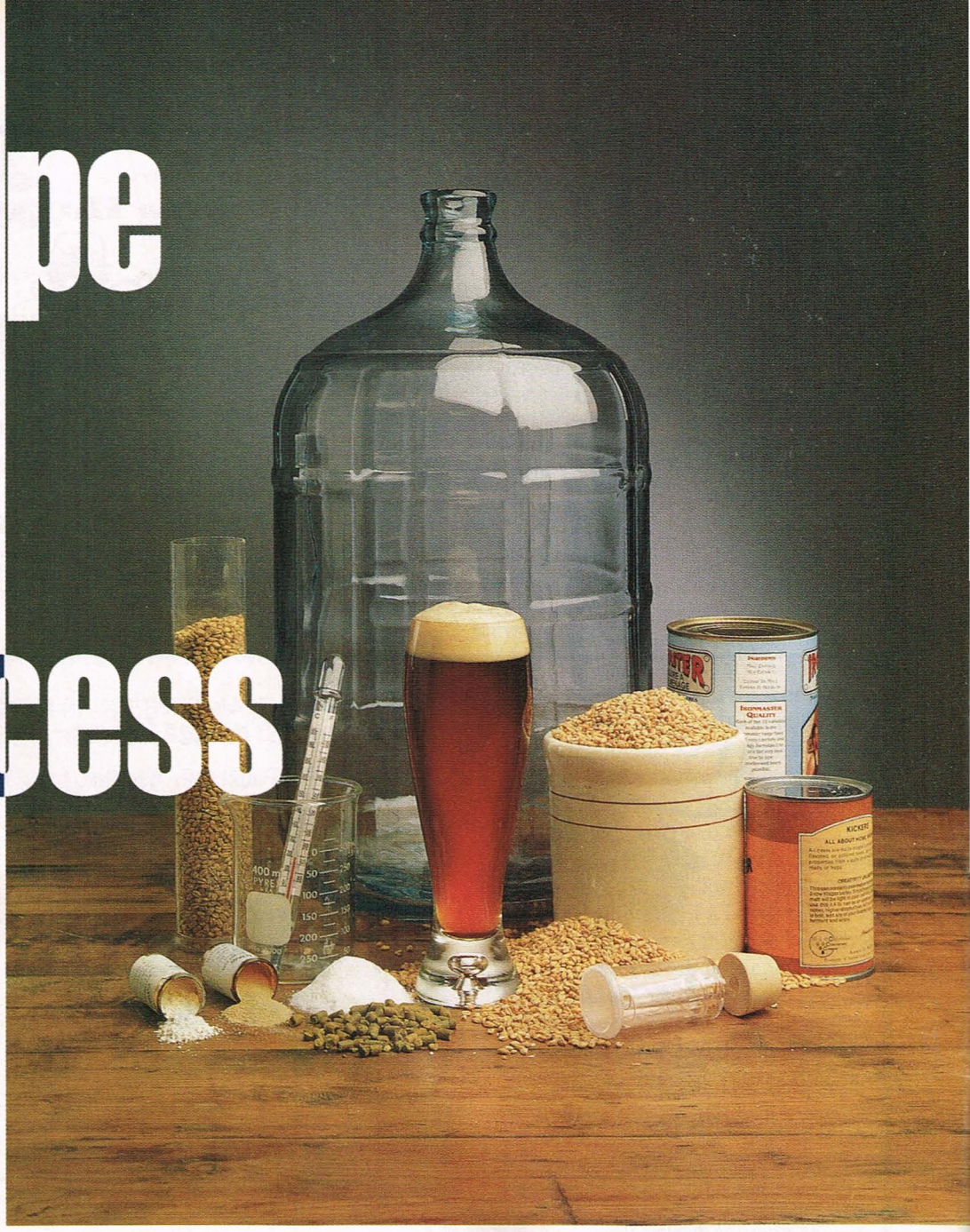

Simple steps to better beer

by Ashton Lewis

So you're a kit brewer, or perhaps you want to start brewing with kits. Maybe it's your first brew or you've brewed several and are still getting things down before venturing into grain brewing, or you've decided that you like kit beer and are happy to stick with them. If any of these descriptions fits, here are a few helpful hints that will make your kit brewing experience more rewarding.

The first thing to consider about your beer is that (cue spooky music)—it's alive! Making beer means taking this nutrient-rich stuff, wort, introducing yeast, and then letting the yeast grow. The growing yeast—not to get too literal about this—coughs and burps alcohol, carbon dioxide, and yeast-derived flavors into the beer.

If everything is going right, these flavors will be enjoyable. However, the wrong type of yeast—or worse, bacteria—will give the yeast indigestion and produce beer with off flavors. The goal is to successfully introduce brewing yeast into the wort while keeping unwanted life forms out. This means that all the equipment must be sanitized, and air-borne contaminants must be kept out of the brew.

An important fact about yeast is that they produce different flavors depending upon their concentration in solution (called pitching rate), the temperature of fermentation, the amount of oxygen in the solution, and most important, the yeast strain itself. This means that yeast selection is critical.

Ingredient kits come with yeast under the lid, but dry yeast only lasts for a specific period of time if it's not refrigerated. To make sure you're not going home with a packet of yeast that won't do the job, check the freshness date on the package. If it's past the freshness date or doesn't have a date, buy some fresh yeast. After all, it is fairly cheap.

You also need to use the right amount of yeast. A good rule is to use

DAVID BISHOP

The brewery is clean, we've got healthy yeast in hand, and the wort is all-malt. Good brew is in sight!

10 to 15 grams of yeast for five gallons of wort. Don't be surprised if you have to buy extra yeast, as most kits don't enclose this quantity. If you want to get out of dried yeast, there are many liquid varieties out there. However, dried yeast can work fine. Ask the homebrew store owner for suggestions.

The No-Sugar Diet

Many kits recommend adding table sugar to boost the wort's original gravity. Throw this suggestion out. Even the big breweries that use adjuncts such as rice and corn would never use refined sugar in large quantities. White sugar in large doses gives beer a distinct and unpleasant cider flavor.

The preferred substitute for sugar is dry malt extract (DME). DME is unhopped wort that has been spray dried into a powder. Substitute DME pound for pound for white sugar. This will give you an all-malt beer if the kit is all-malt.You can also use unhopped malt syrup. However, this ingredient should replace white sugar in a 1.25 to 1 ratio. In other words use 1.25 pounds of malt syrup for every pound of sugar called for in the recipe.

At this point the brewery is clean, we've got healthy yeast in hand, and the wort is all-malt. Good brew is in sight!

Water, Water...

The number one ingredient in beer isn't malt or hops, it's water. Beer is 95 percent water, and the quality of the water you use matters. Chlorine-free water is recommended for all brewing because chlorine can create off flavors. All-grain brewers also have to worry about salts in the water, because they have a major effect on the pH of the mash. Since you're not mashing, good tasting, chlorine-free water is all that is needed. Charcoal-filtered tap water or bottled water will do the trick.

Double Bubble...

Wort boiling has many purposes in brewing, not the least of which is sanitation. Fortunately the wort in kits has been boiled during manufacture, and all of the positive goals of boiling have been achieved. However, when the wort is poured out of the can and mixed with water, which may carry spoilage organisms, it is no longer "sterile." Therefore, it's a good idea to boil the mixture for at least 10 minutes to re-sterilize it, but this advice is not given by many kit manufacturers. Perhaps they don't want the hop aroma of the kit to be driven off by boiling. If you need the hop aroma, boil your mix and add 1/4 ounce to one ounce of aroma hops at the end of the boil. This gives your beer a good hop nose and satisfies the desire to have everything as clean as possible.

10 Tips to Better Kit Beer

1. **There is no such thing as being too clean!**
2. **Stay away from the sugar bowl. Table sugar is for coffee, not beer.**
3. **Always use good-tasting brewing water.**
4. **Boil your wort despite what the can may say. A brewer is always better safe than sorry!**
5. **Leave the old yeast pack at the store where it has been left alone for the past two years. It's happy where it is!**
6. **Choose a good yeast strain and pitch enough of it. This may mean two yeast packs.**
7. **Keep the fermentation temperature in the appropriate range. A fast and furious fermentation is the quickest way to fruity beer and a throbbing brain.**
8. **Aerate the wort before fermentation and never aerate again.**
9. **Despite your burning desire to sample the fermentation every day, leave it alone! A watched pot doesn't boil (any faster).**
10. **Let the beer clarify before bottling. Too much yeast in the bottle will guarantee yeast bite and can cause your beer to gush over when you open it.**

Brew Day

The step-by-step instructions that follow can be used for almost all hopped beer kits.

1. Start the day by getting all of the necessary equipment laid out. You'll need a brew kettle (2-3 gallon pot), a metal mixing spoon, a large metal funnel, a fermenting vessel, an airlock, and a strainer if using aroma hops. All of the equipment should be sanitized by placing it in a sink with a cool sanitizer solution such as scent-free chlorine bleach or an idophor solution (don't use too much chemical). Leave the equipment here until you need it. Since the fermenter probably won't fit in your sink, you can put the sanitizer in your clean fermenter to

coat all surfaces. Utensils should not be rinsed before using; just let the solution drip free from the surface.

2. Remove paper labels from the kit can and soak the can in hot water to soften up the extract. This will make it much easier to get out of the can.

3. Determine how much water needs to be added to the kit. There will probably be two amounts listed. One will be for initially diluting the syrup, and the other will be for topping the fermenter off once you've finished boiling. Boil the latter quantity for five minutes, cool it a bit by putting the pot into a sink of ice water, and then transfer it to your fermenter using the funnel. Place the fermenter in a cool place, preferably a refrigerator or cooler, for later use. The purpose of this is to sterilize and cool your water. Later you'll use it to cool the wort.

4. Remove the syrup from the hot water bath, open the can, and pour it into the brew kettle. Make sure to get all of the syrup out of the can. The kit will call for some water, one to two gallons, to be added to the syrup at this point. Use some of this water to clean out the can of all syrup.

This is the point where some can directions may wander. If the directions call for sugar, add your DME or malt syrup. Give this mixture a 15 minute boil. If you want a nice hop aroma, add the 1/4 to one ounce of aroma hops at the end of the short boil. Cover the pot and place it in an ice water bath to cool it down—the temperature should be close to your yeast-pitch temperature (see number 5)—before moving the wort to the fermenter, which should contain the water you cooled earlier. During the transfer to the fermenter, it is all right to let the wort splash into the fermenter. This helps aerate the wort and will give the yeast the oxygen they need to begin growing.

5. Mix the wort with the water in the fermenter by gently swirling the vessel. If you're using a glass carboy, fit aluminum foil over the mouth. This further aerates the wort, since oxygen from the atmosphere can still enter. Once it's mixed you need to get an idea of the temperature. If you're using an ale yeast, it should be added to 70°F wort; 55°F for lager yeast. Most kits come with ale yeast.

6. It's now time to pitch the yeast. It is best to rehydrate the dried yeast before pitching into the wort. To rehydrate, simply take about one cup of boiled and cooled water, about 80° to 90°F, and sprinkle in the yeast (10 to 15 grams for a five-gallon batch). It is rehydrated after 10 to 15 minutes. Pour this yeast slurry into your fermenter. Be careful when pouring it to practice sanitary techniques. Once the yeast is safely in the fermenter, fix the airlock or blow-off tube in place.

7. Place your fermenter in a cool, dark place for fermentation. If you're working with ale yeast, the fermentation temperature should be between 65° and 75°F. For true lager yeast it should be no warmer than 58°F.

The reason that temperature is so important lies in its effects on yeast performance. During fermentation yeasts take in sugars from the wort and produce alcohol, carbon dioxide,

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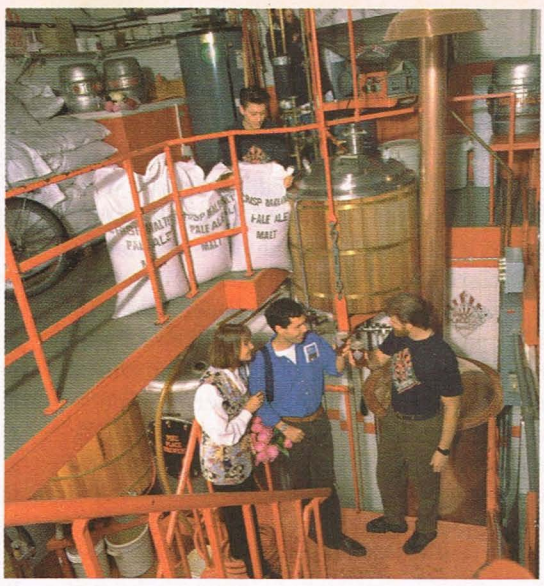
Crisp Brewer's Profile

Fal Allen
Pike Place Brewery
Seattle, WA, U.S.A.



Meet the Brewer: Fal gives a tour of the Pike Place Brewery.

Please tell us about your background as it pertains to beer.

I grew up in Hilo, Hawaii. Like most of my peers, I was exposed only to the locally available beer. As a food enthusiast, I was disappointed in the taste, flavor and character of the mass-market beers. In college, some friends began homebrewing. The beers they brewed were excellent, with myriad subtle flavors. I was studying microbiology at the University of Hawaii, so I began to homebrew. I became fascinated with the subject and became an all-grain brewer after a few months. I continue to devote a lot of time to tasting, reading, and brewing. After college I moved to Seattle and because I loved brewing, I got a job at Redhook Ale Brewery as a cellarman. You might say I started at the bottom. In 1991 I secured the position of second brewer at Pike Place Brewery. Pike Place's philosophy of brewing only flavorful ales and stouts by hand appealed to me. After a year, I became head brewer, a job that I have held for four years. The brewery is a microcosm of brewing and continues to be a wonderful learning experience. Last year I won a scholarship to the Siebel Institute in Chicago to study brewing. Siebel is the oldest American brewing school.

Where is the Pike Place Brewery?

