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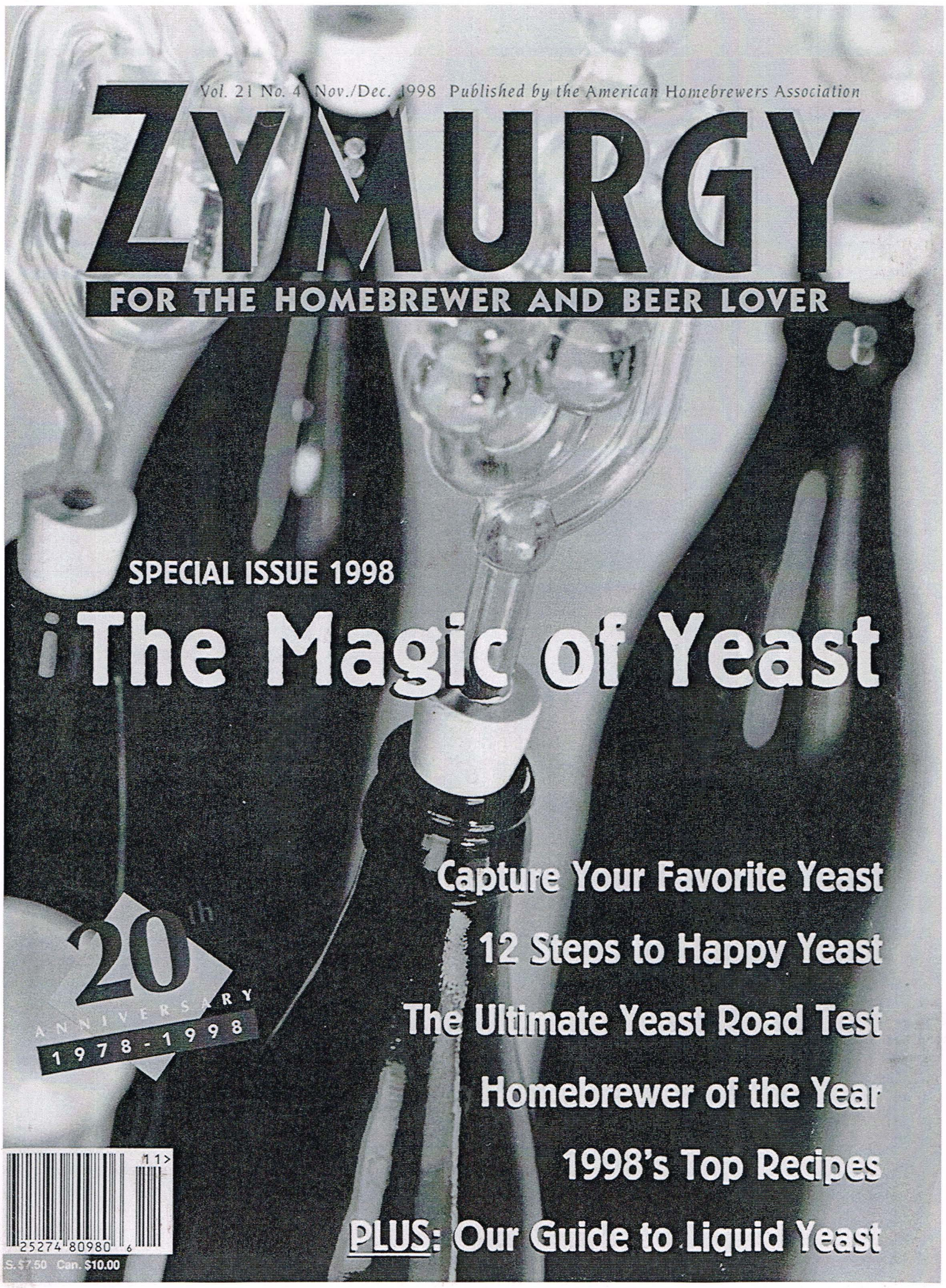
ZYMURGY

FOR THE HOMEBREWER AND BEER LOVER



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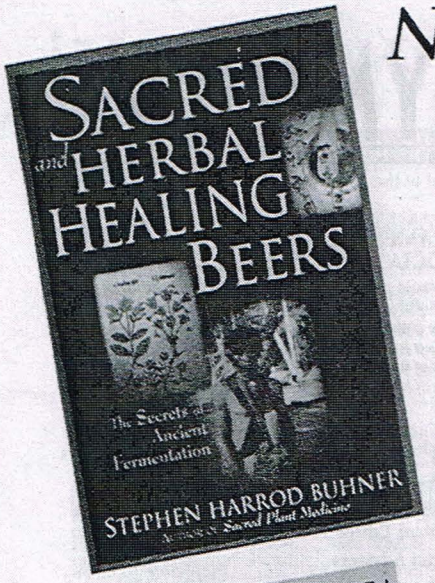

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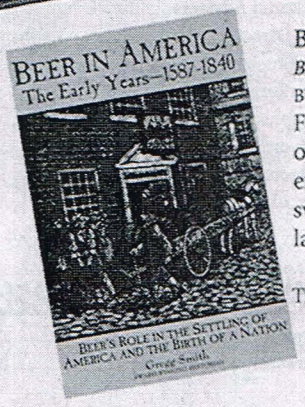

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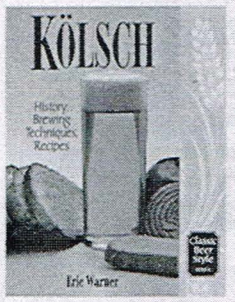

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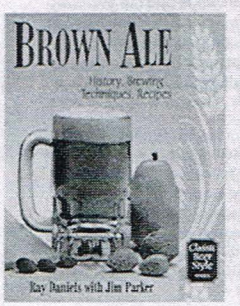

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FOR THE HOMEBREWER AND BEER LOVER

Journal of the American Homebrewers Association®

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To promote public awareness and appreciation of the quality and variety of beer through education, research and the collection and dissemination of information; to serve as a forum for the technological and cross-cultural aspects of the art of brewing; and to encourage responsible use of beer as an alcohol-containing beverage.

The American Homebrewers Association is a division of the Association of Brewers. Membership is open to everyone. ***Zymurgy*** is the journal of the American Homebrewers Association and is published six times a year. Annual memberships which include subscriptions (payable in U.S. dollars) are $33 U.S., $38 Canadian and $51 international. **Changing your address? Let us know in writing, please.**

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ZYMURGY®

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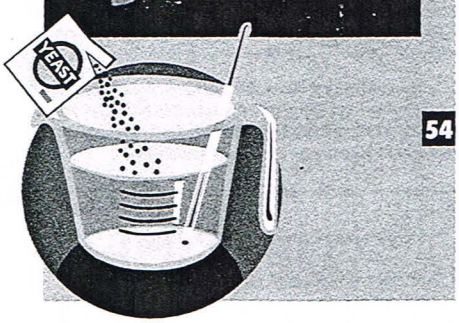
AHA
AMERICAN HOMEBREWERS ASSOCIATION

VOLUME 21, NUMBER 4



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COVER PHOTOGRAPHY BY BOB GOLDMAN

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IT'S THE BEER TALKING

Paul Gatza

Homebrewers are an opinionated lot. When you ask 10 homebrewers a question, you will usually get 12 different answers. If you ask what is the key to making great homebrew, you will get answers related to proper sanitation methods, the brewers' attitude while brewing and how you handled your yeast. Hops and malt are important flavor ingredients, but not nearly as important as using a good, clean yeast strain in abundance.

It has been nine years since ***Zymurgy*** dedicated the annual special issue to yeast and beer. Dry yeasts were readily available, but liquid yeasts were relatively new as a packaged item for sale to homebrewers. Many brewers would repitch on existing yeast beds, some would hit up their local brewery for a healthy quantity of good yeast and some would furtively gather cultures on their travels, store the yeast and step up the cultures when needed.

When I was a beginning homebrewer I was far more interested in the malt extracts and the different hops than I was in the yeast. I started to steep grains and that elevated my interest in brewing until I had experimented with every grain that my homebrew suppliers stocked. There remained a sameness in my beers, however, which did not go away until I started to investigate the various dry and liquid yeast strains that were available. I brewed frequently, approaching the annual 100-gallon legal limit of homebrew by about mid-February. It did not take long for me to use every commercially available strain in my area. I needed a new avenue of exploration for my brewing passion.

My local homebrew club, Hop Barley and the Alers, does a fund-raising auction

each year. When the offer came to bid on a yeast culturing session, I went for it. I learned to make my own wort-agar medium, how to grab yeast from a bottle of commercial beer and how to streak out yeast onto a petri dish with an inoculating loop. I even got to play with fire with the torch I used to keep petri dishes and slants sanitary. It was great fun. I later learned that my teacher learned from that special issue of ***Zymurgy***.

I gathered a collection of a dozen or so "plates" of yeast. When I "stole" yeast from a bottle, I felt connected to the outlaw nature of homebrewers. I stepped up the pure colonies into larger and larger volumes and my beers improved dramatically. I even learned to gather as much information as I could about the beers I cultured from. An example is a GABF-winning abbey ale that I cultured from the bottle only to learn that the abbey strain of yeast was filtered out and that a more common yeast variety was used in the bottle. I used my own cultures until the live yeast companies tripled the numbers of available strains. As I explored the new cultures, I let my petri dishes become "science experiments" in the back of my fridge.