Pike Place is truly a micro-brewery in the heart of Seattle. We are named for the Pike Place Market, America's oldest continually operated public market. Our brewhouse is gravity-flow, with a beautiful, handmade copper brewing vessel. Though small, we have excellent control on all aspects of the brewing process. We are located in the LaSalle Hotel building, formerly home to one of Seattle's most famous bawdy houses.

What beers do you brew?

We brew Pike Place Pale Ale (1.052 O.G.) and XXXXX Stout (1.068 O.G.), year-round. A small quantity is bottled, but the bulk of our sales are in draft beer. Several other beers are brewed seasonally. We have made cask-conditioned beers a specialty. Michael Jackson rated our brewery among the eight whose beers he would choose if stranded on a desert island. Roger Protz rated our porter the finest in America. Our beers are designed to complement tasty cuisine.

What are your personal food and beer combinations?

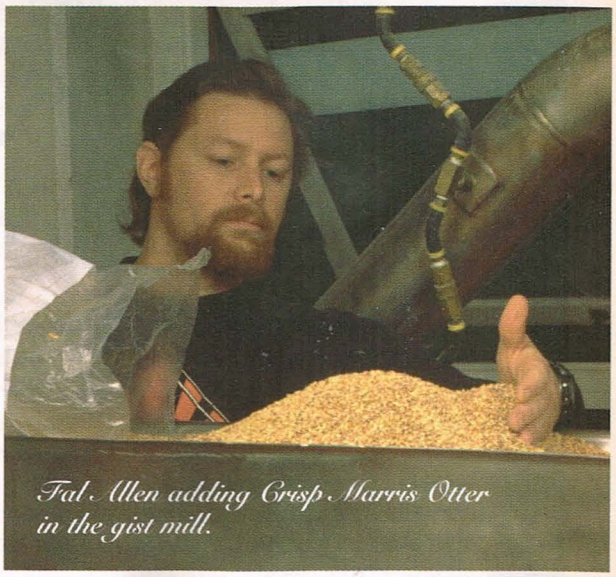
I particularly like our Pale Ale with seafood. One of my hobbies is to experience our beers with various ethnic cuisines. The oaky quality of our East India Pale Ale (1.062) is especially nice with spicy Indian cuisine. XXXXX Stout, a natural with oysters on the half-shell, is also excellent with Chinese and Mexican food. In addition, we brew seasonal beers specifically for individual cuisines. For example, Birra Perfetto, seasoned with oregano, is brewed for Italian food, and Cerveza Rosanna, with added red chilies, is ideal for Mexican cuisine. Our holiday beer, Auld Acquaintance, combines malt, hops, orange peel and other spices, and is delicious with turkey or duck. Old Bawdy Barley Wine (1.096) is brewed with Crisp peated Scotch whiskey malt. It is a great digestive.

It sounds as if your profession is also your hobby. What other activities do you enjoy?

I sculpt with found objects. Several of my pieces were recently included in a group show here in Seattle. I enjoy commuting to work by bike. And, because of the extraordinary engineering and beauty employed, I am interested in antique British motorcycles and have a collection of nine—mostly disassembled in bushel baskets.

What importance do you place on the malt?

Malt is the most important ingredient in beer. A fresh, malty flavor is characteristic of all great beers. Malt is the heart, hops the soul, and yeast the signature of craft brews. My goal is to balance the delicious flavors and aromas of malt with the yeast, hops and other seasonings. When I began homebrewing, I quickly became an all malt brewer, which dramatically improved my beer. Pike Place beers also improved when we began using Crisp Malt. Their two-row floor-malted Maris Otter is the perfect pale ale malt. Crisp Crystal Malt lends depth and character to all our beers. We rely on their specialty grains to make really unique brews. We find that the quality of the malt is outstanding shipment after shipment.



Fal Allen adding Crisp Maris Otter in the gist mill.

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and many flavor compounds, some good and some down-right nasty. If the fermentation temperature is too warm, your beer will have an elevated flavor profile, and many of the nasty flavors will become quite obvious. In fact some of these compounds, known as higher alcohols, are infamous for producing killer headaches. The other fermentation flavor group is esters, which contribute negative fruity and solventy characters to beer (ethyl acetate, or finger nail polish remover, is the most prevalent beer ester).

Fermentation should last between three and 10 days depending on what you are fermenting. It is important to identify when fermentation is complete. The first indication is appearance. If you're using a glass carboy, you can see when the beer begins to clarify from the top. This is an indication that fermentation is complete. To confirm your observation take a hydrometer reading at this point and check it again in 24 hours. If there is no difference in the gravity, fermentation is over (unless there is a hung fermentation). Don't take too many samples; you risk contaminating the brew with each one. Plus, you lose a certain amount of precious beer with these checks. It is important to check, however, since bottling beer that's not done fermenting will result in over-carbonation or even homebrew grenades.

8. Once fermentation has ended, allow the beer to naturally clarify before transferring it to your bottling bucket. The best way to achieve natural clarity is to move the fermenter into a refrigerator. This will cause the yeast to rapidly drop from solution and will also cause chill haze to form and precipitate. If you clarify in a refrigerator, take note: As the head space of the fermenter cools, a vacuum is created and the liquid contents of your airlock will be sucked into your beer. To prevent this from happening, remove the airlock and cover the carboy with several layers of aluminum foil, then wrap masking tape around the neck. This will allow enough air into the carboy to equalize the pressure. Once the beer is at refrigerator temperature, you can replace the airlock. Let it clarify for about a week.

9. It is now about two weeks since brew day, and you've got five gallons of flat, clarified beer that has called the fermenter its home since conception. You now must gently pry the brew from its fermenter and relocate it to a bottling bucket. This procedure, best accomplished with a racking hose, must be done without disturbing the stuff that settled to the bottom of the carboy and without aerating during transfer. Aerating at this point causes oxidation and damages the beer flavor; stirring up the yeast and trub (the leftover residue) at the bottom defeats the purpose of clarification and will also adversely affect the beer's flavor.

You're home free now. All that's left to do is to add between 3/4 and 1 cup of corn sugar to a small sample of the beer in a saucepan, bringing it into solution by gently stirring while applying heat. Take this solution and carefully add it to the bottling bucket, give it some very gentle splash-free stirs, and it's time to bottle. Once the beer's in the bottle, store it at room temperature for one week and then transfer it to the cellar for 1 or 2 weeks of aging. It's now 4 to 5 weeks after brew day, and you deserve a cold one!

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A SHOPPER'S GUIDE TO BEER KITS

Simplicity. That's the great thing about beer ingredient kits. They make it easy for you to brew decent beer. Buy a pale ale kit and you get the malt and yeast you need to make a pale ale-style beer. Kits come in many different forms from many manufacturers. A handful of national brands are available at outlets across the country. In addition some homebrew stores and mail order houses make up their own kits.

We looked at 16 national brands and tried to answer a few questions:

- Are they complete, or do you need to purchase additional ingredients?
- Are the instructions clear and thorough?
- Is the beer made from each kit true to style? In other words does the pale ale kit make a true pale ale?

In most cases we made stouts or other dark beers for comparison. We chose other styles in cases where dark beer was unavailable.

The kits were brewed by University of California, Davis, master brewing students under the direction of our technical editor, Ashton Lewis. The brewing method was to simply follow the directions on the kit. We did make one exception: If the instructions called for sugar, we substituted dry malt extract. We felt that helped us better compare the quality of the kits.

We found that as a rule these kits make good beer, generally true to style. They're limited by nature, however. They're designed to work well with a specific recipe and to have a certain taste. You can make some adjustments but only within a narrow range. That's the function of the kit, though; you trade control for convenience.

One of the things you won't find in most kit beer is the smell of hops. We only found one that had substantial hop aroma, and that was the only one that required adding hops. If you want a hop aroma, you might want to purchase aromatic hops to add to the boil even if the kit doesn't call for it. On the other hand the pre-hopped kits save you the fuss of dealing with that step.

We also would have liked more yeast with the kits. Most provide five or seven grams. Ten to 15 grams is a safer amount. In addition most kits didn't have a freshness date on the yeast packet. Fresh yeast is vital for good beer, so packets really should be dated. Almost all of the kits had freshness dates on the extract can, but the yeast will wear out before the extract goes bad.

For most kits the instructions were sketchy at best. The most complete instructions came in two parts: a step-by-step procedure followed by a section of tips—the longer the better.

The final step in the review process was tasting, always an enjoyable job. This time was no exception.

Our conclusion: Shop for a kit based on the style of beer you want. Look for a freshness date on the yeast packet, buy extra yeast if necessary. If you need instructions, look for a brand that has a pamphlet of tips in addition to directions on the can.

Also, get a little something free—advice. Whether you shop at a homebrew store or order by mail, it's okay to ask for help. Some places even have a detailed instruction sheet they'll be happy to give you. Finally, check the directions before you buy to see if you need additional ingredients such as dry malt extract.

THE KITS

Armstrong Premium Draught

The Kit: Prehopped with two New Zealand varieties of hops, Super Alpha and Sticklebract, that aren't found in the US. Instructions are listed on can, repeated on an insert under the lid. The two sets of directions are slightly different. We used the ones from the pamphlet, which were more detailed.

Yeast: Seven grams of ale yeast. The packet was stamped with a freshness date.

Brewing: Original gravity 1.040, gravity after fermentation 1.008. Fermentation began eight hours after pitching and lasted four days.

Vital Signs: Made in New Zealand by Maltexo Ltd. List price is $10-11.

Black Rock

The Kit: Makes six gallons. This is an all-malt kit. The instructions are listed on the label. They're brief, but they do give a target final gravity (we didn't quite get there) and also emphasize sterilization—an important point for beginners.

Yeast: Seven grams of ale yeast.

Brewing: Original gravity 1.040, gravity after fermentation 1.012. Fermentation began eight hours after pitching, lasted six days.

Vital Signs: Made in New Zealand by Maltexo Ltd. List price is $10-11.

Brewferm Diablo

The Kit: Makes about three gallons. The instructions are a bit confusing, but they do provide specific gravity and temperature targets, which non-beginners will appreciate. Temperatures are in celsius. This was a nice beer with a rich, caramel malt flavor.

Yeast: Seven grams of ale yeast. Freshness date on the packet.

Brewing: Specific gravity after boiling 1.065; after fermentation 1.030. Fermentation began six hours after pitching and lasted six days.

Vital Statistics: Made in Belgium. Suggested retail price is $15-22.

Brewmart Danish Pils

The Kit: Makes six gallons. Instructions included for five different alcohol strengths. Dry malt extract is recommended for higher-strength brews. We wondered if we got the wrong yeast with this beer. It tasted like a good hefe-weizen or Belgian ale. It wasn't really a pils, but we liked it.

Yeast: Comes with seven grams of ale yeast.

Brewing: Specific gravity 1.038 after boiling, 1.014 at the end of fermentation. Fermentation began eight to 10 hours after pitching and lasted three days.

Vital Statistics: Made in Scotland by Glenbrew Ltd. List price is $13.

Cooper's Stout

The Kit: Makes 23 liters (about five gallons). Instructions recommend white sugar. This brew was true to type with a nice stout color, low to medium bit-

terness, and a roasty, burnt malt character.
Yeast: Seven grams of ale yeast. Ffreshness date on the packet.
Brewing: Specific gravity 1.038 after boiling, 1.010 after fermentation. Fermentation began four hours after pitching and lasted three days.
Vital Statistics: Made in Australia by Coopers Brewery. Suggested retail price is $11-12.

Edme Dark

The Kit: Makes five gallons. Edme's instructions are brief, although they may just be in smaller type than other kit makers use. The beer, however, was a nice, drinkable ale with good balance between malt and hops.
Yeast: Seven grams of ale yeast.
Brewing: Original gravity 1.038. Gravity after fermentation 1.016. Fermentation began eight hours after pitching, lasted five days.
Vital Statistics: Made in England. Suggested retail price is $11-13.

Ireks Munich Amber

The Kit: Made five gallons. Instructions were brief but clear, although sanitation was left out almost entirely. This was the only kit that instructed us to add hops during the boil (hops not included in the kit), and it paid off with a good hop aroma. We used 1 3/4 oz. Perles for bittering, 1/2 oz. Hallertauer for aromatics. The beer itself was true to type with a rich malt flavor and a medium bitterness.
Yeast: No yeast was provided. We used 10 grams of Nottingham English ale yeast.
Brewing: Specific gravity 1.055 after boiling, 1.012 at the end of fermentation. Fermentation began six hours after pitching and lasted four days.
Vital Statistics: Made in Germany. Suggested retail price is $17.75.

Iron Master Imperial Pale Ale

The Kit: One thing we like about Iron Master's instructions, they recommend using dry malt extract instead of sugar to "improve the body of the beer and give it strong malt flavor." The kit requires you to provide three pounds of DME. Makes about four gallons.
Yeast: Comes with five grams dried ale yeast.
Brewing: Original gravity 1.044, gravity after fermentation 1.020. Fermentation began 10 hours after pitching and lasted four days.
Vital Statistics: Made in Scotland by Brewing Products Ltd. Suggested retail price is $11-13.

John Bull Stout

The Kit: This is a six gallon kit. The instructions contain a list of equipment that goes beyond the basics. As with many kits, however, they don't list target gravities, which would help non-beginners.
Yeast: The kit came with an unmarked packet, which we suspect contained seven grams of ale yeast.
Brewing: Specific gravity was 1.040 after boiling, 1.012 after fermentation. Fermentation began 12 hours after pitching and lasted five days.
Vital Statistics: Made in England by Paine's Malt Ltd. Suggested retail price is $10-12.

Morgan's Dockside Stout

The Kit: Makes six gallons. Instructions put a strong emphasis on sterilization, recommend against boiling wort to avoid killing the hop aroma.
Yeast: Six grams of ale yeast included. A freshness date was printed on the packet.
Brewing: Original gravity 1.033. Final gravity 1.012. Fermentation began 24 hours after pitching, lasted nine days.
Vital Statistics: Made in Australia by Morgan Brewing Co. List price $10-11.