This column is titled "It's the Beer Talking." Listen to the beer. It will tell no lies. When I look at my experience judging beers in competitions, I have to conclude that the quality of yeasts has improved dramatically. When I first judged five years ago, the majority of entries had yeast-related problems. The beers entered in today's competitions are better and the judging standards have risen accordingly. The live yeast companies are increasing the cell counts prior to packaging. Dry yeast companies have also made strides. During Charlie Papazian's Beer Evaluation Lab at the 1998 AHA Conference in Portland, a porter made with dry yeast was judged to be "world class" with a score of 45 out of 50.

Yeast and the fermentation byproducts of yeast can have significant flavor effects on your beer. Among these flavors are buttery (diacetyl), estery (fruits, banana, clove), phenolic (plastic) and cornlike (dimethyl sulfide). If these characters are undesirable components of your beer, look at your yeast management techniques. Sometimes lagering (an extended cold secondary or tertiary fermentation) can reduce these flavors and smooth out any rough edges in your beer.

I have several recommendations on selecting yeast. The first is to know what strains are conducive to your fermentation temperature. If your temperature varies seasonally, plan your brewing based on optimum temperature for certain styles and strains. Consider freshness of your yeast strain. Most liquid yeasts have a culturing date right on the package. Most dry yeasts have an expiration date on the package. The fresher the better. *(continued on page 85)*

PHOTO BY BOB GOLDMAN

DEAR ZYMURGY

Our Readers

Fear of Copper

Dear ***Zymurgy***;

I have been a homebrewer for almost a year now, and have gotten involved in kegging recently. I wanted to build a keg beer cooler as described on page 39 of the 1988 Special Issue of ***Zymurgy*** (Vol. 11, No. 4). The author recommended using copper tubing and I purchased the materials to build such a cooler. Then, to my dismay, I discovered that many knowledgeable people in the industry say that having copper contact fermented beer with CO_2 is a no-no.

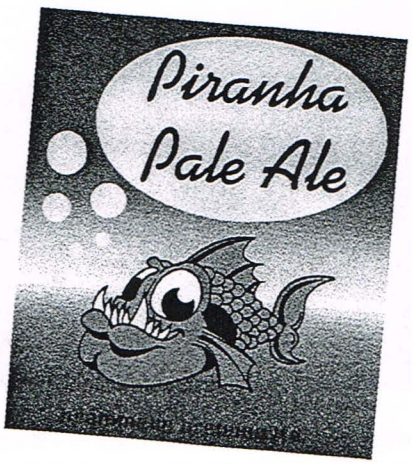
The problems I've heard about range from simply bad-tasting beer to poison to potential to cause an explosion. As someone with no chemical background, I'm in no position to evaluate what I've heard. I do find it hard to imagine that your technical experts would OK an article if its recommendations were potentially damaging.

I suspect that the time the beer spends actually in the coil is germane to the potential problem. Interestingly enough, the same type of cooler was featured in the August 1996 issue of *Brew Your Own* (page 27). I am also writing *Brew Your Own* to get their comments.

Please let me know if the copper tubing is safe to use with kegged beer. Your prompt response is very much appreciated. Keep up the good work with the magazine!

Sincerely,
Ed Dorn
Virginia Beach, VA

In fact, in 1994-95, the FDA ruled that copper shouldn't be used in conjunction with food supplies because of the danger of copper leeching into the food. However, since most breweries have some copper on their equipment, the BATF did a study of 185 beer samples and submitted the results to the FDA. Only one of those beers showed a leeching of copper—no explosions! Using copper tubing in a cooler is still common. Stainless is better, but the odds are that the copper won't have an effect on your beer. Interestingly enough, early brewers used copper brewpots, which darkened the brew. Early IPAs, for example, were much darker than the present microbrewed varieties.



Brit Beer Bread

Dear ***Zymurgy***;

In 1978, four years after retiring at 61, a friend and I founded a beer club devoted to traditional methods. It is still going strong (around 12 active members) and is now run by younger men—but I attend regularly and get yeast from the brewery. We are the North Cotswold Amateur Brewers.

I am writing particularly about Jeff Renner's article "Bread for Brewers" (***Zymurgy***, Spring 1997, Vol. 20, No. 1) as Alice's bread is as sought after as my beer. I enclose her recipe and method. She is my wife, of course, and taught me to bake bread in case of need. (I've not taught her the brewing process tho' as she doesn't care for alcohol.)

Alice's Bread Recipe

2	**lb strong brown flour (1/2 whole wheat & 1/2 white)**
2	**tsp salt**
2 or 3	**tbsp oil**
1	**handful sparged husks**
1	**handful malted barley**
1	**tbsp dried yeast**
1	**tsp sugar**
1	**pt of warm water (1/3 boiling, 2/3 cold)**

Put all dry ingredients into a bowl. Add worked yeast, sugar in water. Knead roughly and heavily (men do it best) until smooth. Mold and put to rise until twice size. The longer it takes the better the finish. I sometimes put it in a polyethylene bag in the refrigerator from morning until midday. I always put it to rise in a polyethylene bag which CO_2 balloons out. Mold to final stage by kneading again and putting in tins or on tray. Bake 20 minutes or so.

Cheers,
Herbert W. Hall
Cheltenham, UK

Thanks for the kind words, Herbert, and check out the spent-grain bread recipe in this issue. And remember, beer is far more than just alcohol...

LABEL COURTESY OF DAVE DRUMMER

The Amish Connection

Dear *Zymurgy*;

I have been a homebrewer since Thanksgiving of 1997. I have been doing experiments with barley malt that I buy at an Amish bulk food store. Barley malt is a light dry malt extract. They use it as a substitute for sugar and bread; I use it to make beer. It kinda smells like Budweiser, without the hops and yeast. And it makes damn good beer.

Good enough that Chris and Todd, presidents of the local brew club, suggested that I send this in.

Here's one of my best recipes and how to do it:

Mr. Cooper's Missouri Pale Ale

5	lb Amish barley malt
.5	lb pale malt (crushed)
1	cup 40° crystal malt
1.5	cup barley flakes
1	cup wheat flakes
.5	lb Amish corn syrup
.75	oz Chinook hops bittering
.5	oz Cascade hops pellets flavor
1	pkg Muntons ale yeast

Now to cook up the wort: in three-quart saucepan place grains with two quarts of water. Raise to boil, pour grain juice through wire mesh strainer into wort kettle. Put grains back in pan, add more water, boil again. This way you get all the goody.

Add one gallon of cold water to wort kettle and grain juice. Place kettle on stove to get hot. Place Chinook hops in foam cup with hot water, let pellets dissolve before going into the wort. When water is hot, add five pounds barley malt and corn syrup. Boil for half an hour. Dissolve the .5 ounce of Cascade pellets and put in during the second half an hour of boil for flavor.

Strain into fermenter, let cool, then add yeast. Let set in fermenter for two weeks. All my beers turn out so much smoother if I let it set for two weeks. This makes a light amber beer that has a very thick frothy head, and has a very satisfactory flavor.

The point being that Amish barley malt is well worth making beer. They also have

A Special
Thank You
from the AHA

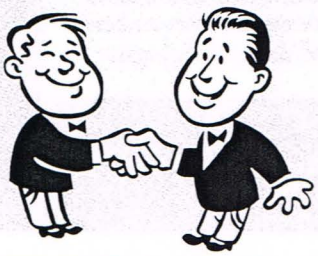
Running a national homebrew competition is a daunting task. It would be an impossible task were it not for the huge number of volunteers who make the National Homebrew Competition a reality.

The AHA sponsored eight first-round judging sites to collect, sort and host the judging of 3462 entries from around the world. Entries were made in 28 categories—24 for beer, three for mead and one for cider. The first round sites were Lowell, MA; Newton, MA (cider only); Atlanta, GA; Portland, OR; Grass Valley, CA; Shawnee, KS; Chicago, IL; Denver, CO; and Toronto, Ontario, Canada. We could not have pulled off the competition without the help of the many volunteers at each of those sites.

Special recognition goes to first round site directors Paul Correnty, Rick Lubrant, Noel Blake, Michael Williams, Alberta and Jackie Rager, Roger Deschner, Gary Gutowski, and Richard Oluszak. Also thanks also to the BJCP for judge support.

The top three finalists in the mead and beer categories from each site sent beers to the second round sorting location, Saxer Brewing Company in Lake Oswego, OR. Thanks to Steve Woolard, Ken Johnson and other members of the Oregon Brew Crew Homebrew Club for the help in the unglamorous tasks of unpacking, numbering and sorting beers. Second round, final round and best of show judging occurred prior to the 1998 AHA Conference in Portland, OR, at the end of July.

Again, every year we're reminded of what a tremendous undertaking this competition is. We can't thank all our volunteers enough!



barley flakes, corn syrup, wheat flakes, corn flakes, buckwheat groats and wheat bran. All very reasonable. Two pounds barley flakes only $1.79. Fresh and best quality. I might be wet behind the ears, but I know how to make good beer.

Sincerely,
Nathan Cooper
Sedalia, MO

You don't sound wet behind the ears to us. Of course, most of us don't have an Amish grocery store around the corner. Here at AHA World Headquarters in Planet Boulder, there's an organic food store or juice bar every hundred yards.

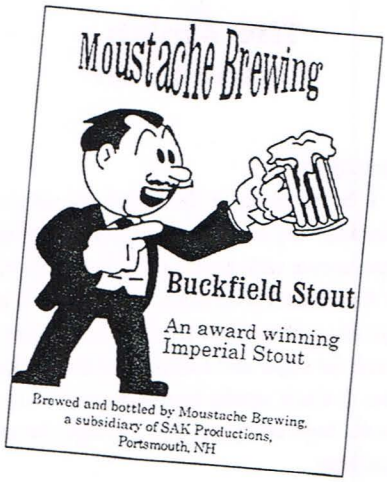
Sick of Styles

Dear ***Zymurgy***;

I am writing to express my displeasure with the AHA's emphasis on brewing to match a particular style in its competitive events. It seems to me that characteristic styles of beer arose historically because the ingredients, such as water with peculiar dissolved salts, were what the brewer had available locally and, through a little experimentation, the brewmaster leaned toward flavors that his customers seemed to prefer.

Natural evolution resulted in a host of concoctions of varying complexity that most real beer lovers exalt in. Why is it, then, that modern homebrewers are encouraged to match in great detail a particular predetermined profile when entering a brewing contest? In fact, I wonder how many entrants simply brew a beer and then try to match what they perceive the flavor to be to one of the stated categories only to receive back a critique stating that it was a "good effort but not to style."

I think most cooks would find it demeaning to be judged on how closely their creations matched some sort of artificial culinary model. "Nouvelle cuisine" would have been pushed aside by boiled beef and cabbage. Given that any tasting contest is inherently extremely subjective, I would suggest that categories be very broad, such as "medium-flavored beers," "dark beers," "beers with unusual ingredients," etc. If a



particularly outstanding brew happened to closely match a traditional style, so be it, but if it seemed to defy exact classification, so much the better—that brewer should be rewarded, not penalized, for adding to the gustatory pleasures of a classic beverage.

Jim Lau
Wausau, WI

Your points are well-taken. You're absolutely correct that beer styles "evolved" according to locally available ingredients and, oftentimes, sheer expediency—some of the strongest flavors in beer were originally brewed in to mask poor quality or to allow for long storage while being transported by sailing ships. There is, I believe, room for both points of view. Brewing to style is a test of a brewer's skill. And although what we think of as current beer styles may have come about by fortuitous happenstance, we at the AHA think it's important to preserve those styles for the future. On the other hand, I think we do encourage "thinking/brewing outside the box." Charlie Papazian is a major proponent of experimentation, and having had the pleasure of tasting some of his "experiments," I wholeheartedly agree with him. Ditto for new AHA Director Paul Gatza, who just yesterday shared a very nontraditional mead that was one of the finest beverages I've ever tasted. Having gone to cooking school myself, before I was encouraged to experiment, I had the basic sauces hammered into my head—Hollandaise always had to taste like Hollandaise. Once I could do that, I was ready to crank out my own stuff...Ed.

(continued on page 80)

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Zymurgy Now Available in Six-Packs

ZYMURGY Reader SURVEY

FOLD HERE

Tell us what you think...

We want to know about you! It helps us to have as much information on you, our readers, as possible. We use this information for several purposes, including planting stories in the media, creating a profile of homebrewers and to gather information for ***Zymurgy*** supporters. Please take a moment to fill out this survey and mail it back to us, or fax to (303) 447-2825. We really appreciate it!

Gender:

○ Male ○ Female

Age:

○ Under 29 ○ 30-39 ○ 40-49 ○ 50-59 ○ over 60

Highest Level of Education:

○ High School ○ Some college
○ College degree or beyond

What is the distance between you and your closest homebrew supply retailer?

○ Less than 10 miles ○ 10-30 miles ○ 30-50 miles
○ Over 50 miles ○ Don't know

Have you purchased brewing supplies or equipment by mail order in the last 12 months?

○ Yes ○ No

Have you purchased brewing supplies or equipment over the Internet in the last 12 months?

○ Yes ○ No

FOLD HERE

Household income:

○ Under $25,000 ○ $25,000-$50,000
○ $50,000-$100,000 ○ Over $100,000

How long have you been homebrewing?

○ Less than 1 year ○ 1-3 years
○ 4-6 years ○ 7-10 years
○ More than 10 years

How much beer do you brew per month?

○ Less than 5 gallons ○ 5-10 gallons
○ 11-20 gallons ○ More than 20 gallons

How much have you spent on homebrewing supplies and equipment in the last 12 months?

○ Under $100 ○ $100-250 ○ $251-400
○ $401-600 ○ Over $600

How often do you visit your local homebrew supply retailer?

○ 1 time/month ○ 2-5 times/month
○ More than 5 times/month

Do you share your copy of *Zymurgy* with friends?

○ Yes ○ No

Do you read all or most of the advertisements in *Zymurgy*?

○ Yes ○ No

Do you frequently save your issues of *Zymurgy*?

○ Yes ○ No

Do you frequently purchase products you've seen advertised in *Zymurgy*?

○ Yes ○ No

What do you brew?

○ Ales ○ Lagers ○ Mead/Cider/Wine

What type of brewing do you do?

○ All Extract ○ Extract/Grain All Grain

How many six-packs of commercial beer do you usually purchase per month?

○ 1-2 ○ 3-5 ○ 6-10 ○ over 10

Continued on back ➡

Do you make wine from:
○ Grapes ○ Boxed Kits ○ Concentrates

How often do you make wine?
○ Less than once per year ○ 1-3 times/year
○ 4-7 times/year ○ More than 8 times/year

How much wine do you make per year?
○ Less than 5 gallons ○ 5-10 gallons ○ 11-15 gallons
○ More than 16 gallons

Do you enjoy gourmet cooking?
○ Yes ○ No

If yes, how often do you cook gourmet meals?
○ Less than once/month ○ 2-5 times/month
○ 6-10 times/month ○ Over 10 times/month

Do you have a garden?
○ Yes ○ No

FOLD HERE

TAPE TOP WITH THIS SIDE FACING OUT. PLEASE DO NOT STAPLE CLOSE.

How many bottles of wine do you purchase per month?
○ None ○ 1-4 ○ 5-8 ○ More than 8

What types of liquors do you drink:
○ Gin ○ Vodka ○ Brandy ○ Rum ○ Tequila
○ Whiskey ○ None

Do you smoke cigars?
○ Yes ○ No

How often?
○ Less than once/month ○ Once/month ○ Once/week
○ More than once/week

Have you purchased a new computer or upgraded your current computer in the past 12 months?
○ Yes ○ No

Do you plan to purchase a computer or upgrade your computer in the next 12 months?
○ Yes ○ No

Do you have Internet access?
○ Yes ○ No

How much have you spent on computer software in the past 12 months?
○ Under $100 ○ $100-$250 ○ $251-$500
○ More than $500

Thanks for your help.

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HOMEBREW COOKING

Amahl Turczyn

Bread...The Other Use For Yeast

For all brewers—professional or all-grain homebrewers—spent grain constitutes, next to water, the second greatest byproduct of the brewing process. Once the bulk of the malt sugars have been rinsed from the crushed and steeped barley, there really doesn't seem to be much left in it except raw fiber and protein, so most homebrewers simply bag it up and toss it in a dumpster.

However, while there are several uses for the stuff, probably the best, and definitely the most tasty, is to make bread from it. Several varieties of breads and pizza dough can be made using a proportion of sweet, fibrous barley grain to add a coarser texture and slightly nutty flavor. Some breweries have even gone as far as to add on a bakery specifically for this purpose, producing commercial-sized quantities of spent-grain breads.

At the farmhouse brewery called Brasserie A Vapeur near Pipaix in southern Belgium, brewer Jean-Louis Dits makes a batch of spent grain bread at the end of every brew day as part of the routine. (The rest of his grain, by the way, is given to a local farmer to feed livestock.) This should serve as a reminder that brewing beer and baking bread are very similar crafts, and complement one another in many ways.

I realize what you're thinking here. You're an all-grain brewer, which means you've just put in a good six to eight hours making beer. Now you're supposed to commit another five hours for bread? Well actually, there are a few options here.

You can store a few cups of spent grain in the fridge for baking another day—it should keep for two or three days at least. Second, you can start the bread by making the dough and letting it rise overnight in the refrigerator. Then it should only take a half hour or so to get the yeast going, combine the ingredients and knead the dough.

Or, third, you can just go ahead and do it. Breadmaking is a long process, but not nearly as difficult as brewing; there are one-to-two-hour gaps in the process during which all you need to do is wait. So really, it's not as bad as it sounds.

The following recipe is a fairly simple, straightforward loaf bread. You shouldn't use too much spent grain in breadmaking, because there has to be enough gluten present for a proper rising. Gluten, found in wheat flour, is what makes bread dough stretchy and elastic, and having something as coarse in texture as crushed barley tends to defeat its purpose. I'd say a ratio of 70:30 wheat flour to spent grain is about the maximum you can use and keep everything holding together. Unfortunately, that also

means you really can't use much of your spent grains for breadmaking unless you are baking enough for the whole block.

Another thing to remember about any baking with spent grain is that it contains a huge amount of moisture: typically just under 84% when it comes out of a drained lauter tun. That means that in most recipes you will have to drastically reduce or eliminate additional liquids. It may look pretty dry, but it's not.