Mahogany Coast Stout

The Kit: Makes five gallons. The directions are brief, probably to avoid confusing beginners. In this case, however, they're too brief. They do provide target gravity and suggest dry malt extract as a substitute for sugar.
Yeast: Comes with seven grams of ale yeast.
Brewing: Specific gravity was 1.050 after boiling, 1.016 after fermentation. Fermentation began less than 24 hours after pitching and lasted for five days.
Vital Statistics: Made in US. Suggested retail price is $12.

Mountmellick Stout

Kit: The instructions are printed on the back of the label, so be careful not to tear it. They call for an extra two pounds of corn sugar to make a "stronger, lighter-bodied beer" (we used dry malt extract, and it paid off). This was one of our favorites—a nice, clean beer with a chocolatey, roasty malt character.
Yeast: Comes with five grams of yeast.
Brewing: Specific gravity 1.054 after boiling, 1.022 after fermentation. Fermentation began six hours after pitching and lasted four days.
Vital Statistics: Made in Ireland by Mountmellick Products. List price $12.

Muntons Export Stout

The Kit: Muntons comes in a snazzy carrying case with two cans of malt, a packet of yeast, and a booklet of brewer's tips. It includes three- and five-gallon recipes. For the larger brew you are required to supply 1 kilogram of dry malt extract.
Yeast: Seven grams of ale yeast. Freshmess date on packet.
Brewing: We made the five gallon batch. Specific gravity after boiling was 1.045, slightly above the recommended 1.040-1.044, and 1.022 after fermentation. Fermentation began five hours after pitching and lasted three days.
Vital Statistics: Made by Munton & Fison of England. Suggested retail price is $10.95.

Premier Brown

The Kit: Makes five gallons. The directions are comparatively comprehensive and clear, although they don't list target gravities. They do suggest substituting dry malt extract for sugar.
Yeast: Seven grams of ale yeast.
Brewing: Specific gravity 1.044 after boiling, 1.013 after fermentation. Fermentation began 10 hours after pitching and lasted for five days.
Vital Statistics: Manufactured in Canada with U.S. ingredients. List price $10-12.

Telford Stout

The Kit: Another one with the instructions on the reverse side of the label. If you don't make the mistake that

we did, you'll find the directions printed in a light blue type that is difficult to read. Additional dry or liquid malt extract is recommended for extra body.
Yeast: Comes with seven to 10 grams of ale yeast.
Brewing: Specific gravity 1.050 after boiling, 1.015 after fermentation. Fermentation began eight to 10 hours after pitching and lasted about five days.
Vital Statistics: Made in Scotland by Brewing Products. List price $9-12.

SuperBrau Dark

The Kit: Makes five gallons. The instructions suggest boiling for up to 15 minutes, a good recommendation. Most kits warn you not to boil, which increases the risk of infection.

Yeast: Seven grams of ale yeast.
Brewing: Okay, you can't win them all. This beer was ruined when we inadvertently substituted bad yeast for the yeast that was supplied. How did this happen? Don't ask, don't tell.
Vital Statistics: Made in US. by Specialty Products. Suggested retail price is $10-11.

Hardware

Ingredient kits are the software of brewing, providing the vital ingredients to make it work. But where do you get the hardware? The fermenter, the brewing pot, the gadgets. Most homebrew stores and mail-order houses sell hardware kits that include the essentials such as a food-grade bucket, glass carboy, tubing, hydrometer, etc.

If you're looking for the bare basics, there are at least three products sold nationally that let you "brew" beer.

Mr. Beer

With Mr. Beer you get a six-gallon plastic fermenter, six one-liter plastic bottles, and an ingredient kit. You also get the Mr. Beer catalogue, which offers an assortment of ingredient kits, unhopped extract, hops, bottles, and caps.

It's good for beginners. You get a convenient fermenter with an airlock and spigot. You can use it with any standard brewing kit or extract.

One plus: Mr. Beer's directions tell you much more about brewing than you'll learn from any of the ingredient kits.
Mr. Beer is made by Mr. Beer Products of Tuscon, Arizona.

The Beer Machine

This is sort of like the bread machine come to beer. If you like the idea of just pouring in the water and letting the machine do its thing, the Beer Machine may be for you.

Be forewarned, however. There's lots of assembly involved and, because you have to resanitize it each time, you have to constantly reassemble it. Also, because you don't boil the water, there's a chance of contamination.

The Beer Machine is made by The Great American Microbrewery, Blaine, Washington.

The Mini-Brewery

The "Mini-Brewery" is a sort of sack that requires you to add yeast (included) and water. It works about the same as the Beer Machine and carries the same risk. With both of these you have no real control over the beer, and there's no actual brewing involved. Still, it couldn't be easier.

Premier Mini Brewery is made in Great Britain and marketed by D. Distributing, Santa Cruz, California.

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CIRCLE 31 ON READER SERVICE CARD

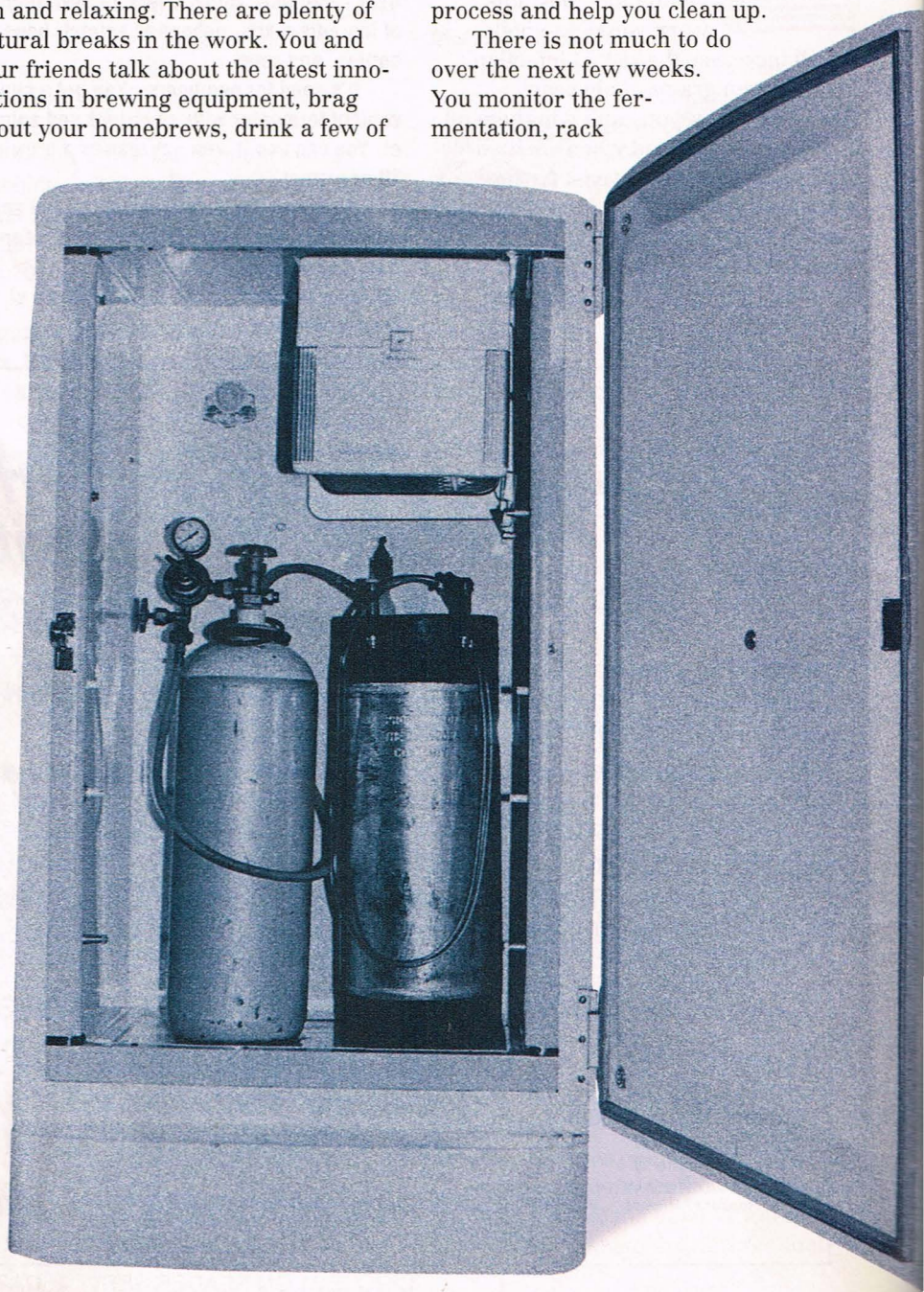
BUILD YOUR OWN

You can bring this project in for under $100 using a little ingenuity.

by Charles Skypeck

If you brew your own beer, you know the drill. A few friends come over on brew day. The brewing process is fun and relaxing. There are plenty of natural breaks in the work. You and your friends talk about the latest innovations in brewing equipment, brag about your homebrews, drink a few of the same, and generally have a good time. Why, one or two of your friends even stay all the way through the process and help you clean up.

There is not much to do over the next few weeks. You monitor the fermentation, rack



AMY ELLIOTT PHOTOS

DRAFT SYSTEM

the beer at some point, and consider recipes for your next brew. The one thing you try not to think about is the next step in the production process of your current brew—you have to bottle it. That's when the work really starts. Now the problem becomes finding your friends. Where are they on bottling day? The answer is anywhere but in your brewery.

So you wash your bottles. Then you rinse them. Then you sanitize them, fill them, cap them, clean them off, and put them away. But it doesn't stop there. Every time you drink a bottle of your brew, you dutifully rinse it out and dry it upside down. This way something won't grow in the bottom of the bottle, something as weird as the results of your high school science project.

You brew often, so bottles are everywhere. There are full ones in the refrigerator, more aging down in the cellar. Your working supply takes up a whole closet. There are some more out in the garage that you just picked up from a local bar. You can't wait to clean the dregs and cigarette butts out of those. From the start of the brewing process to the point of consumption, how many times does a homebrewer handle each bottle? The answer is the same for most: too many. There has got to be a better way. You need a draft homebrew system.

You have seen draft systems advertised, but nothing you have seen excites you. They are too expensive, or a reviewer has pointed out their limitations or lack of flexibility. Besides, you are a homebrewer. That leaves you with but one alternative, build your own draft homebrew system.

The Pieces

To put your own system together, there are a few basic items you will need. First, you must have a gas cylinder to hold carbon dioxide along with a pressure regulator and shut-off valve to control the flow of the gas. Find at least one five-gallon soda container, with the accompanying gas and liquid connectors that are fitted with a hose barb attachment. The basic system is complete with 3/16-inch diameter tubing, a hand-held beer dispensing tap, a few hose clamps, and a refrigerator.

Carbon dioxide gas cylinders come in various sizes ranging from just a few points up to 50 pounds. (The gas in the cylinder is actually in liquid form and is measured in pounds.) The small cylinders, up to five pounds, are easy to handle but have to be refilled too often.

Larger cylinders, above 20 pounds, are much too bulky and heavy for convenient use. For your home try a 20 pound cylinder. If you intend to transport your cylinder often, to events such as beer tastings and parties, look for a 10 pound cylinder.

A note about transporting these cylinders: When full of gas, a typical cylinder will have more than 2,000 pounds per square inch of pressure. Always attach the cylinder securely to some type of fixed support, both at home and in your vehicle, to prevent accidents.

A new 20 pound cylinder will cost $80 to $100, a 10 pound cylinder slightly less. To find a cylinder locally, look in the yellow pages for either a bottled gas company, a local soft drink

distributor, or a company that services fire extinguishers. Sometimes used cylinders are available at a substantial savings. The bottled gas company can foil the cylinder for you. Filling a 20 pound cylinder will cost around $8. Be sure to specify that you want "food grade" carbon dioxide. If you put your system together properly with no leaks, a 20 pound cylinder will last you a long time.

A pressure regulator with a shut-off valve is necessary to control the flow of gas from the cylinder to the container holding your beer. A two-gauge regulator is best. The first gauge reads the amount of pressure in the gas cylinder. The second reads the pressure in the line going to your beer. Ask for a low pressure beer regulator (0 to 30 psi). A normal soda pop regulator is set to operate at a much higher pressure than you will need for your beer. Ask for a regulator wherever you find your gas cylinder. You can't have one without the other. A new regulator will cost about $40. To protect your investment, gauge cages are available. These cages fit around the regulator and protect it from bumps, blows, and minor falls. A gauge cage costs $10.

The next piece of equipment you will need is a "keg." Normal beer kegs, besides having a much larger volume than the normal batch size of most homebrewers, are difficult to access for cleaning and filling without specialized equipment. Fortunately, typical stainless steel soda pop canisters hold five gallons, a very common batch size for most homebrews. These canisters are easy to access for cleaning and filling, and stainless steel is the material of choice for a container holding draft beer. A new soda pop container will cost about $80. However, many soda pop distributors are currently changing to "bag in a box" dispensing systems. Surplus soda pop containers are in abundance and can often be purchased for a song, or maybe a few homebrews. Check with your local distributor to see if any surplus containers are for sale.

Be careful that the used kegs don't smell like soda. You may want to take them apart and replace the soda-tainted O-rings, if necessary.

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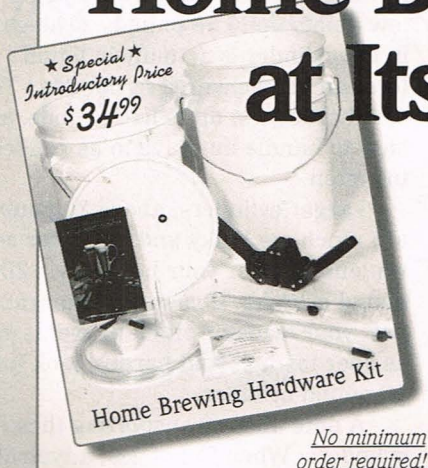

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BRING HOME THE GOLD

CIRCLE 53 ON READER SERVICE CARD

Cornelius kegs, are serviced by simple connectors that either deliver gas to or dispense liquid from the container. There are two general types of connectors, pin types and pop-it types. These two types of connectors are generally associated with the two major soft drink companies. Neither system has a significant advantage over the other. Just make sure to match the connectors with the type of "keg" you have. These connectors can be purchased along with your keg. They cost about $8 a pair new.