Grain Types

Grain from pretty much any style of beer can be used, although some of the best bread I've made has come from batches of wheat beer in which malted wheat constituted greater than 50% of the total grain bill. This will give you something similar to a rustic cracked-wheat bread, but the malting of the wheat adds a wonderfully sweet and mellow quality. Spent grain from an Irish-style dry stout also makes a great and interesting bread; the roast barley gives it a little bit of bitterness and the flaked barley, which has not been converted, lends itself very well to bread.

Flour

You can use whole-wheat flour for spent grain breads, but in doing so you are reducing the amount of gluten, so you have to, in turn, reduce the proportion of grain added. It is best to stick with plain white wheat flour. I use all-purpose unbleached. There are breadmaking flours available that supposedly have a higher proportion of gluten. Although I have not tried these higher gluten flours with spent-grain breads, it stands to reason that they would be preferable for this purpose.

Water

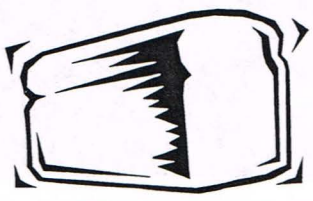
You don't have to be as picky about water quality in baking as in brewing unless your water is very poor. I'll often save some of the last runnings from the lauter tun to use in the bread. It contains small amounts of maltose, which act as food for the bread yeast and help get it going. Some bakers even use a small amount (up to 1/4 cup or 59 mL for a sweeter bread) of malt extract in their breads.

Toward the end of baking, if you have a spray bottle you can use water to help give the loaves a crusty texture by spraying the inside of the oven. Do this every five minutes or so for the last 15 minutes of baking, closing the oven door quickly after each spraying to trap steam inside.

Yeast

Don't use brewer's yeast! Trust me, I've tried it. California ale yeast is a wonderful thing in beer, but will leave you with loaves of bread suitable only for doorstops and masonry. Bread yeast is available both dry and in foil-wrapped cubes. Both seem equally effective. As a bonus, you don't have to sanitize everything when making up a bread yeast starter, since it's all going in the oven anyway.

If you are really gung-ho about this breadmaking thing, you can also use a sourdough starter, or a regular bread yeast starter. This will give your bread a better flavor and allow you to keep a yeast culture going for more consistent breadmaking. Mix flour and water in roughly equal proportions to a consistency slightly thicker than pancake batter and add either dry yeast or sourdough starter, cover with cheesecloth and put near a window. Hopefully, within a day or so, it will catch some sour, wild yeasts that will multiply in your starter medium and allow you to make sourdough bread. At this point, cover the starter loosely and refrigerate for several days until you are ready to bake. Then remove half of the starter for your bread, and add the same amount of water and flour to the remaining starter, so the yeast will have something to chew on until you decide to make bread again. Keep refrigerated.



Eggs, Milk, Butter and Other Stuff

These can be used with your spent grain bread to give it a softer, moister consistency. You also can experiment with different flours, raisins and other dried fruit, nuts, oats, olives, etc., but keep in mind these extra ingredients will make your bread heavier. It also will probably take longer to rise. Personally, I prefer light, crusty, unadulterated loaves, but it is true that bread made with these other goodies probably will be of greater nutritional value and have a fuller and more complex flavor. The following Basic Spent Grain recipe also makes a good pizza dough!

Basic Spent Grain Bread

1 tbsp salt (14.8 mL)
5 cup flour (1183 mL)
1 cup 100 degree F water (38 degrees C)
1 tbsp sugar or malt extract (14.8 mL)
2 tbsp olive oil (29.6 mL)
1 tbsp dry bakers yeast (14.8 mL) or .5 to 1 cup starter (118 to 237 mL)
2 cup spent grain, well drained (473 mL)
more olive oil

In a large bowl combine the salt and flour. In a small bowl, dissolve the sugar in warm water and add the yeast and olive oil, stirring well. Within 10 minutes you should see a layer of foam begin to form, indicating the yeast is active. Make a well in the pile of flour and salt and pour in the liquids. Make sure the salt has been combined well—your yeast won't appreciate high saline concentrations. Add the spent grain and stir to form a stiff dough. You should have enough flour left over to allow you to knead the dough on a bread board or counter top for five to 10 minutes, or until it is consistently elastic.

Form a ball and remove the dough from the bowl. Pour about one teaspoon (4.9 mL) of olive oil in the bottom of the bowl and put the dough back in. Drizzle the same amount

on top, and coat the dough ball thoroughly with oil. Leave in a warm place (78 degrees F, 26 degrees C) for two hours or until the dough has doubled in bulk. You can also throw it in the fridge to rise overnight.

When dough has risen, punch it down and knead a little more. Divide into either two loaves for two 8 1/2 × 4 1/2 × 4 1/2 inch loaf pans or into three or four balls if you're going to make pizza. Loaf pans should be liberally greased.

For bread, coat the loaves with a little more olive oil and allow to rise in the loaf pans to double bulk again for another hour or so, or until you can poke them and the dough won't spring back. Meanwhile, preheat your oven to 375 degrees F for a good hour before putting in the bread. Be gentle, or the risen bread may fall. Bake for 40 minutes in the very center of the oven, or until the loaves sound hollow when tapped. Let cool for 10 minutes or so, then remove from loaf pans and cool another hour or so on a rack. If you are going to eat the bread within a few days, store the loaves in paper bags to keep the crust crisp. If not, plastic will do.

For pizza, roll the ball out on a floured surface to the desired thickness (usually 1/4 inch), and brush with olive oil. Allow a good hour to preheat your oven to 500 degrees F. Open the windows. Disable the smoke detectors. Warn the neighbors.

Then, using a baker's peel if you have one, or a large piece of heavy cardboard if you don't, slide the pizza crust onto your preheated baking stone. If you don't have one, don't worry...slide the crust onto your top baking rack and bake for two to three minutes, until the bubbles just start to brown a bit. Then remove, top with your favorite toppings, and bake again in a pizza pan or on your baking stone until cheese is melted and toppings are cooked.

This method guarantees a crispy crust.

Note: rolling the crust too thin may cause the dough to sag once it's on your baking rack.

Now sit back, have a cold one and bribe someone else to clean up. You've been in the kitchen too long.

Amahl Turczyn is the former AHA Project Coordinator, a professional brewer and has been to cooking school.

TIPS & GADGETS

Paul Zocco

Bilge Pump RIM System

The most expensive component of my backyard half-barrel brewing system was the pump to move liquids around. When I wanted to build a RIM system for my mash tun, cost was an important factor.

After much searching for conventional magnetically coupled pumps and such, I came upon an idea to try a bilge pump commonly used in boating applications. Cost was only a fraction of what I had been experiencing. My choice cost about $30. It has a plastic impeller encased in a molded plastic housing. My concerns were if the pump and impeller would be affected by up to 178 degrees F (81 degrees C) temperatures. Trials proved it suitable. I can recirculate wort throughout the entire mash cycle, or at any time I desire. My mash runoffs into the boiling kettle were coming out almost crystal clear. Most or all of the grain residue and large solids would be trapped in the mash tun.

My mash vessel has a propane burner under it to maintain constant temperatures. There is a slight heat loss in the pump and associated plumbing used in the RIM system, but it doesn't seem to have much of an effect overall.

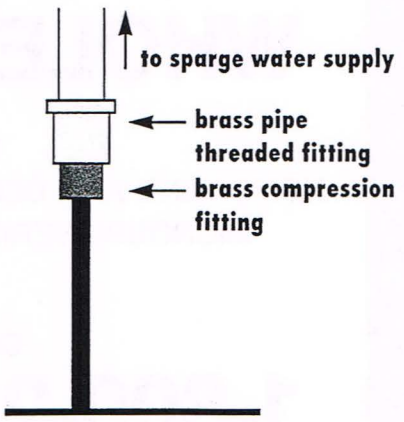
During the trial runs, grain would plug up the pump exit line going back to the mash kettle. I simply added a small inline screen filter. This would have to be removed and rinsed once after its initial plugging, and then it would henceforth run clear.

Positioning of the bilge pump is a very important step. It must be mounted below the exit level of the mash tun if you want easy priming of the pump. This is important for ease of operation.

Recirculated liquids pumped back into the mash should not be splashed. This could cause oxidation and off-flavors in the beer. Make sure that the end of the exit tube into the mash tun goes under the level of liquid, or into the upper part of the grain bed.

My experiments with a backyard RIM system proved successful. There are many other possibilities using different types of pumps and hardware. Let your imagination work for you.

Spin Sparge Retrofit

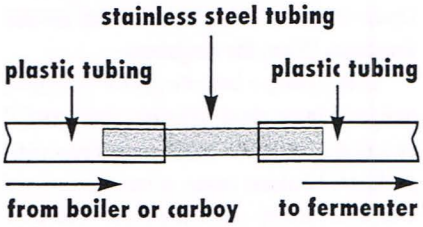


The commercially available spinning-type spargers used with five-gallon plastic pails can be modified to fit your half-barrel system. These devices use head pressure to work, so you must mount your water supply vessel above them. My hot liquor tank is a half-barrel Sanke keg with a 170,000 BTU Cajun cooker burner mounted underneath. My mash tun is placed directly next to it, but exactly one-half barrel height lower. This gives me plenty of head pressure.

All plumbing on my system is 3/4-inch brass pipe and brass ball valves. This standard size makes retrofitting the commercial spinner a simple task. All of the plumbing parts needed are readily available at your local hardware store.

The mash tun also has a 3/4-inch brass ball valve exiting into the boiling kettle. The water flow into the spin sparger and the products out the mash tun can be adjusted to flow at an equally slow rate. This allows for a very efficient sparge (see illustration).

Fast and Clean Transfer



After your wort has been chilled by whatever method you use, it is at its most susceptible to infection. Transferring from the chilling vessel to the primary fermenter should be done as sanitarily as possible. The simpler the sanitary method, the better. This also can be used when transferring from primary to secondary fermenting vessels.

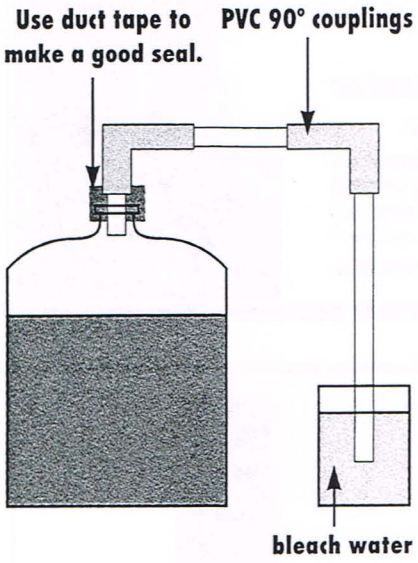
My solution to prevent infection is a simple siphon, but using a separate removable tube and coupling. Cut a six-inch piece of plastic tubing and attach it to your long siphon tube with a four- or five-inch piece of stainless-steel or copper pipe. This short plastic piece will be the one you draw on to

start your siphon. When you see liquid (wort) draw up from the chilling vessel or the fermenter and start to come over the top in a downward movement, then quickly remove the short plastic tube.

Bacteria from your mouth will never come in contact with any liquid, be it wort, water or beer.

A rubber primer bulb commonly used with outboard motor gas tanks also can be retrofitted with appropriately sized tubing instead of drawing by mouth (see illustration).

Keep It Hot; Keep It Cool



After toying with ideas of thermostatically controlled hot liquor and mash tun vessels with elaborate expensive equipment, I came upon a simple solution. Why not just insulate? My picnic cooler keeps my drinks very cold for long periods in the hot summer sun.

I insulate my mash tun with a material commonly called duct wrap. This is a material made of mineral glass or Fiberglas with a foil outer wrap. It is used to wrap hot air ducting in home and industrial applications. I simply wrap this two-inch-thick blanket around my mash and hot liquor tanks and tape it together with aluminum tape. This material is fire retardant, so heat can be applied without any danger, in case your mash tun is heated. I also fabricated a cover of the same material, effectively sealing off any heat loss. My mash temperatures stay within 3 or 4 degrees F (1 or 2 degrees C) over the period of an hour mash.

This same material can be wrapped around a five-gallon pail or any other vessel of your choice for its insulation properties.

Simple, but it works like a dream.

Simple Blowoff Tube

A simple blowoff tube can be fabricated from basic PVC plumbing fittings and large-diameter plastic tubing. The part that inserts into the glass or plastic bucket fermenter can be made to fit tightly by wrapping a little duct tape on its end until snug. One-inch i.d. tubing will fit snug in some carboys without needing the tape to hold it. When using 90-degree PVC elbows, you won't have the problem of crimped tubing descending to the water bucket.

You will also use much less tubing and have a neater setup. Sanitation is accomplished by dismantling and immersing in a cleaning solution (see illustration).

If you have a quick tip or a tested gadget to share, send a brief description and photo to Tips and Gadgets, PO Box 1679, Boulder, CO 80306-1679.

NEW PRODUCTS

New Product descriptions are submitted by manufacturers and distributors and are printed for reader information. These claims are made by manufacturers and distributors and do not imply testing by *Zymurgy*. For more information, call (303) 447-0816 for Linda Starck (ext. 109) or Christopher Lowenstein (ext.108).

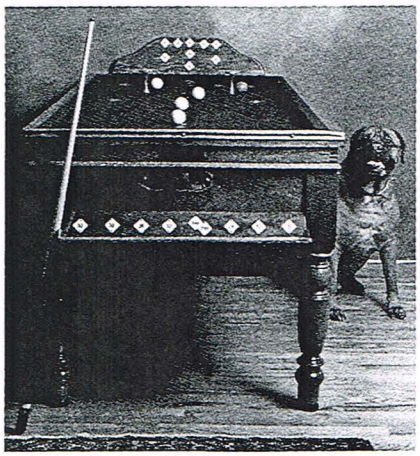


PHOTO COURTESY UK BREWING SUPPLIES, LTD.

Wallet Check!

Let's say, just for a moment, that you have some money left over from purchasing homebrewing supplies. Your Significant Other has rather significantly pointed out that your brew room looks like a cross between a freshman college student's dorm room and an accident in an industrial kitchen. You decide to spruce the place up a little.

Well, what better way to spruce it up than acquiring—or perhaps we should say investing in—a genuine refurbished 1930s English bar billiards table?

Bar billiards are played from only one end of the three-feet by six-feet table, so you can cram it up against the wall. There's a coin-operated timer, so you can beat your friends out of their spare change when they come over to brew. According to U.K. Brewing Supplies, these billiards tables "exemplify the sturdy design and exacting finish craftsmanship of that period." Cues, balls, scoreboard and all accessories are included for only $2,995.

Then again, you could get a dartboard.

Still, the Anglophile owes him or herself a trip to www.ukbrewing.com or a call to (717) 293-8111 to see what's missing. By the way, the dog is extra.

Tap into a Hogshead

If you've been frustrated in your attempts at tinkered-together lagering systems, take heart. The homebrewers at Cobritt Industries have taken a quantum leap forward in providing an efficient—and affordable—lagering system.

Dubbed the Hogshead Tapper, the product can not only lager a standard five-gallon batch of beer, but it also has the capability of dispensing kegged beer from Cornelius kegs or the newer quarter-barrels or even wine from bag-in-boxes.

The Hogshead system uses new generation thermoelectric cooling (TEC), which does not use environmentally harmful CFCs, a coil or a compressor. Another advantage of the system is that it draws about as much electricity as a household lightbulb.

A remote-control device monitors the operation of the refrigeration unit, which has six preset temperature levels to allow for gradual cooling of the wort at specific temperatures (from 60 degrees F or 15 degrees C to 32 degrees F or 0 degrees C).

The whole lagering/dispensing system is comprised of a wooden barrel (which can be unfinished, allowing the user to customize to the room's decor) lined with a polyurethane liner and insulated with a special high-density, closed-cell foam. The Hogshead Tapper can be ordered with or without the TEC unit, in both 20- and 30-gallon sizes.

The array of options and configurations is impressive. Prices range from $360 for a stock 20-gallon barrel up to $1,535 for a TEC-cooled 30-gallon barrel with a single tap. Contact Cobritt Industries at (920) 295-4469 for their excellent brochure, or visit the Website at www.cobritt.com.

Yeasty Business

Appropriate for our special issue on yeast, Wyeast Laboratories recently announced their new "XL" 175 mL liquid yeast packs are now available in all strains. The 175 mL XL pack provides the most active, viable yeast cells available to the homebrewer.

Wyeast remains committed to bringing homebrewers maximum levels of convenience. They continue to package all homebrewing yeast with a nutrient-enriched sterile brewery wort for optimum cell growth and viability. The state-of-the-art packaging also provides 100% UV light protection; UV light is a direct cause of yeast cell mutation.

Wyeast also has expanded their varieties of wine and cider yeasts. Check your local brewstore, or visit Wyeast at www.wyeastlab.com.

CALENDAR

October

10 Best of Fest, Club-Only Competition, **AHA SCP**. Entries due Oct. 5. Sponsored by Brew Angels Homebrew Club. Contact Brian Rezac at (303) 447-0816 ext. 121 or brian@aob.org.

10 Queen of Beer, **AHA SCP**, Placerville, CA. Entries due Sept. 16 - 26, 98 with $5 entry fee. Contact Nora Keller-Seeley at (530) 676-2237 (h) or (916) 854-4344 (w), email: nkseeley@jps.net, http://haze.innercite.com.

10 Oktobersbest, **AHA SCP**, Cincinnati, OH. Sponsored by Zinzinnati Homebrew Competition. Entries due 10/1/98 with a $5/1st entry fee, $3/ ea. add'l. Contact Jeff Seeley at (513) 231-6062 (h) or (513) 627-5005 (w), e-mail: seeley.ja@pg.com, http://home.fuse.net/cincinnatimaltinfusers/.

17-18 Farmers Fair Homebrew Competition, **AHA SCP**, Perris, CA. Entries due 10/1/98 with a $5/entry fee. Contact Bill Satmary at (909) 767-0950 or (800) 741-8387 ext.1726, e-mail: satmary@pe.net.

24 3rd Annual Music City Brew-Off, **AHA SCP**, Nashville, TN. Entries due 10/12/98 with a $5/entry fee, $4/entry each add'l. Contact Steve Johnson at (615) 327-4100, e-mail: johnsons@uansv5.vanderbilt.edu.

24 Pacific Cup, **AHA SCP**, Long Beach, CA. Sponsored by Long Beach Homebrewers. Entries due 10/16/98 with a $5/entry fee. Contact Robert Wise at (526) 425-4477 (h) or (526) 435-6188 (w), e-mail: nobuddrkhb@aol.com.