The system is completed by connecting the components together with the five feet of 3/16-inch inside tubing. (It's important to use sufficient beer line to ensure a gentle pour from the tap when your keg is at relatively high pressure—10 to 15 psi.) Proper use of the hose clamps ensures tight connections that will not allow gas leaks. The beer is dispensed from your keg through a hand-held tap. The tubing and clamps are available at most hardware stores for a nominal cost. The hand-held tap may be available at your local homebrew store and usually costs around $6. If not, the tap, and any other pieces that you are having trouble locating, can be purchased from one of several mail order businesses that specialize in beverage dispensing. Some of the best known are Foxx Equipment Co., 1-800-821-2254, Braukunst, 1-800-972-2728, and Rapids, 1-800-472-7431. These companies are also good sources of spare parts and additional optional equipment.

One of the biggest advantages of this type of draft system is its expandability and flexibility. To increase your capacity you can simply add more "kegs." Also, if you look hard enough, you can find soda pop canisters in other sizes, mostly three and 10 gallons. The three-gallon kegs are great for mobile situations. The 10 gallon kegs are perfect for larger batch sizes. Gas manifolds are available that allow you to service several kegs with the same gas cylinder and regulator. Additional serving taps allow you to serve several beers at once. Simple and inexpensive counter pressure bottle fillers can be used with the system to put portions of your draft beer in bottles if you choose to do so.

The system also does not require any specialized or expensive tools. All you will need is a screwdriver to attach the hose clamps and the gauge cage, and a large crescent wrench to install and remove the pressure regulator to and from the gas cylinder. The use of bulk carbon dioxide, in contrast to the small disposable cartridges of gas used in many other systems, is much less expensive per pound of gas.

The major disadvantage of this type of draft system is the need for refrigeration. Your draft beer will not necessarily have the kind of protection that bottle conditioning provides. Thus it will need to be kept refrigerated.

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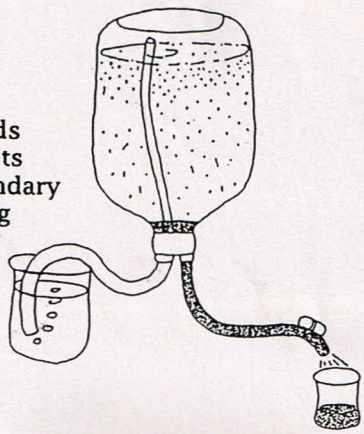

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With the shelves removed, a normal refrigerator will hold up to three five-gallon kegs. This does not leave much space for anything else, except hop storage in the freezer. You will have to have a dedicated refrigerator for your draft beer. Where do you find a used refrigerator? Try apartment complexes that are replacing their old ones. Often you'll get a very reasonable price.

The biggest advantage to such a draft beer system is the savings in your labor that you will realize over time. You will easily save one to two hours for every batch of beer you would have bottled. The total cost of the system new is around $225 (refrigerator not included). Finding any, or all, of the components in used condition can bring the cost down considerably.

You will also notice subtle differences in your draft homebrew. A draft beer usually has a smoother flavor profile than the bottle conditioned version of the same product. The clincher is reducing the amount of time you spend dealing with all those bottles. Being able to spend more time enjoying your homebrews can only be described as priceless.

Make Your System Stand Out: Add a Tap Tower!

The ultimate addition to your basic homebrew draft system is a tap tower and small bar. A tap tower, or stanchion, is basically a fancy device that holds a tap head or several heads in place. Tap towers come equipped with a barb that accepts standard 3/16-inch beer line and allows the beer to pass to the faucet.

Once you have the basic tower, you can add different tap head designs to the tower for special offerings. For example, if you put a Guinness tavern head on your tap tower and dispense your homebrewed stout with a mixed gas (nitrogen and carbon dioxide), you will have a rich creamy head similar to Guinness. This is only possible with a tap tower.

Basic towers are sold by companies such as Foxx Equipment, but you'll have to look harder for porcelain or sculpted stainless models. The best way to get hold of these is to go to a bar or brewpub with nice towers and ask them where they found them.

A tower without a bar doesn't work too well, so you'll need to build a bar. The simplest bars can be made out of floor-quality plywood, also called floorboard. The only thing the bar must do is support the tower. If it has six-inch sides and a two-foot-by-two-foot top, it'll work fine. Just leave one of the sides open so you can bring your beer lines through the bottom and into the tower's barbs.

Floorboard accepts stains evenly and can be sealed with an alcohol resistant poly-urethane covering to spruce it up.

One homebrewer built a system like this that is fully mobile and proudly sits on counter top. It has three tap heads and soda pop fittings permanently attached to the five-foot-long, 3/16-inch-diameter beer lines. This way it is easy to switch kegs on and off line. You can, of course, get a lot more elaborate with your bar design, but cost will quickly escalate.

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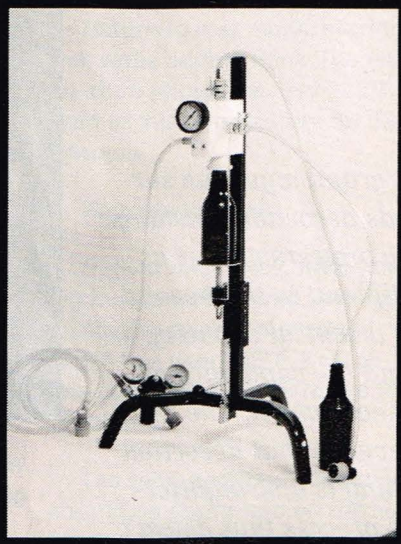

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CIRCLE 64 ON READER SERVICE CARD

Decoction Mashing

Solving the Mystery

Decoction (di-KOK-shun) (noun): an extraction of flavor by boiling.

Traditional German copper vessels (lauter tun in foreground, mash mixer/kettle in background). Decoction brewhouses have a second, smaller kettle used to boil the decoctions.

A grand mystique surrounds decoction mashing. Many brewers view it as too difficult to try, beyond their technical capacity, or beyond the capability of their equipment. The truth, however, is that decoction mashing is a straightforward process that doesn't require lots of extra hardware or a master's degreee in brewing science. And it can significantly enhance many styles of beer.

by Mary Samuels

As brewers, we refer to the entire process of converting the starch present in grains and adjuncts into sugar as mashing. We use the enzymes present in pale malted grains to perform this conversion. These enzymes are active over a range of temperatures, with more activity within certain ranges than outside of these ranges.

Decoction mashing is the method of boiling portions of a mash, which can extract flavors and fermentable sugars from those ingredients while allowing the remainder of the mash to "rest" (which is why it's called a "rest mash"). When the boiled (decocted) mash is reintroduced to the rest mash, it raises the temperature of the rest mash.

When sufficient decocted mash is added back to the rest mash, the entire mash is raised from the range at which one or more enzymes are active to the range at which other enzymes are active.

Grain and Water

Decoction mashing began in the days before the development of scientific method or even simple instruments such as thermometers and hydrometers.

Through trial and error and careful observation, brewers learned how to raise the temperature of a "porridge" of crushed grains and water (what we now call a mash) by boiling portions of it and re-combining it with the remainder of the mash to convert the starch in the grains into fermentable sugar.

Of course that was also before brewers knew of such things as alpha amylase, acidity, and even yeast. They just knew that if they started with a certain amount of grains and a certain amount of water and boiled a portion of it, the starchy porridge would turn sweet. Probably they would boil more of the mash in cold weather than in warm weather. It took more heat from the decocted portion of the mash to raise the temperature of the combined mash during the cold season. That's because they were starting out with cooler water and grains, and because there was probably greater heat loss through the mash tun.

Decoction mashing began in the days before the development of scientific method or even simple instruments such as thermometers and hydrometers.

In addition, since German and other continental grains are not as completely malted (meaning not fully modified), there are portions of the barley corn that are hard and "steely" (undermodified is the technical term). These hard kernels are not as easily crushed as the remainder of the corn and not as accessible to the mashing enzymes. The decoction boil causes these areas of unconverted starch to become totally hydrated (soaked with water) and ultimately to burst, making them accessible to the mashing enzymes and increasing mash yield over a simple infusion mash.

With this perspective in mind, can you believe you have the ability, with better instrumentation and other equipment, to perform a decoction mash? Sure you can!

Decoction's Competition

How does decoction mashing differ from other forms of mashing?

Infusion mashing: Infusion mashing is a process by which a measured amount of hot water of a known temperature is combined with a measured amount of crushed grains at a known temperature so that the resulting mash settles at a desired temperature. After the mash has "rested" at this temperature for a while, i.e., until conversion of starch to sugar is complete, the sweet wort is separated from the husks and other remaining matter comprising the mash.

This is the simplest form of mashing, and it differs from decoction mashing in that no part of the mash is ever boiled. Although both mashing techniques are used to convert barley starch to fermentable sugars, the process used to accomplish this goal is quite different.

Temperature program mashing (upward step infusion mashing): This is a relatively new development in the history of brewing and was specifically developed to mimic the temperature rests inherent in decoction mashing.

A temperature program mash proceeds similarly to an infusion mash; a known quantity of water at a known temperature is mixed with a known quantity of grain at a known temperature to arrive at a "rest" temperature.

TRIPLE DECOCTION

1. **Mash in malt and water to hit first temperature stand at 95°F. Hold for 15 minutes.**

2. **Remove about a third of the mash solids (leave most of the liquid in rest mash) and heat to 155°F. Hold for 5 minutes and bring to a boil. Boil for 30 minutes.**

3. **Return to rest mash, stirring well while adding back. The temperature should be near 122°F. Hold at this temperature for 15 minutes.**

4. **Repeat step two.**

5. **Repeat step three. After mixing the decoction with the rest mash, the mash temperature should be near 155°F. Rest at this conversion temperature for 15 minutes .**

6. **The third and final decoction should be performed on the liquid portion of the mash to deactivate enzymes. Boil 1/2 to 1/3 of the free liquid for 30 minutes. Test the rest mash for conversion using the iodine test before returning the decoction. After adding back, the mash temperature should now be in the neighborhood of 170°F.**

7. **Let the mash sit undisturbed for 10 to 20 minutes to allow the filter bed to form.**

8. **Recirculate the wort (called vorlaufi) until clear and begin lautering.**

But instead of this temperature being in the saccharification range (142° to 158°F), it is in a range where an enzyme attacks and degrades proteins (protease) to yield a wort that is more conducive to yeast growth and resulting fermentation, as well as yielding a potentially clearer product.

The Stages of Decoction

In a decoction mash there can be a protein and a saccharification rest, but instead of applying heat to the entire mash or adding boiling water (thus thinning out the mash), part of the mash is removed to another vessel. Heat is applied to that part of the mash to raise it briefly to the saccharification temperature range, then to the boiling point. It's held for a period of time, cooking the mash.

It's also possible to use a decoction boil for mash-off. There's an important distinction between the portion of the mash removed for decoction at this point and the portion removed in the earlier decoction, however. In this decoction only liquid is removed from the mash for boiling, while the first decoction called for removing the thick part of the mash (mostly grain) and leaving as much liquid behind as possible.

That's because the mashing enzymes (alpha and beta amylase) are contained in the liquid, and for the first decoction boil they need to be left behind to perform the actual work of converting starch to sugar. At this point, when the intention is to disable the enzymes, it's a good idea to remove just liquid. That way the bulk of the mashing enzymes are exposed to boiling temperatures, effectively denaturing them and"freezing" the character of the beer with respect to the flavor, fermentable sugars, and non-fermentable dextrins contributed by the grist bill.

Adding this liquid back to the rest mash will raise the temperature of the entire mash. The target temperature range is 168° to 170°F.

When Decoction Works Best

Decoction mashing may be used for nearly any kind of brew in which you wish to emphasize the maltiness of the beverage. Suppose you were planning a brew similar to Paulaner Salvator, a beer very malty and alcoholic. You might choose to perform a decoction mash to emphasize the malt character of this brew.

It should not be used in most English ales. These beers traditionally are brewed with a single-infusion mash, and their flavor profile reflects this. Also, as most English malt is heavily modified (meaning that it's been fully malted), a decoction mash may inhibit proper head formation and retention because of the effects of heat on the proteins in the grain.

The Up Side

There are many reasons to choose decoction as your mash style. Here are four:

1. A clear advantage decoction mashing has over infusion mashing comes when undermodified grains are used. The hard tips ("steely ends") of such grain are not typically available for conversion from starch into sugar but become gelatinized (liquefied) and available for mashing after a decoction boil. A decoction mash using undermodified grain will have a greater yield in terms of fermentable sugars than an infusion mash with the same grain.

This advantage doesn't apply when fully-modified grains are used, because there are no undermodified portions of the ungelatinized starches present in the grain.

2. Another advantage is the emphasis on the maltiness of a decoction-mashed brew, described above.

3. Especially in a triple-decoction mash, you'll find that the resulting beer is more likely to be clear than a similar recipe that uses an infusion mash. That's because there's a hot break that takes place during each decoction, which is subsequently filtered out during the sparge.

4. Finally, because boiled mash is used to raise the temperature of the mash from one strike temperature to another, the mash is not as thin as it can become in some temperature program mashes that use boiling water to raise the temperature of the mash. This is an advantage in two ways:

A thick mash enhances the formation of unfermentable dextrins, which aid in body and head formation and retention, versus the formation of fermentable sugars with a thin infusion mash, which yields a beer with less body.

Larger amounts of grain can be mashed using the same equipment, because less room is taken up by water in a thin mash.

A Question of Color

When the mash is heated to boiling, some of the sugars that were converted are exposed to fairly extreme heat on the bottom of the decoction pot and are carmelized, which will darken the resulting brew in proportion to the length of time the mash is boiled. Five minutes of decoction time, as recomended in the first recipe, will result in minimal darkening, even though the decocted mash will appear significantly darker than the rest mash when it's added back after boil. This color will not carry over into the finished product.

A Word of Caution

For the brewer considering a triple-decoction mash for the first time, the task may seem nearly insurmountable. So the greatest disadvantage it presents is a perception that it's very difficult to do. Granted, a triple-decoction mash involves many more steps than a single-infusion mash. But a single-decoction mash, when laid out in the form of a plan, isn't much more complicated than a step-infusion mash.

In addition a brewer's first decoction mash requires significantly more

time than a single-infusion mash because of lack of experience. There are several things that could be happening at once. The experienced decoction brewer can take advantage of this and shorten the time required for a single-decoction mash to approximately the same time as a step-infusion mash.

In fact decoction mashing presents no disadvantages other than the extra time required to do the job right, and that extra amount of time will not be significant once you've done it a couple of times.

Equipment List

If you're already doing infusion mashing, you'll only need a little extra equipment for a decoction mash, and chances are you already have it.

1. Additional boiling pot for the decoction boils. For mashing five-gallon batches, this need only be a couple of gallons in size, and the bottom of it should either be heavy-gauge stainless steel or something that's "copper-clad" such as Revere Ware.

You could use your brew pot for this, but be sure to rinse it out before you sparge into it at the end of the mash.

2. A strainer or slotted ladle. You'll use this to strain the mash liquid from the grain (also called the "thick" part of the mash). You probably already have one.

3. A two- to four-cup measuring pitcher with handle. This is really handy in moving mash from the mash tun to the decoction boil pot and back again after the decoction boil. You can also use it to stir up the mash as you transfer decocted mash back to the mash tun, distributing the heat of the decocted portion throughout the entire mash.

4. If you don't already have some, pH test papers will come in handy. If you're already doing mashing without these, though, you can probably continue to get by.

Not a large list, is it? Now, on to the good part!

A Simple Mashing Schedule

For a single-decoction mash, we're going to use the boiled mash to raise the temperature of the entire mash from the protein rest at 122°F to the conversion rest (also called the saccharification rest) at about 155°F.

This mash will start out very similarly to a temperature program mash, by adding hot water to crushed grain and stabilizing the temperature at the strike temperature of 122°F. At this point, we'll deviate from the next step

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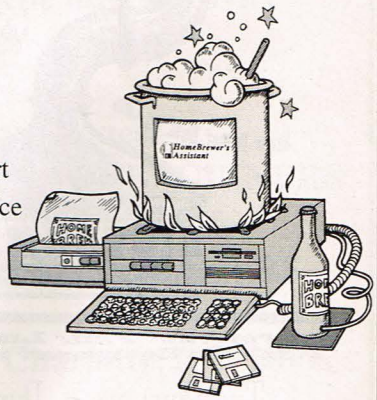

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CIRCLE 28 ON READER SERVICE CARD

Decoction mashing extracts flavors and fermentable sugars from (certain) ingredients while allowing the remainder of the mash to "rest."

usually taken in a step-infusion mash.

Instead of adding additional boiling water to raise the temperature of the mash to the conversion temperature, we'll remove a portion of the main mash, boil (decoct) it, and return it to the main mash. The higher temperature of the decocted mash will raise the temperature of the entire mash to the conversion temperature.

Pretty simple in concept, isn't it? It's not too much more difficult than other mashing styles in practice, and you'll quickly decide that it's no more difficult than handling the boiling water required to rinse the temperature of the mash in a step-infusion mash.

And now the important part: the recipe!

RECIPE

German Pilsner
(Recipe for 5.5 gallons)
1.50 Hours Boil

Grains:
4 lbs. Pilsner Malt
4 lbs. Munich Light

Hopping Schedule:
.75 oz. Perle, 9% alpha, 60 min.
.75 oz. Tettnanger, 3.80% alpha, 40 min.
.75 oz. Hallertau Tradition, 5.80% alpha, 40 min.
.50 oz. Tettnanger, 3.80% alpha, 10 min.
.50 oz. Hallertau Tradition, 5.80% alpha, 10 min.

Technical Specifications:
OG: 1.040 - 1.047
FG: 1.007 - 1.012
Alcohol: 4.6-5.3% by volume
Yeast: Wyeast Bavarian (W2206)
Protein Rest: 122°F
Conversion Rest: 155°F

Mashing Procedure:
Add approximately two gallons of water at 129°F to the grains to hit the first strike temperature of 122°F. Hold for 15 minutes. At the end of this time, draw off about 40 percent of the mash into a separate pot, leaving as much liquid behind as possible.

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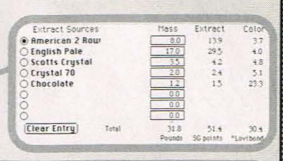

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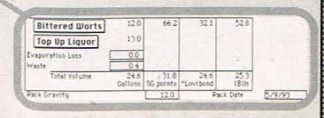

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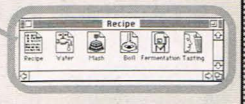

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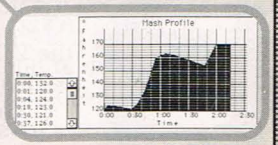

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CIRCLE 19 ON READER SERVICE CARD

While maintaining the temperature in the main mash at about 122°F, raise the temperature of the decoction mash by about 5°F per minute to 155°F, stirring constantly. The mash you moved to the decoction pot was fairly thick and dry, but there is water bound up by the starch that will be released when heated. If it is still a little dry, add additional water to make stirring easier and to help avoid scorching the grain on the bottom of the pot.

Hold the decoction mash at this temperature for five minutes, then again raise its temperature by about 5°F per minute until boiling, stirring constantly. Once the mash is boiling constant stirring is not as necessary, but stir it occasionally to make sure the entire mash is cooked thoroughly. Boil for about five minutes.

At the end of this time, remove the decoction mash from the heat. Begin adding it back to the main mash a few cups at a time, stirring thoroughly between additions to distribute the heat uniformly. When about three-quarters of the decoction mash has been added back, begin monitoring the temperature. When it reaches 155°F, discontinue adding the decoction mash back to the main mash. Set the remainder aside until it cools to about 155°F, and then add it back to the mash.

Test for conversion with iodine by placing several drops of the mash, with no visible particles of grain or husk, in a small puddle on a white porcelain dish (Corning Corelle works well and doesn't stain) and letting it cool. Then, placing a drop of iodine into the middle of the puddle, observe any color reaction along the edge of the iodine. If you observe the colors blue or black, then there's still starch in suspension and the mash needs to continue. However, if brown appears or there is no color change, then it's safe to prepare for sparging.

If you're not using a combination mash/lauter tun, transfer the mash to the lauter tun. In either case thoroughly stir the mash and let it settle for 10 minutes before initiating the sparge. Collect seven gallons of wort. You can be testing the specific gravity and tasting the sweet wort. Discontinue the sparge when the specific gravity of the runoff drops below about 1.010 or the taste reminds you of warm tea (an indication that tannins are being extracted from the husks). If this happens before you've collected the entire seven gallons of wort, just use plain water to make up the difference.

Boil the wort for a total of 90 minutes, adding hops per the schedule indicated. Before beginning to chill the wort, reserve two quarts of wort for later use in priming the beer. You can use sanitized mason jars for this purpose, which you'll then store in the refrigerator.

Chill the remaining wort to about

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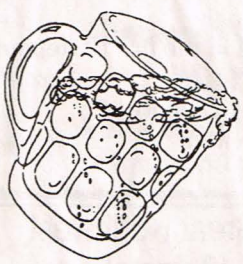

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CIRCLE 3 ON READER SERVICE CARD

70°F and then pitch the yeast. Transfer the fermenter to a 45°F refrigerator for three to four hours after pitching and ferment for seven to 10 days, then transfer to a secondary fermenter.

When the beer is clear (about two to three weeks), rack it to the bottling bucket into which the reserved priming wort has been poured. Bottle as usual.

RECIPE

Triple Decoction Bock

For the next brew, a Bock, we'll hold the boil for a bit longer, resulting in a greater degree of darkening of the beer and a correspondingly greater degree of maltiness in the flavor profile.

We're going to proceed to a more advanced recipe this time with a triple decoction-mashed Bock. This beer can be brewed with chocolate and crystal malts to add color and character, but we're going to rely on three different decoctions to accomplish this. The result will be a true-to-style German Bock beer, and although the mashing schedule seems very involved, it's no more difficult than performing a single decoction; you're just doing it more often.

Traditional German Bock
(Recipe for 5.5 gallons)
1.50 Hours Boil

Grains:
6.50 lbs. Pilsner
2 lbs. Pilsner, Toasted in 350°F oven for 15 minutes
4 lbs. Munich Dark

Hopping Schedule:
1 oz. Hallertau Tradition, 5.80% alpha, 60 min.
.25 oz. Hallertau Tradition, 5.80% alpha, 20 min.
.25 oz. Tettnanger, 3.80% alpha, 20 min.
Technical Specifications:
OG: 1.065 - 1.073

Decoction mashing presents no disadvantages other than the extra time required to do the job right, and that extra amount of time will not be significant once you've done it a couple of times.

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CIRCLE 52 ON READER SERVICE CARD

FG: 1.008 - 1.014
Alcohol: 6.7 - 8.5% by volume
Yeast: Wyeast Bavarian (W2206)
Acid Rest: 95°F
Protein Rest: 122°F
Conversion Rest: 155°F
Mash-out: 170°F

Mashing Procedure

Note: We'll leave some of the details out here, having already covered them in the prior recipe.

Add approximately 3 1/4 gallons of water at 99°F to hit the first strike temperature of 95°F. Hold for 15 minutes. At the end of this time, draw off about 40 percent of the mash into a separate pot, leaving as much liquid behind as possible. Maintain the temperature of the rest mash during the decoction.

First Decoction

Raise the temperature slowly, about 5°F per minute, to 155°F. Hold for five minutes, then raise the temperature quickly to boiling. Boil for 30 minutes, stirring occasionally. Then transfer the boiled mash to the rest mash two cups at a time, until the rest mash is at the next strike temperature, 122°F. Set any remaining decocted mash aside until it cools to 122°F, then stir it into the mash. Let the mash rest for 15 minutes, then proceed to the second decoction.

Second Decoction

Again draw off about 40 percent of the mash, leaving behind as much liquid as possible. Raise the temperature 5°F per minute to 155°F, hold for five minutes, then raise the temperature quickly to boiling. Boil for 30 minutes. Transfer the boiled mash to the rest mash two cups at a time until the rest mash is at the next strike temperature, 155°F. Set any remaining decocted mash aside until it cools to 155°F, then stir it into the mash.

Let rest for 15 minutes, then proceed to the third decoction.

Third Decoction

In this decoction instead of boiling the thick part of the mash, we'll be boiling the liquid part of the mash. Draw off 40-50 percent of the liquid and bring it quickly to a boil. Hold for at least 30 minutes.

Test the rest mash for conversion with iodine as described above, then add the decocted liquid back to the rest mash until the mash-out temperature of 170°F is reached. Set any remaining liquid aside until it cools to 170°F, then stir it back into the mash.

There are two reasons we're boiling the liquid at this point:

1) That's where the sugars reside now, so boiling the high-gravity liquid will contribute greatly to maltiness and color by caramelizing some of the sugars in the liquid.

2) Since we're no longer concerned with preserving the amylase enzymes now that conversion is complete, it's to

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CIRCLE 33 ON READER SERVICE CARD

our advantage to disable them. That way the dextrins in the mash, which contribute to body and head retention, aren't further converted into fermentable sugars, resulting in a thin beer.

Let the mash rest at the mash-out temperature for 10 minutes, then transfer to the lauter tun if a combination mash/lauter tun isn't being used. In either case thoroughly stir the mash so the heavier husks settle out and form a well-stratified filter bed.

Proceed with the sparge, stopping when you've collected seven gallons of wort or when the specific gravity of the runoff drops below about 1.010 or the taste reminds you of warm tea (an indication that tannins are being extracted from the husks).

Boil the wort for a total of 90 minutes, adding hops per the schedule indicated. Reserve two quarts of wort for later use in priming the beer.

Chill the remaining wort to about 70°F and pitch the yeast. Transfer the fermenter to a 45°F refrigerator for three to four hours after pitching and ferment for seven to 10 days, then transfer to a secondary fermenter.

When the beer is clear (three to five weeks), rack to the bottling bucket into which the reserved priming wort has been poured. Bottle as usual.

Is It Working?

As in the single-decoction mash, when you remove the mash to be decocted it's important to make sure that you leave as much liquid behind as possible.

With the exception of the last decoction, you'll again observe that the mash becomes much more liquid after a brief stop at 155°F.

The last decoction, since it involves a high-gravity liquid, is likely to boil over unless you maintain strict control of the heat, just as any wort boil is subject to boiling over.

As mentioned before, some of the sugars that were converted during the brief conversion time in the decoction boil are caramelized, which will darken the resulting brew in proportion to the length of time the mash is boiled. Thirty minutes of boiling time will result in noticeable darkening, and significant additional maltiness will be contributed to the resulting beer.

A Final Note

If you decide to perform decoction mashing in a future brew, do yourself a big favor: don't pass judgment on how much longer it takes to mash this way versus the infusion mash. Just like everything, it takes practice to learn how to do the mash efficiently and performing more than one task concurrently. By overlapping tasks you can shorten the time required to mash in this manner, and a single-decoction mash shouldn't take any longer than a temperature program mash.

So... give it a try!

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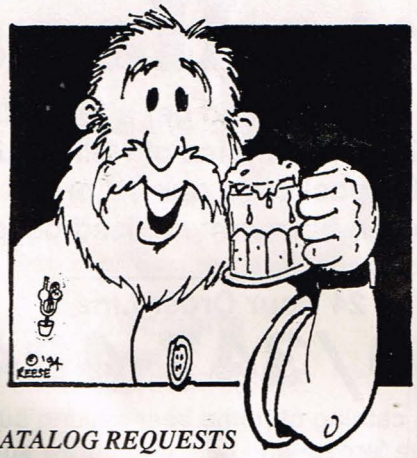

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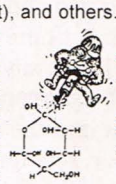

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CIRCLE 26 ON READER SERVICE CARD

A LITTLE MATH

Let's say you're in the middle of a decoction mash and it's time for the first temperature raise.