24-25 Taste of the Great Lakes, **AHA SCP**, Frankenmuth, MI. Entries due 10/20/98. $7/1 entry, $6/2, $5/3 or more. Contact Robert Schmidt at (517) 892-7577, e-mail: brownjsf@concentric.net.

31 1998 Ozark Homebrew Festival, **AHA SCP**, Fayetteville, AR. Entries due Oct. 19 - 26, 1998 with $5 entry fee. Contact Dave Justice at (501) 443-7017 (h) or (501) 582-4680 (w), email: davej@nwark.com, http://holodeck.uark.edu/ohc98/ohc98.html.

31 Trub X 10th Annual Competition, **AHA SCP**, Durham, NC. Sponsored by Triangle Unabashed Homebrewers Competition. Entries due 10/27/98 with a $6/1st entry fee, $5/ each add'l entry. Contact Gary Clayton at 919-471-4996 (6-10pm EST), e-mail: trubx@mindspring.com.

November

7-8 Novembeerfest, **AHA SCP**, Seattle, WA. Sponsored by The Brews Brothers. Entries due Oct. 12 - 31, 1998 with $5 entry fee. Contact Jim Hinken at (425) 483-9324 (h) or (425) 656-7908 (w), email: jhinken@accessone.com, http://www.brewsbrothers.org.

8-15 1st Annual Mexican Riviera Brew Cruise with Fred Eckhardt, **AHA SCP**. Sponsored by Imperial Tour & Travel, Inc.. $1299 per person includes beer competition, seminars, tastings, pub crawls. Contact Imperial Tour & Travel at (503) 224-8300 or (800) 888-2887.

14 San Joaquin Beer Festival Competition, **AHA SCP**, Stockton, CA. Entries due 10/31/98 with a $5/entry fee. Contact Rick Stanton at (209) 957-2764 (h) or (209) 957-4549 (w), e-mail: ruudrick@aol.com.

December

11 If It's Not Scottish It's... Club-Only Competition, **AHA SCP**. Entries due Dec. 7. Sponsored by Derby Brew Club. Contact Brian Rezac at (303) 447-0816 ext. 121 or brian@aob.org.

February 1999

20 4th Annual MASH Homebrew Competition, **AHA SCP**, San Rafael, Calif. Entries due 2/6/99 with a $6/entry fee. Contact Mike Riddle at (415) 472-3390 (h), e-mail: jadeeds@sonic.net.

March

13 4th Annual Hurricane Blowoff Homebrew Competition, **AHA SCP**, West Palm Beach, FL. Sponsored by The Palm Beach Draughtsmen. Entries due 3/6/99 with a $6/entry fee. Contact Mel Thompson at (561) 471-2634, e-mail: melwpb@aol.com.

20 13th Annual Bluebonnet Brew-Off, **AHA SCP**, Irving, Texas. Entries due 2/26/99 thru 3/5/99 with $6 entry fee. Contact Spence Mabry at (817) 249-4789 (h) or (817) 415-4126 (w), e-mail: smabry@flash.net.

AHA SCP = American Homebrewers Association Sanctioned Competition Program

The Calendar of Events is updated weekly and is available from the Association of Brewers: info@aob.org or http://beertown.org on the web.

To list events, send information to ***Zymurgy*** Calendar of Events. To be listed in the January/February Issue (Vol. 22, No. 1), information must be received by Oct. 23, 1998. Competition organizers wishing to apply for AHA Sanctioning must do so at least two months prior to the event. Contact Brian Rezac at brian@aob.org; (303) 447-0816 ext. 121; FAX (303) 447-2825; PO Box 1679, Boulder, CO 80306-1679.

ILLUSTRATION BY JOHN MARTIN

• KUDOS •
AHA SANCTIONED COMPETITION PROGRAM

• APRIL •

Land of the Muddy Waters Homebrew Competition
Rock Island, IL, 115 entries— Joe Formanek of Lisle, IL won best of show.

• MAY •

Kearney Area Brewfest
Kearney, NE, 86 entries—Dan Davis of Wichita, KS won best of show.

2nd Annual Western New York Homebrew Competition
Buffalo, NY, 176 entries—Dave Chudy of Buffalo, NY won best of show.

Elizabethan Homebrew Competition
San Bernadino, CA, 118 entries—Dave Sullivan of San Pedro, CA won best of show.

Celtic Brews
Arlington, TX, 51 entries—David Denning of Grand Prairie, TX won best of show.

• JUNE •

Sixth Annual Nation's Capital "Spirit of Free Beer" Homebrew Competition
Chantilly, VA, 439 entries—George De Piro of Nyack, NY won best of show.

4th Annual Mill Creek Classic
Salem, OR, 138 entries—Curt Hausam of Salem, OR won best of show.

Big Batch Brew Bash
Houston, TX, 63 entries—Steve Capo & Charles Vall Honrat of Houston, TX won best of show.

Fourth Annual 8 Seconds of Froth
Cheyenne, WY, 136 entries—Paul Claassen of Albuquerque, NM won best of show.

San Joaquin County Fair
Stockton, CA, 206 entries—Jim Johnson of Turlock, CA won best of show.

Nor'Wester Home Brew Competition
Lake Oswego, OR, 325 entries—Ken Johnson of Boring, OR won best of show.

E'ville Triple Threat
Ellicotville, NY, 82 entries—Paul M. Jackson of West Seneca, NY won best of show.

Orange County Fair
Costa Mesa, CA, 122 entries—Ray Ballard of Moreno Valley, CA won best of show.

BUZZ OFF
Downingtown, PA, 501 entries—Mark DeOrio of Bridgeport, PA won best of show.

Growlers 3rd Semi Annual
St. Charles, MO, 31 entries—David Roesch of Millstadt, IL won best of show.

• JULY •

Mother Lode Fair
Sonora, CA, 19 entries—Bill L. Neilson of Sonora, CA won best of show.

Oregon State Fair Amateur Beer Competition
Salem, OR, 135 entries—Michael J. Brown of Portland, OR won best of show.

Ohio State Fair Homebrew Competition
Columbus, OH, 165 entries—Brian St. Clair of Cincinnati, OH won best of show.

• AUGUST •

Buffalo County Fair
Kearney, NE, 23 entries—John Krontz of Kenesaw, NE won best of show.

Iowa State Fair
Des Moines, IA, 161 entries—Brian Karn of Des Moines, IA won best of show.

Professor Surfeit

DEAR PROFESSOR

Frozen and Gassed

Dear Professor Surfeit,

I have two simple questions you may be able to address.

First, can yeast be frozen and still work very well after thawing? If not why not, or if so why?

Second, is it possible to force carbonate beer with a mixture of carbon dioxide and nitrogen, or is nitrogen only used to dispense beer? I have some very fine Scottish ale coming out, and since a good majority of the better British beers are dispensed with nitrogen, I was hoping to give my homebrew that same rich, thick, creamy head and unique flavor; this would be very much like a good pint of Guinness or Newcastle. Some of the local gas supply shops will sell me a mixed blend of carbon dioxide and nitrogen prepared in a ratio of 25% carbon dioxide to 75% nitrogen. However, since nitrogen is an inert gas, I'm not sure that this ratio will carbonate my beer. Fortunately, for a little extra money, my local gas shop will custom blend the nitrogen and carbon dioxide to my liking. If I go with, say, 75% carbon dioxide and 25% nitrogen, I'm almost certain the beer will be carbonated, but I don't know if it will get that distinctly British flavor and texture. Apparently, any blend or either gas on its own would use the exact same regulator and gas cylinder. I only have one five-pound cylinder I can use—the gas shop won't rent or sell in less than 20-pound cylinders (unless I bring them my own five pounder to fill), and since I only want to do this with one or two batches, it looks like I'm all gassed up with nowhere to go.

Help!!
Steve Kerver
Denver, CO

Dear Steve,

Sure, put them in the freezer! They'll be frozen sure as tootin'. Thaw them out and listen to them. If they're alive they won't be in the best of moods. Fact is you may get a few survivors but generally, simply freezing yeast will damage the cell walls. Hey, these guys are living things, just like you and I. But if you prep the liquid they're suspended in with some glycerin this will protect the cell walls to some degree from damage during freezing. Refer to yeast-culturing articles and books for details on this process. Keep in mind you should culture the thawed yeast through a few generations to get them "on board" again.

Carbon dioxide and nitrogen mixes will lend a creamy Guinness-type head to any draft beer. But be careful. Nitrogen requires high-pressure regulators and tanks. Never fill your carbon dioxide tank with nitrogen. Never. With a ratio of 25:75 or 75:25 you'll get some degree of creaminess. I believe the famous stout ratio is about 25:75. But you've got to dispense at higher pressures than 100% CO_2 and use special nozzles for best results. I recommend as a homebrewer to naturally carbonate your draft and then dispense with the gas. Don't try to artificially carbonate with this gas mix. You can try it, but I know that topping off a naturally car-

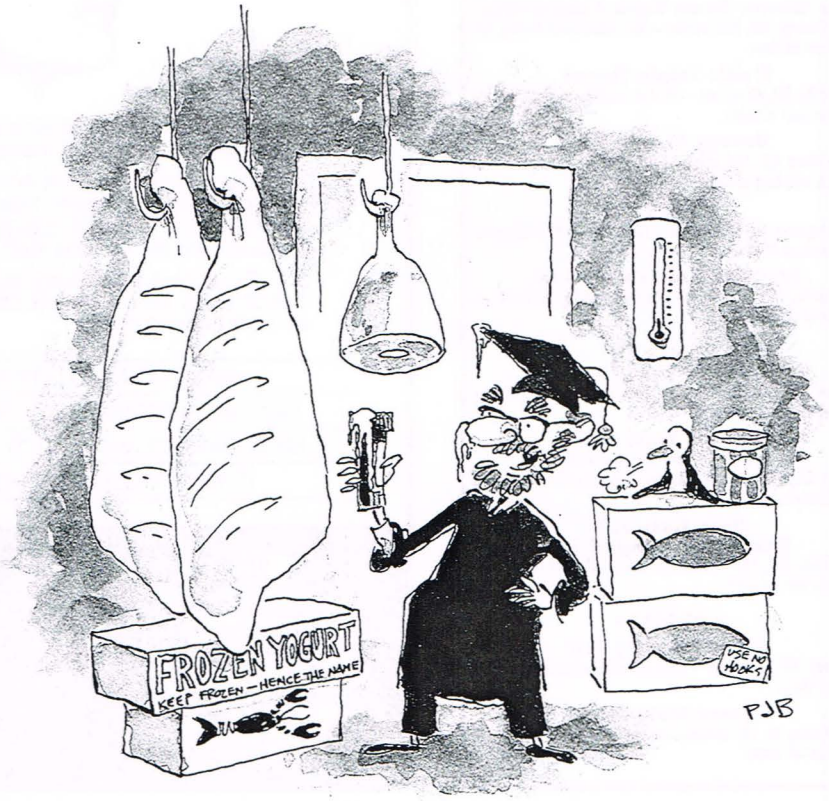


ILLUSTRATION BY PAT BYRNES

bonated keg with a nitrogen mix or pure nitrogen will lend a degree of creaminess. Leaving a head of high-pressure nitrogen on the beer for at least 24 hours is necessary to get some of the nitrogen into the beer. For best results consult your local shop owner. He should have information for the gas mix he is providing to you. If he doesn't, he shouldn't be selling it.

Pass the gas,
The Professor, Hb.D.

A House of Yeast

Dear Professor Surfeit,

A few questions for you or your other brother Charlie.

1. In *The New Complete Joy of Home Brewing* page 280 says, "refrigeration will slow fermentation...for the yeast to go dormant. . . the yeast will remain healthy and active for at least 2-4 weeks, after which time you should propagate the yeast in another bottle of sterile wort...some beer yeast can survive for over a year using this method—and still make excellent beer." Also in a past ***Zymurgy*** 1996 Special issue (Vol. 19, No. 4) page 24 says "I've had one of my strains, a house yeast at this point, since 1983." How often do you actually propagate your yeast to keep it going that long? Every four weeks would be very time consuming and you'd have a pretty large amount of yeast built up in those years. What temperature do you keep the beer bottles with the air-locks? Would 49 degrees F (9 degrees C) be cool enough (that's my keg freezer) or better to use the kitchen fridge that's much cooler?

2. If one were to save yeast for repitching, what is best: (a) skim off top layer after initial kraeusen subsides, or (b) take the dregs from primary fermenter after transferring the beer to the secondary, or (c) neither (a) nor (b), but rather use method in question 1 above? I use 19-liter glass carboys with blow-off tube and they are filled nearly full. I use the Yeast Lab 09 English ale yeast.

Thanks for answering my previous letters.

Regards,
Joe Wdowiak
Warsaw, Ontario

Dear Joe,

Yep, yep, yep, yep I have a yeast bank under beer. And I still use that 1983 yeast. I've never slanted it. I've never acid washed it. I simply culture by fermenting with hopped wort of about 1.040 (10 °B) gravity and then keep it between 35 and 40 degrees F (2 and 4 degrees C). It amazes me—sometimes I don't get around to reculturing it for one year! That is absolutely no bull. One year! Pour off the fermented beer, then add new highly hopped and bitter wort. Set out at room temperature. Get the fermentation going and then store in the fridge again. Or if I'm going to use it reculture again after three days to get another generation active and not as much related to the dormant yeasts. I think I make good clean-tasting lagers with this special yeast that was mysteriously given to me by a large brewery. Only 14 years later did I learn that it was a Budweiser St. Louis yeast, cultured from a keg. I do the same thing for liquid yeast from homebrew shops. But be careful. You've got to have a good palate and a nose to detect off and wild aromas that don't belong. Sometimes the name brand packaged yeast is slightly contaminated and after a few generations it catches up and you've got to toss it out. Culturing liquid yeast this way is simple and does save money, but I find myself brewing more variety and spending what I saved on other better ingredients.

I don't believe 49 degrees F (9.5 degrees C) is cold enough. The closer to 32 degrees F (0 degrees C) the better. Contaminants don't like cold temperatures.

What yeast to use for repitching? I like to use the secondary fermentation sediment when I can, but if given the conditions I also like to use yeast from the primary, but only prefer this when I've whirlpooled or filtered off the hot trub and hop particles from boiled wort. I don't usually go to this trouble unless I'm making a beer with a lot of finesse. Skimming yeast from some top fermentations is a good idea, only when using a recognized good top-flocculating yeast; Bass did this with their Burton Union system. Using a blowoff will work too, though I haven't used it. I imagine you'll get some hop bitterness and characters transferred over to your next fermentation that influence the balance of your new beer. But I'm sure the beer will be great.

Keep it squeaky,
The Professor, Hb.D.

Spelunking for Lager

Dear Professor Surfeit,

I recently moved from Denver to Milwaukee, and as a result I now have a cellar/basement which stays at about 54 degrees F (12 degrees C) in the winter, and about 70 degrees F (21 degrees C) in time summer. This winter I tried to brew my first lager, a batch of Pilsner aimed at recapturing the malty nectar that I fell in love with in Bratislava, namely Budvar Budweiser. I infusion-mashed eight pounds pale ale malt and one pound Cara-Pils for five gallons of beer at OG=1.050. I used the basement as my ferment and lager storage area (two weeks primary, six weeks secondary, then Polyclar and bottle) and a starter of Wyeast Bohemian Pilsner yeast. The temperature of the beer stayed right around 54-56 degrees F (12-13 degrees C).

The result? No perceptible fruitiness, nor did I get that luscious malt/hop balance that I was striving for. I got a very good, light golden, sparkling clear beer that reminds me of Boston Lager; good but not what I wanted. My questions are: 1) Is 54 degrees F (12 degrees C) acceptable for lagering? I find it hard to believe that the caves used in early lagering were at the 34-38 degree F (1-3.5 degrees C) mark recommended. 2) Is a decoction mash worth the time and trouble? 3) Couldn't I just boil some of the mash after starch conversion to achieve that malty character alluded to by lager gurus? 4) Will disco ever come back?

Lazy lagerer,
Ben Bock
Milwaukee, WI

Dear Ben,

Budvar Budweiser; that's a 6-pack I'd envy anytime. Good stuff and worth trying to brew close to. To answer your questions, 54 degrees F (12 degrees C) is excellent for primary fermentation. Actual lagering temperatures would be best done at temperatures in the 40s F (5-9 degrees C) range and even as low as 32 degrees F (0 degrees C). Yes I agree with you, I'm sure caves were not kept at the 34-38 degree F (1-3.5 degrees C) range most modern brewers recommend. But then again, the Budvar Budweiser you enjoy today may be kept in caves, but my supposition is that they have modern equipment allowing for colder lagering ranges. Furthermore the Budvar Budweiser of natural cave temperature days was likely most excellent but perhaps a bit fruitier (relatively speaking). The natural days of old provided a product that was not shipped great distances, but consumed locally and fresher and with an examination of current sad trends it probably had more hop character than modern day versions. That's my guess.

Is a decoction mash worth the time and effort? Other experts would argue NO! But I probably agree with what you're thinking. How do you get that nice malty character in your beer—similar to the classic Czech and German Pilseners? I think decoction does make a difference. Some Germanic brewers are getting away from decoction. Some Germanic Pilseners are getting away from the character you and I appreciate. Homebrew minds wonder don't they? If decoction isn't your bag, then try adding five percent wheat malt along with another five percent of some specialty malts such as Belgian *(continued on page 81)*

1998 Homebrewer of the Year

Ichiri "Hino" Fujiura

AWARD SPONSORED BY MUNTON'S P.L.C.

By Michael Bane

When I first met Ichiri—"Hino" to all his Internet friends—Fujiura, he was smiling like a crazy man and flashing a bottle of dark, chocolate-colored brew.

"You've got to try this," said then-AHA Director Jim Parker, "and guess the secret ingredient."

He poured me a small glass of Ichiri's dark brown beer. It was, flat out, one of the best porters I'd ever tasted. And there was a strong hint of...of...of...

"Coconut," said Ichiri. "Toasted coconut."

Now the 39-year-old software consultant, part-time lecturer on digital graphics and beer writer has ridden his Toasted Coconut Porter to Homebrewer of the Year, the first brewer from the Land of the Rising Sun to be so honored.

Ichiri Fujiura, Tokyo, Japan

The Challenge

Homebrewing in Japan is not without its challenges.