How much do you boil?

The recipe says take about 40 percent and then use only what's needed. You're exacting, however. You don't want to leave anything to chance. You want a number.

Fortunately, there's a simple mathematical answer to the question: How much mash do I need to boil to change my mash temperature?

You don't have to know this formula to have a successful decoction mash, but it may come in handy. If you're an engineer by trade or you tend to scribble equations when you doodle, read on.

To determine the percentage of the mash you need to boil, start by assuming that the mass of the rest mash multiplied by its necessary temperature change will be equal to the mass of the decoction multiplied by its temperature change.

This assumption leaves out the specific heats of the rest mash and the decoction. Although slightly differnt, omitting these terms doesn't cause large errors. It does favor undershooting your target by a hair when boiling a thick decoction and overshooting by a bit when boiling a thin decoction. These little differences can be figured in as fudge factors once you get a feel for them.

FOR EXAMPLE

If you heat your mash from 50°C (122°F, but we need to use Celsius or Kelvin in the equation) to 67°C (152.6°F) by boiling part of it, the question is how much to boil.

We'll call the mass of the decoction "X" and measure it as a percentage of the total mash volume; therefore, the rest mash must be "100 - X," since the total mash represents 100 percent.

Multiply the rest mash mass (100 - X) by the temperature change (67 - 50), which will equal the decoction mass (X) multiplied by the temperature change (102 - 67).

$$(100 - X)(67 - 50) = (X)(102 - 67)$$
$$(100 - X)(17) = (X)(35)$$
$$1700 - 17X = 35X$$
$$1700 = 35X + 17X$$
$$1700 = 52X$$
$$1700/52 = X$$
$$32.7 = X$$

SOLUTION

We need to boil 32.7 percent—about 1/3—of our mash to increase the tempertaure from 50°C to 67°C.

This same expression can be used to calculate the decoction volume required to cause any temperature change desired, simply plug in the numbers for your mash's current and desired temperature and follow the steps.

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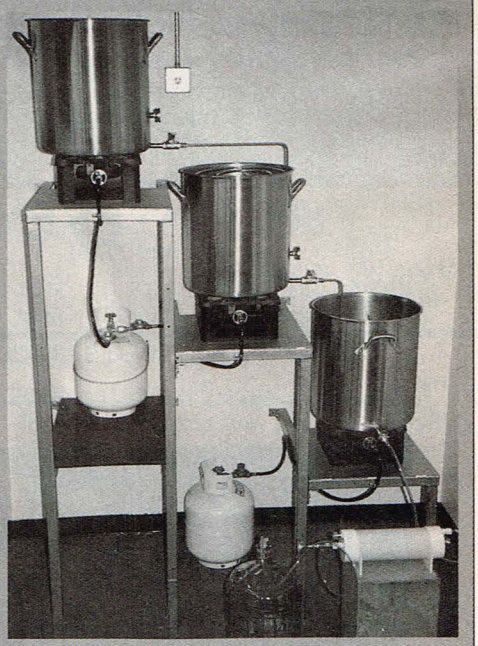

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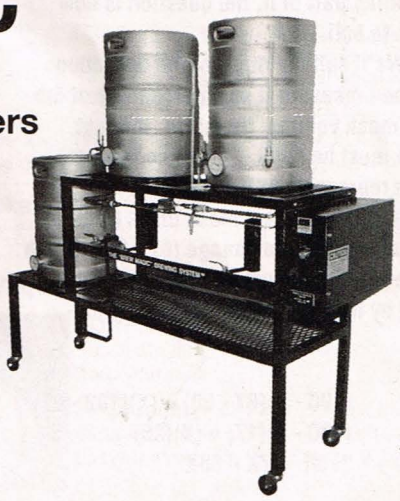

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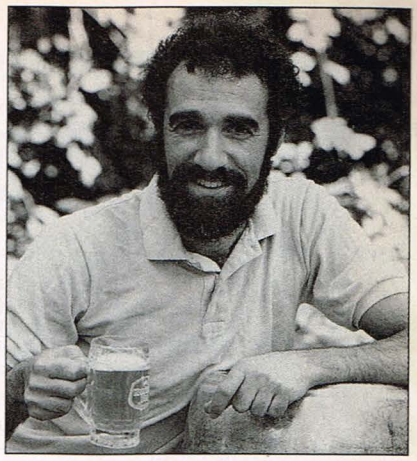


ASSOCIATION OF BREWERS PHOTO

Charlie Papazian:

Still Brewing After All These Years

by Kathy Kincade

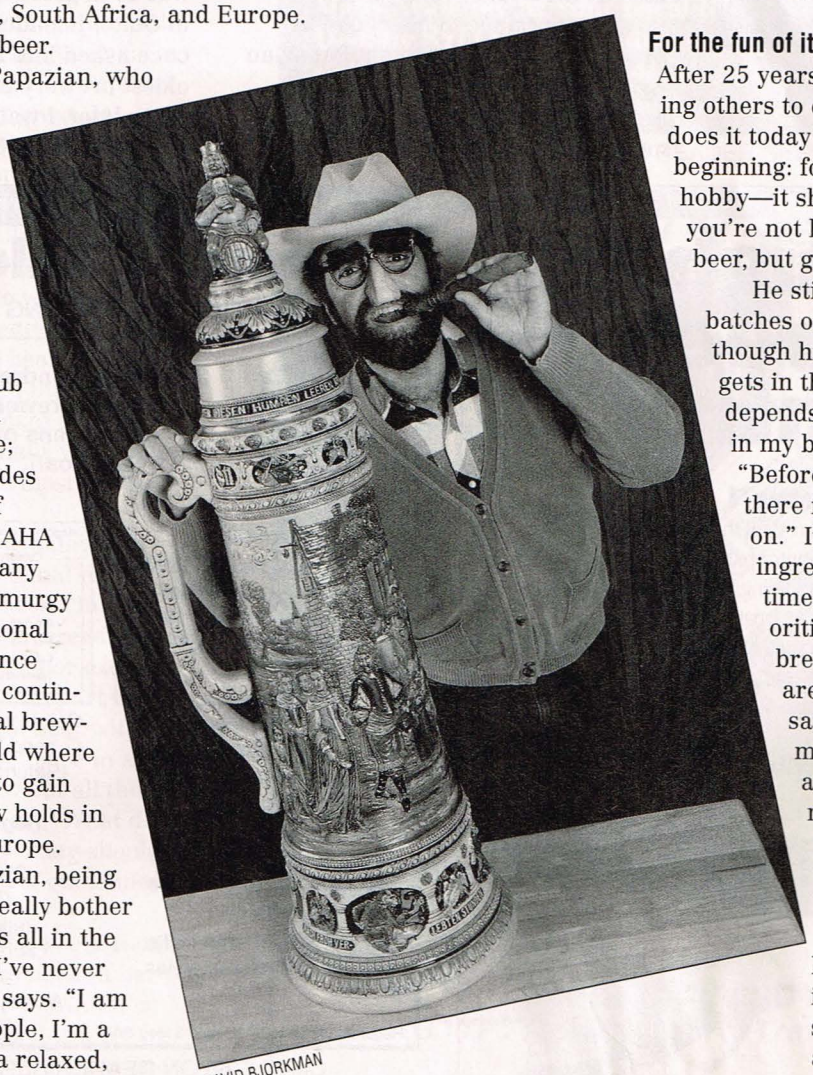
His voice is soft, his manner calm. In fact Charlie Papazian is amazingly mellow for someone with his schedule. Before the snow even begins to melt this spring in the mountains outside Boulder, Colorado—home of the American Homebrewers Association (AHA), which Papazian founded in 1978—he will have traveled to Brazil, Japan, Southeast Asia, South Africa, and Europe.

All in the name of beer.

Some people call Papazian, who has been crafting his own beer since 1970, the guru of homebrewing. He has written and published numerous books and articles on the subject; taught classes and given lectures on brewing at club meetings, schools, and conferences worldwide; founded and still presides over the Association of Brewers (of which the AHA is a division) and its many activities, including Zymurgy magazine and the National Homebrewers Conference and competitions; and continues to educate potential brewers in parts of the world where homebrewing has yet to gain the hobby status it now holds in the US and much of Europe.

According to Papazian, being called a guru doesn't really bother him, but he believes it's all in the eyes of the beholder. "I've never called myself that," he says. "I am who I am. To some people, I'm a bastard; to others I'm a relaxed, homebrew-kind-of-guy." Still others, he says, call him a "pie-ro-maniac"; besides beer and traveling, his passions include pie—apple, berry, banana cream, you name it. He even founded National Pie Day, January 23.

But no matter how people perceive him, says Papazian, "I'm just a homebrewer. I'm happy with who I am and what I brew and why I do it."



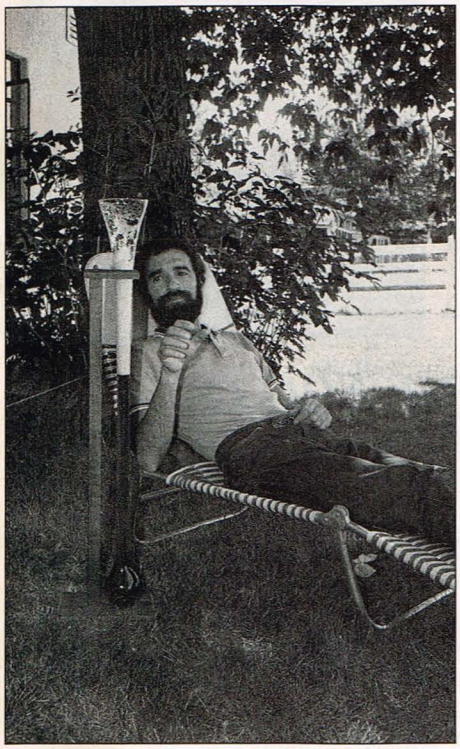
DAVID BJORKMAN

For the fun of it

After 25 years of brewing beer and inspiring others to do the same, the reason he does it today is the same as it was in the beginning: for the fun of it. "It's a hobby—it should be fun," he says. "If you're not having fun, you can still brew beer, but get yourself another hobby."

He still brews regularly—about 20 batches of beer and mead a year—though his busy schedule sometimes gets in the way. What he brews depends on "what I have the least of in my basement stash," he says. "Before I start brewing, I check there first and see what I'm low on." It also depends on what ingredients strike his fancy at the time. "Homebrewing is about priorities, and I believe that each brewer's style reflects what they are most interested in," he says. "My priorities are experimenting with new ingredients and trying new recipes. I'm not a gadgets or yeast kind of guy—I'm more of a malt-and-hops and trying-out-new-balances kind of guy."

In fact, he says, his homebrewing set-up is nothing sophisticated or expensive—just stainless-steel pots and plastic buckets. "I brew in my kitchen using the basic



ASSOCIATION OF BREWERS PHOTO

principles and systems. Except when it's hot—then I brew on the back porch with a propane burner."

Even so, Papazian says, he admires people like Al Andrews—a member of the Maltose Falcons in Riverside, California, who Papazian calls the first real "gadget guy"—as well as those individuals who have worked to upgrade homebrewing technology with all sorts of equipment innovations. "We have really progressed over the last 20 years in improving the quality of home brewing," he says. "And because of these improvements, our beer continues to improve as well. In fact the better the suppliers and the supplies, the better the product gets. We can always go back to Prohibition beer, to really cheap beer, but that isn't what we want."

My priorities are experimenting with new ingredients and trying new recipes.

Beer on the beach

In the preface to his book *The Home Brewer's Companion*, Papazian writes: "Homebrewing has been responsible for many inspirations in my life." In addition to the AHA and Zymurgy, he says, homebrewing has inspired friendship, love, romance, and more than a few journeys. "I remember one trip I took, to Regensburg, Germany, in 1985, just because I was interested in rye beer," he says. "Back then, the only brewer making rye beer was in Regensburg." He also traveled to Quito, Ecuador, because someone once asked him if he knew where the oldest brewery in the world was. "Five years later, I went there," he says. "It was built in 1530, in a monastery, and

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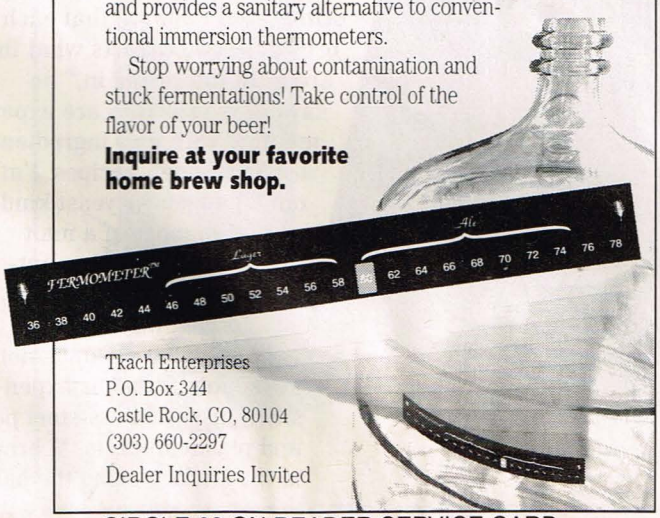

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it was still operating in the late 1960s. It's now a museum."

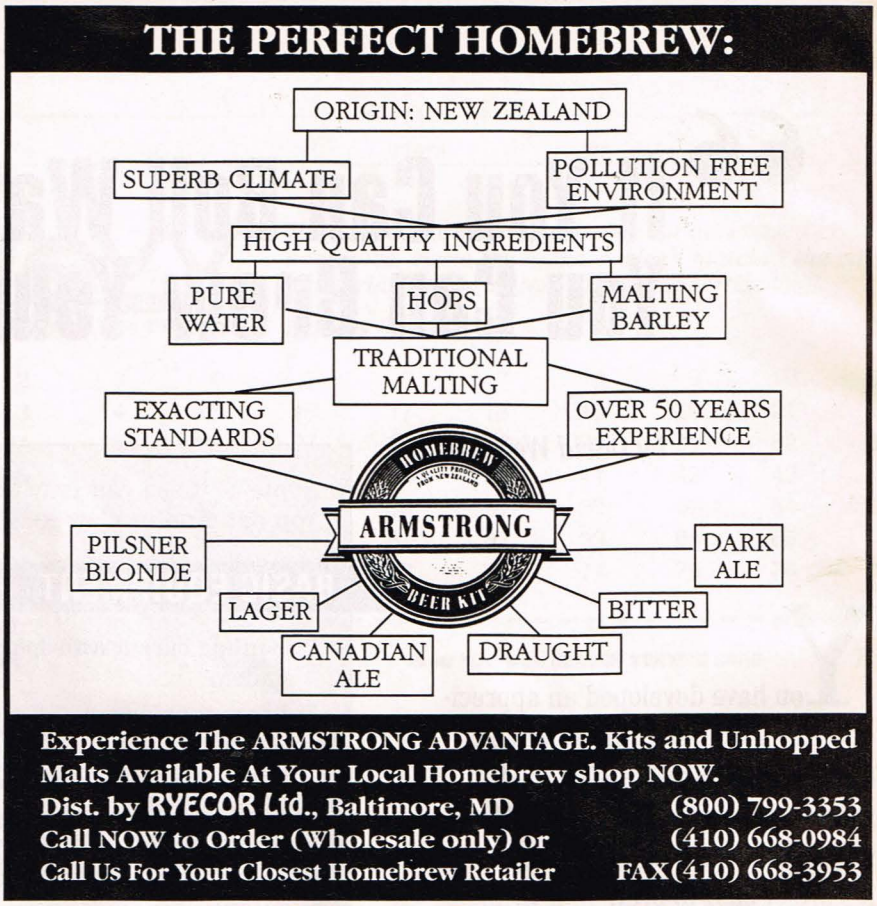
These days, many of his travels are inspired by his desire to both teach and learn. Despite the homebrewing "explosion" that has occurred in the US over the last few years, "it's not just Americans who are interested in brewing good beer," he says. "There is this network of people all over the world who are trying to understand what's going on in brewing these days. So I visit breweries, go to conferences, give seminars, meet other brewers and enthusiasts, judge some competitions...And I've found that what we can learn about other cultures can help us improve our beer and brewing here in the US."

Occasionally, he says, he does get to hang out on the beach and simply enjoy a beer without having to talk about it or think about it. For example, during a recent visit to Southeast Asia he sampled many local beers. "In Hue, Vietnam, I drank a Hue Imperial Stout, which was really great. In Bangkok my favorite was a German helles-style beer at a brewpub that opened a few months ago. And on the beach in Southern Thailand—well, it was just a cold beer."

Does beer make the world a better place? "Absolutely, unequivocally," he says, laughing. "I have been all over the world and have seen that when people enjoy beer, it makes for a better atmosphere—especially when it is used responsibly, which most people do."

All in all, whether drinking beer or brewing it, "people should make their own choices," he says. "In fact, the neat thing about homebrewing is that it's all about choice." For example, he says, "There is a real art to blending certain styles of beer with certain types of food. But once in a while, you have to throw out all the philosophical stuff and say, 'What do I really want?' The whole thing should be approached in terms of guidelines, not rules. I don't like rules."

He chuckles, and his voice softens again. "But you sure can't beat a barley wine around the fire in winter, or a mead on the beach when you're watching the moon rise with someone special." ■



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CIRCLE 34 ON READER SERVICE CARD

"If You Can Boil Water, You Can Brew Your Own"

by David Weisberg

You have developed an appreciation for good beer. And you liked the few homebrews you've tried from your neighbor next door. Now what? Like to know a little secret? It's pretty easy to brew your own. Here's a quick overview of the equipment, ingredients, and brewing process for the first-time homebrewer.

Some of these you may already have in your kitchen. The others you can find in your local homebrew store.

BASIC EQUIPMENT

1. Fermenting bucket (food-grade white plastic, 5-6 gallon)
2. Bottling bucket with spigot attached (food-grade white plastic, 5-6 gallon)
3. Large canning pot, 4-7 gallons (coated steel or stainless steel—avoid aluminum)
4. Bottle capper (two-handled type is most common)
5. Rigid siphon tube or cane (2 feet) with tip (attaches to siphon hose)
6. Flexible siphon hose (4-6 feet)
7. Floating thermometer (temperature range 40-240°F)
8. Large spoon (wooden, plastic, or stainless steel)
9. Bottle filler (attaches to bottling bucket spigot with a short piece of tubing)
10. 2-4 cases of empty bar bottles (refillable, strong glass—no twist-offs)
11. Plastic airlock device (half-filled with water, allows carbon dioxide to escape and keeps oxygen out)
12. Miscellaneous: can opener, colander/strainer, rubber gloves, sauce pan, 1 quart measuring pitcher, bleach (unscented), B-Brite cleanser

If possible, try to have equipment reserved just for brewing. This way your first brew won't have pieces of last night's stew floating in it because you used the same large pot to boil your brew.

BEER INGREDIENTS

Even though beer tends to be this magical mixture, the basic ingredients are really down to earth.

1. Water. Spring water or well water is the best to use. If you have chlorinated city water, you may want to pre-boil three gallons the night before. Then let it cool covered overnight. The pre-boiling gets rid of any chlorine present in the water.

2. Malt extract. This comes in dry and liquid forms. Malt extract is basically a sugar called maltose, which is created by converting (mashing) malted grains (i.e. barley, wheat, etc.) from starch to sugar.

Do you remember as a kid eating chocolate malted balls? Well that was chocolate coated maltose—the main ingredient in beer! No wonder you like beer so much.

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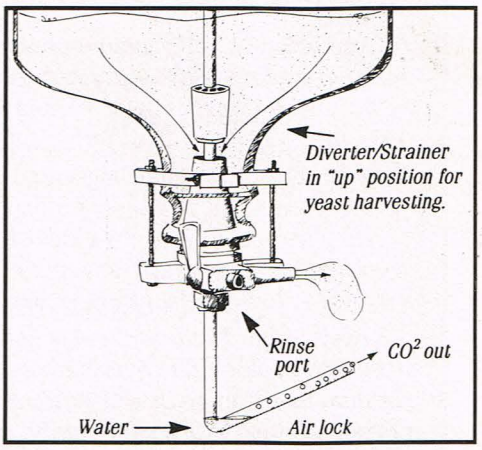

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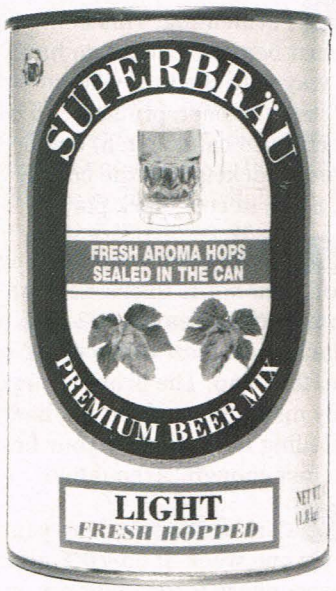

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BEER INGREDIENTS

3. Hops. Although beer existed for thousands of years without hops, you'll find it is the hops that makes a beer bitter and gives it the flowery aroma you come to expect in a good beer.

You will add different amounts (usually 1/4 to one ounce at a time) of different strength hops (rated in Alpha Acid Units, a low bitterness level is 3 AAU; high is 13 AAU) into your brew at different times during the boil.

4. Yeast. This mysterious ingredient was originally called "god is good." You will soon agree god is good after brewing several of your own batches. These microscopic living yeast beasties will eat (metabolize) malt sugar and then produce carbon dioxide and alcohol.

Even in the 1500s yeast was not understood. It was not even considered one of the ingredients in beer in the German Beer Purity Law of 1516. Beer to the early brewers just seemed to start fermenting on its own.

5. Priming sugar. Usually corn sugar is used (3/4 cup per five-gallon batch) to carbonate your homebrew. This is added to your beer when you are siphoning (also called racking) your brew into the bottling bucket.

Now that you have a handle on the equipment and ingredients, let's move to the fun part—BREWING!

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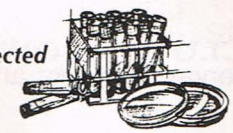

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THE BREWING PROCESS

Brewing your beer is the process of boiling the ingredients, cooling, adding the yeast, fermenting, bottling, carbonating, and aging. To brew your beer implies the whole process, not just the boiling part. Now here's the nitty gritty.

1 Cleaning and sanitizing. You need to clean any equipment that comes in contact with your precious brew. Then you need to sanitize the equipment.

For cleaning use B-Brite brand of powder cleanser, then rinse with hot water. For sanitizing use a weak bleach solution of 1 teaspoon to five gallons of water. Then soak everything for 15-20 minutes, drain, and shake off the excess sanitizer. No need to rinse; any chlorine drops will be negligible.

2 Boiling. You will start with 2.25 gallons of water. Boil. Add the ingredients at different times depending on the recipe you're using. Boiling lasts 30-60 minutes.

3 Cooling. Before you can add the yeast, the temperature must be below 70-75°F. Just add three gallons of starting-to-freeze water to your plastic bucket (fermenter). Then carefully ladle (with a sanitized saucepan) the unfermented beer into the bucket.

4 Fermenting. This is where the yeast beasties can get to have their way with the lovely liquid wort (unfermented beer, pronounced *wert*). You add (also called pitch) one or two dry yeast packets into the cooled wort. Store in cool, dark place.

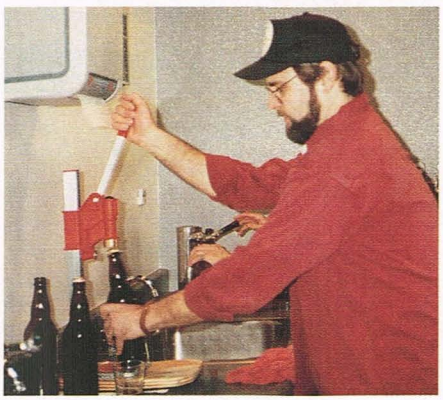
5 Bottling. Use your bottling bucket, with bottle filler attached, to fill your bottles. Leave a 1/2-inch to one-inch headspace at the top of each bottle, then cap. The priming sugar (gently mixed throughout the beer in the bottling bucket) gives your first batch just enough carbonation.

6 Carbonating. Storing your beer for one week at 65-70°F allows a mini-secondary fermentation to create carbon dioxide in your beer. Drink

one homebrew after one week. If it's still not carbonated, wait another week and try again.

7 Aging. Although you probably don't have a beer cellar (yet!) you should store your beer in a cool closet or down in the basement. 50-60°F is optimum. As your homey ages, it becomes smooth. Give it two to three weeks to properly age.

8 Drinking. Need we say more. Always pour your homey into a tall, clean glass. Your precious brew doesn't deserve to be swigged from the bottle.



DAVID WEISBERG PHOTOS

Remember to stop pouring your homebrew when you see yeast sediment just starting to flow out.

Although the yeast is rich in Vitamin B, it gives your homebrew a cloudy and yeasty taste. Some homebrewers will drink the yeast in the bottom separately. It tends to ward off evil headaches caused from drinking alcohol.

Good health and enjoy!!

First-time homebrewer's biggest problem? Not brewing the second batch soon enough. Your first batch will go so quickly, you will have wished you started earlier.

David Weisberg is author of 50 Great Homebrewing Tips *(Lampman Brewing Publications).*

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A Cookstove, a Wort Chiller, and LOTS of Carboys

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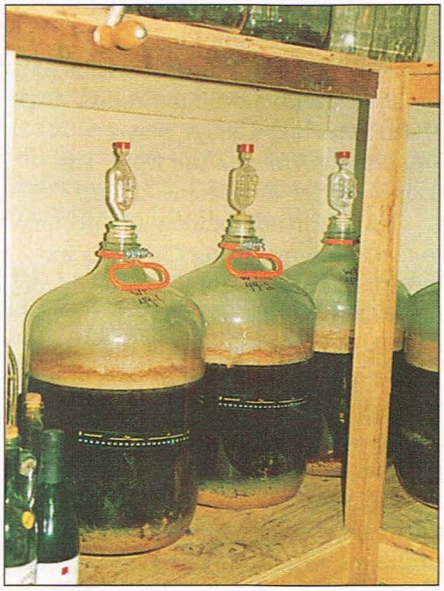


STEVE JOHNSON

Looking good enough to drink...almost, the brew in three of Tim Wilson's 499 carboys inches toward tap time.

Meet Tim Wilson, owner, brewmaster, official taster, and keg washer at the smallest commercial brewery in the United States. How small? In 1994 Tim brewed a grand total of 81 barrels. That's 167 15 gallon batches, each batch divided into three carboys . . . let's see, that adds up to about 500 carboys of beer. Actually, 499—a full one came tumbling down and broke.

Just one question: Is Tim Wilson a masochist or just plain crazy? Answer: neither. Tim and his wife Sally owned a historic bed and breakfast in Norwich, Vermont, and Tim wanted to add a brewpub. With five years of homebrewing experience under his belt, he thought he had the expertise to pull it off. Problem was, he just didn't have the capital to buy the equipment, and although he was on good terms with the local bank, he didn't want to go too deeply in debt.

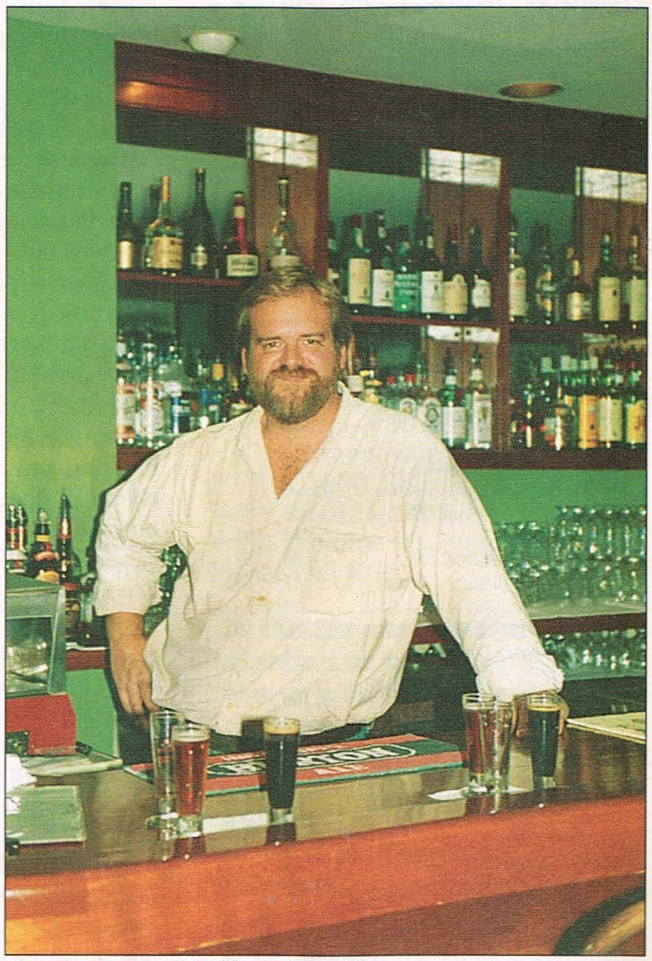
Tim found the solution in a homebrewers' magazine—an ad for a top-of-the-line homebrewing system from Pico Brewing Systems in Ypsilanti, Michigan. It would produce 15 gallons of beer at a time and cost under $900. Tim spent another $1,100 for a milk cooler, carboys, kegs, inventory, and other odds and ends. Six months and a total of $2,000 later, Tim was in business.

The ales are served at a charming little pub called Jasper Murdock's Alehouse in the rear of the Norwich Inn. The inn was built in 1797 by Jasper Murdock, a land owner who served as a colonel in the Revolutionary War. Murdock began taking in guests, and the mansion served as a coach stop. The inn has been in continuous operation, except when it was being rebuilt after a fire. That was in 1889-90—it burned to the ground and was rebuilt in the Victorian style by then-owner Dr. Bowles.

Legend has it that during the 1920s, the innkeeper's wife, Ma Walker, bootlegged out of the cellar. Although her body lies moldering in the ground, her spirit has stayed on. Many guests have reported hearing footsteps at odd hours and other supernatural phenomena. So if you want to spend a haunting evening with some fresh ale, the Norwich Inn is the place for you—rooms range from $69-99.

Before lunch or dinner, guests at the inn pass the time in the pub, trying out Tim's wonderful brews and mingling with local beer lovers. He usually has three ales on tap at a time. Tim has chosen colorful names for his offerings, picked from local history and legend. They have included Jasper Murdock's Extra Special Bitter (Tim's favorite), Old Slippery Skin, Whistling Pig Red Ale, Stackpole Porter, Short and Stout, Elijah Burton Mild Ale, Dr. Bowles' Honey Elixir, Heifer Vice (a Bavarian wheat beer for the summer), Wassail (at Christmas) and several others. The Wassail (oringial gravity 1.077) was a raspberry stout in which 40 pounds of fresh raspberries were used in only 30 gallons of wort.

Tim serves up the ales from five-gallon Cornelius kegs. He says that



STEVE JOHNSON

Brewmaster and publican Tim Wilson serves inn guests and visitors his latest creations.

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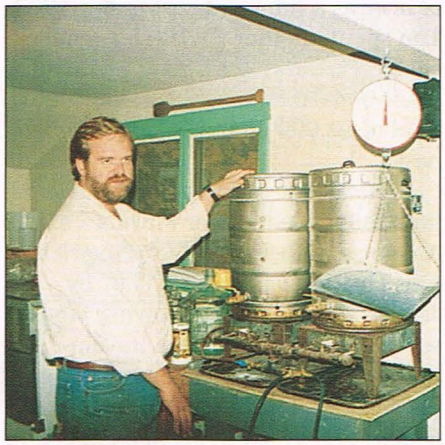
even though the beers are unfiltered, he did not have to modify the draw tube that runs to the bottom of the keg. The cold conditioning, the use of gelatin finings, and the fact that Tim claims to be a world-class siphoning expert have reduced the amount of



STEVE JOHNSON

Tim Wilson brews the old-fashioned way...on the stovetop in his kitchen.

trub in the keg to a minimum.

With such small quantities available at a time, Tim says he occasionally runs out of ale. Although others warned him that running out would spell disaster, Tim looks at it no differently than running out of, let's say, potato salad.

However, demand has risen to such a degree that Tim has finally purchased a larger system. He obtained a four-barrel brewhouse from Elliot Bay Manufacturing in Seattle and scrounged 25 pressure vessels for fermenting and conditioning from a biochemical firm that had used them for bioreactors (i.e., culturing). They range in size from 16 to 36 gallons. Production should begin with the new equipment by summer.

For the time being Tim is brewing in his home, a cottage converted from a chicken coop, behind the inn. The mash and brew are done in reconditioned 15.5-gallon stainless steel kegs on Tim's stove top. Because the pH of the local water supply is so high (7.0-8.0), gypsum is added to the mash. For most of the ales, he does a single-step infusion mash and sparges with 168° water during the mash out.

For three of the ales—Stackpole Porter, Whistling Pig Red Ale, and Short and Stout—he starts with a base of Munton & Fison malt extract, to which he adds specialty grains. All the other beers receive a full mash, using Munton & Fison pre-crushed, two-row pale malts and two-row specialty malts imported from England. The specialty grains are crushed with a Glatt malt mill, manufactured by Glatt Manufacturing, College Place, Washington. To cool the wort, Tim uses a copper immersion chiller.

Tim is a traditionalist and prefers to use leaf hops, using Chinooks for bittering for all of the ales. For flavoring and aroma he uses mostly imported East Kent Goldings and Fuggles. This may be surprising to fans of liquid yeast cultures, but Tim says he gets good results using dried yeast packets, which he rehydrates before pitching. He started out using the liquid yeast cultures but encountered problems with timing and low pitching rates.

He uses a single-stage fermentation (another surprise). The brew is split into three six-and-a-half-gallon carboys and ferments at 65° for five days. The wort is then chilled to 40° and conditions for two days before it is racked to Cornelius kegs. Tim composts the spent grains and uses them in his garden.

And speaking of gardens, last year Tim obtained some hop rhizomes from Fresh Hops and from a local grower. He now has 32 hop vines and expects to get his first full harvest this summer.

On my visit to the brewery in Tim and Sally's cottage, I became very fond of the two "ferocious" brewery watchdogs—Barley and Jasper Murdock—who alternated between sleeping and wrestling on the floor beside the carboys. This article is dedicated to the dog Murdock, who Tim says disappeared on Christmas day on a trip to Philadelphia.

Steve Johnson lives in Clemson, South Carolina, and is author of two brewery guidebooks: On Tap: A Field Guide to North American Brewpubs and Craft Breweries *and* On Tap New England. ■

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Panic, Stress, and Worry: My First Homebrew

By Rex Halfpenny

Oh sure, we all know the mantra: "Relax, don't worry, have a homebrew." But what if you don't have a homebrew to begin with?

I bought and read the books. They made it sound so simple. "Any idiot can do it. There are only four ingredients, and all it amounts to is boiling water." But I could also read between the lines. There are great natural forces working against you: invisible bacteria, airborne wild yeast cells, and contaminants that can render your effort undrinkable.

I knew temperature and timing were important, sanitation was critical, and boil-over probable. On top of all this, I had to contend with my panicking wife, the cook, whose kitchen was eminent domain. No wonder I was stressed.

In an effort to at least *look* like I knew what I was doing, I arranged all the components of my "deluxe" mail-order brew kit across the counter like a surgical table on ER. I couldn't even tell you what everything was, but it sure looked impressive.

Next to the equipment I placed the ingredients purchased with the kit, the directions—which *seemed* complete when I first read them—and a log to track my progress. Now I was ready for step one: sanitation.

In the laundry room I filled the plastic bucket with water. Should I use well water, softened water, or bottled water? I chose well water and added the unscented chlorine bleach. To this I added all the tools that would come in contact with the precious elixir and waited the prescribed 30 minutes. Actually, I waited 35 minutes just to be extra safe.

Then what? How do I get all this sanitized stuff out of the bucket, and where do I put it? I carefully washed my hands and pulled out the various utensils, laying them on clean paper towels. I worried about how clean my hands were, if the paper towels were clean enough, and cursed myself each time I happened to bump or touch something that was sanitized.

On to step two: the boil. The first problem was what water to use. Our well water is hard, so we have a water softener. Both have tiny little things suspended in them, so I opted for bottled water. Since I've read horror stories about bottled water purity and I had no idea about it's hardness, I added the salts that came with the kit and prayed for the best. Not knowing how much water was safe to place in the kettle, I held back 1.5 gallons.

I stirred in the dry malt extract and brought the kettle up to boil. I added hops as called for in the recipe and, at the end of the boil, added the last 1.5 gallons of water. To compensate for the addition of cold water, I added five minutes to the boil. I was trying to make five gallons of hot wort but had no idea how to do it. The 24 quart stainless steel pot seemed too small. Nothing I had read told me how much water to boil and when to add the rest of the water.

I knew I needed a rolling boil, but as the foam began to reach the rim of the kettle, my wife would force me to lower the heat. This was a source of some concern as the boil would be too much, then too low, then too much and so forth. On the positive side, this prevented any boil-over.

Step three was the cool down and rack. I did not know how long to immerse the copper wort chiller in the boiling wort, so I left it in for five minutes. If there was a question, five minutes was my answer.

Once the wort was cooled to 75°F, it was time to rack to the plastic bucket and pitch the dry yeast. Now I was really in a panic, because this is when all the nasties can infect your brew. In my urgency I was stymied by how to handle things, when to take a hydrometer reading and, most of all, how to use the siphon assembly. My hands were no longer scrubbed clean and my mouth, well, it's a mouth.

Yes, I brushed my teeth and used mouthwash, too. I even took a shot of straight vodka. After several attempts I got the siphon to work. I knew oxygen was bad, so I tried very hard to minimize air bubbles while stirring and racking. As I racked the wort I was concerned with whether or not to include the stuff floating on the top and the sludge settled at the bottom.

I set the bucket, OG 1.073, in the basement at 67° F. Gratifyingly, the yeast took off in spite of no aeration, which I later read was important.

Two days later I advanced to step four. Because my hands and mouth were all over the siphon assembly and I had to add half a gallon of water to top off the carboy, I felt sanitation was a hopeless cause. Feeling the batch was already ruined, I racked it to the carboy and topped it off with pre-boiled water. Back into the basement it went.

My instruction sheet called for the primary fermentation to take two or three days, but it was over in less than two. After racking it to the secondary, I expected additional activity, but all I observed was a steady stream of tiny bubbles rising to the neck of the carboy. I waited for this activity to stop. After four weeks of no change, I didn't know what to do. Insecure about the whole process and certain that I had screwed it all up anyway, I bottled the brew. The final gravity was 1.022.

It took me more than 12 hours to make 38 pints of beer. My notes at bottling says: "Good taste, no off flavors. Malty, pleasant aroma." Seven days later, when all was said and done, it really wasn't a bad bock after all.

So what was I worried about?

Do you have a brewing story (800 to 1,000 words) for Last Call? Send to: Last Call Editor, Brew Your Own, 216 F St., Suite 160, Davis, CA 95616 ■

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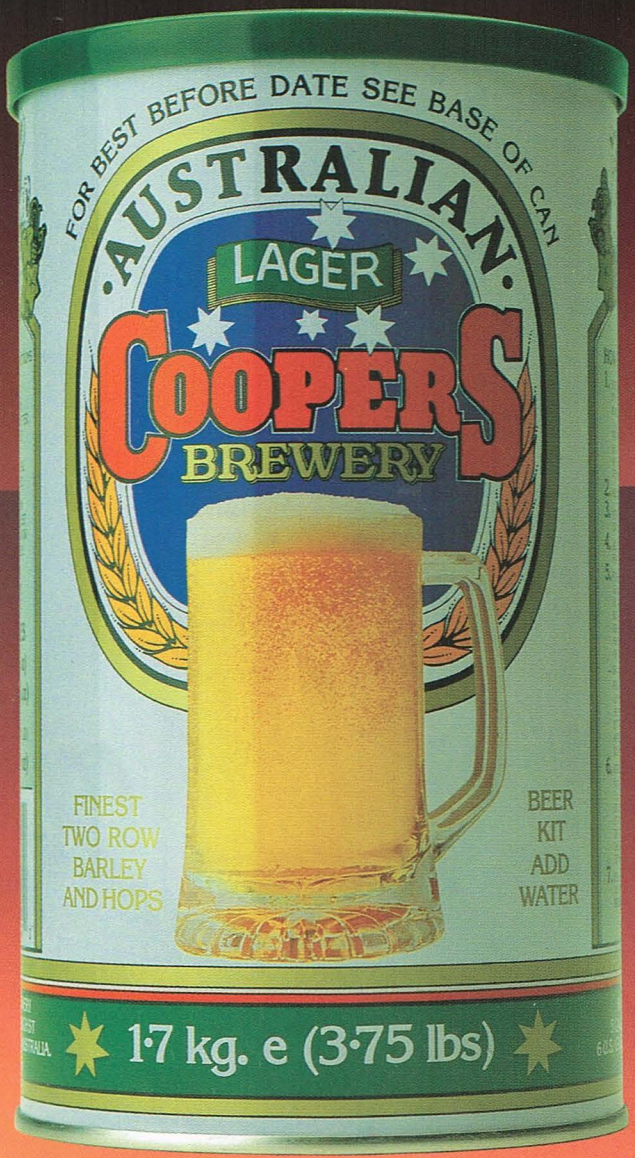

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