"I began homebrewing with a starter set that I purchased at the DIY specialized department store," Ichiri says, via e-mail, from Japan. "I can't explain that kind of store, because, such stores do not exist in the U.S. That store is like home center, but they have more variety of goods. They have art materials, stationary, electric parts, electric appliances, spices, cooking equipment, bike parts...and beer kits, starter sets."

Luckily, he discovered a community of homebrewers on-line on Japan's largest BBS service, NiftyServe, like America's AOL. After a few runs with the kits Ichiri shifted to all-grain brewing. But not before joining the AHA and ordering much equipment and supplies from across the Pacific. Although kits are in ready supply, there is only one homebrew specialty store.

"We have to import most of the ingredients and equipment we use, if we use unhopped extracts or specialty grains," Ichiri says.

His award-winning porter recipe grew out of an issue of ***Zymurgy***.

"I brewed the porter based on a recipe from Graham Wheeler and Rodger Protz's 'Brew Classic European Beers at Home' in the Spring 1997 issue (Vol. 20, No. 1). It had a good chocolate character," he says. "At that time I wanted to try to create a specialty beer. I thought, 'What is a good partner for chocolate?' I thought a nut flavor is one of the best. However, I knew there are some nut-flavor dark ales in commercial brew. My next candidate was coconut."

Ichiri tried a small batch of coconut.

"I was good, but I needed a stronger coconut flavor," he says. "For the second batch I increased the amount of coconut and changed the malt bill. It was worse than the first one. It was overcarbonated, and the chocolate flavor was decreased."

The third batch, with double the amount of coconut but using the original malt bill, was the lucky one.

Umeshu Bins

Right now his homebrew system consists of a five-gallon beverage cooler with a plastic false bottom (Phil's Phalse Bottom) for mashing and lautering; seven and one-half- and five-gallon stainless pots, some plastic buckets, one carboy and eight-liter "umeshu bins" for primary and secondary fermentation.

"'Umeshu bin' means a kind of glass jar for making 'umeshu,' a kind of liqueur made by steeping plums in a distilled liquor (like vodka) with sugar," Ichiri says. "There are some commercial examples, however, homemade umeshu is popular in Japan."

In addition to his kegs, Ichiri has four refrigerators in his tiny apartment.

"So I don't need any kind of heater in winter," he says. "Actually, I used the air conditioner to cool my room until mid-December last year."

Oh yes, one-half of one refrigerator is used for food.

Next up?

"American-style Pilsener," he says.

We can't wait.

PHOTO COURTESY OF ICHIRI FUJIURA

1998 Ninkasi Award Winner

Art Beall

AWARD SPONSORED BY
BOSTON BEER COMPANY

Art Beall, Hudson, OH

For Art Beall homebrewing was a way to get back to his roots...sort of.

"I have an undergraduate degree in chemical engineering," says the 41-year-old Beall, presently working as a software engineer. "It's great to have a hobby that is still sort of tied to chemistry, my first love. Homebrewing helps me cherish my roots."

The one thing Art likes as much as chemistry is beer. While on the job up in Canada, he tasted some different beers that got him thinking. In 1979, he made a stab at brewing his own, using a kit—"I don't even think we boiled it," he says. A couple of stabs at homebrewing in 1980 ended in failure. Then he moved to Ohio, got married and bought a big house—with a big basement.

"I looked at that basement with nothing in it, and I got to thinking again," he says.

Later this year he's headed to Boston Beer to brew with the Sam Adams guys ("Gonna be so fun!"). He's also pining over a broken mash paddle. "We carved it out of maple and Charlie Papazian signed it," he says. "Then I broke it. Do you think he'd sign another one?"

No problem, Art.

1998 Meadmaker of the Year

Ron Badley

AWARD SPONSORED BY
MADHAVA'S MOUNTAIN
GOLD HONEY

Ron Badley, Reno, NV

Ron Badley credits his Dad, a winemaker, with launching his experimental ways.

"He was never afraid to experiment," Ron says. "He made wine out of just about everything."

After several years of near misses, Ron has settled into the groove. He repeats in 1998 as Meadmaker of the Year, adding a key lime red pepper mead to his award-winning repertoire. It was Thai food that inspired him to give that combination a try.

"I'm really into foods," he says. "There are a lot of Thai dishes that use lime, hot peppers and ginger. I was thinking about adding ginger, but I just never got around to it. I also thought it might make the mead too complex."

An additional challenge with fruit mead is getting the aromatics, present in the fruit zest, balanced with the more subtle flavors found in the fruit juices.

He's also issued a challenge for meadmakers around the world. With spice mead and fruit mead wins, next year Ron is entering a traditional mead.

"I'd like to invite all the meadmakers to send in their best traditional mead," Ron says. "Then we're all competing on a level playing field!"

1998 Cidermaker of the Year

Gloria Franconi

AWARD SPONSORED BY
WIDMER BROTHERS
BREWING COMPANY

Gloria Franconi, Red Hook, NY

One thing is for certain—Gloria Franconi, this year's Cidermaker of the Year, knows how to put on a party.

Along with husband Bruce she owns and runs Party Creations, a homebrew shop in Red Hook, NY. She began brewing beer in 1990, then added cider to her recipe list three years later. By 1995, she was snagging blue ribbons.

"We started group pressing at our shop five years ago," she says. "We'd get a group together to both pick and press the apples, then everyone shares in the outcome."

This last year, the group picked a trailer and pick-up load of apples—Northern Spy is her favorite—which yielded 120 gallons of juice.

She then made a tea with some mulling spices and added enough to flavor the cider.

Her advice to new cidermakers?

"Start with a juice that is not only sweet but tart and flavorful as well, so there will be flavor left when the sugar is gone," she says. "Don't go overboard to make a strong alcoholic cider; keep it reasonable so you can enjoy it. And have a lot of patience."

Michael Bane is the editor of *Zymurgy* magazine.

Find all of the gold-medal recipes starting on page 58.

PHOTOS COURTESY OF ART BEALL, RON BADLEY AND GLORIA FRANCONI

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FOR THE BEGINNER

Amahl Turczyn

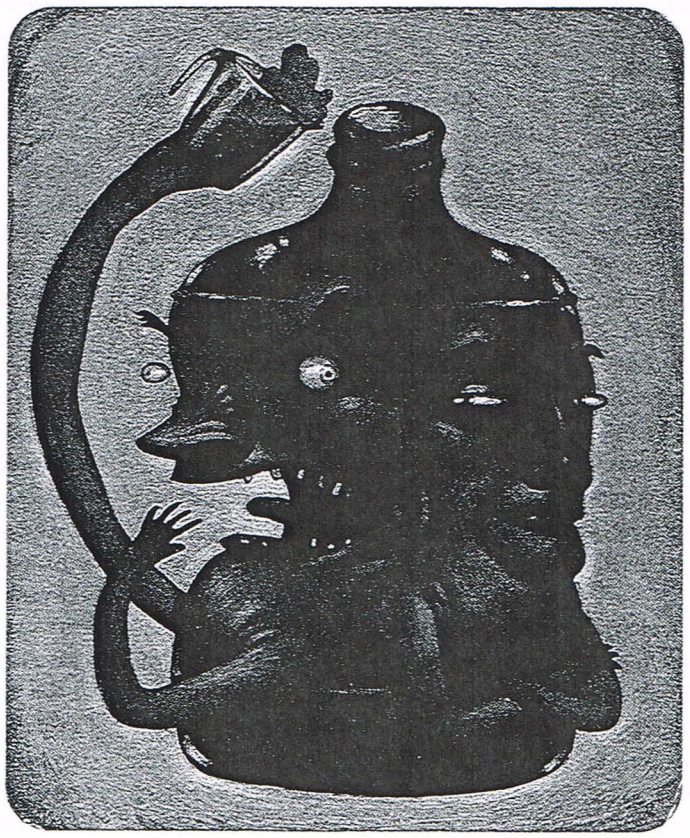
Getting Started with Liquid Yeast

Why liquid yeast? Take a handful of raisins—you know, dried grapes—and soak them in water overnight. Now take a bunch of fresh grapes and compare the two. OK, it's not a perfect analogy, but you get the point. Those water-logged raisins have taken some punishment, and in the process have not only lost most of their charisma but also some nutritive value, vitamins, etc. In the brewing world, most of us don't care how the yeast cells look—brewing yeast is brewing yeast, and at the peak of its health your average yeast cell is still pretty ugly. But how will a living organism's quality of life, and therefore its performance in your beer, be affected by the human equivalent of mummification?

The bottom line is no matter what your level of brewing experience, whether you are brewing from a kit, from malt extract or from grain, you should consider using liquid yeast. Not only are you more likely to find more viable cells in a fresh liquid suspension or culture, but you also will find a much greater variety of strains available than with dried yeast.

The drying process that yeast goes through to produce the packets commonly found in kits is pretty traumatic for the little critters. In fact, only a limited number of particularly hearty brewing-quality strains can be dried successfully. It is unlikely, therefore, that you will ever see a dry Belgian abbey-style yeast, or a dry Kölsch strain. And the drying process puts a huge amount of stress on the yeast, no matter how hardy it is. This can translate into poor yeast performance in your beer, which means it could be producing off-flavors it wouldn't produce under normal circumstances.

Another reason to steer clear of dried yeast is its purity. To be fair, there are some very clean dry yeast strains available from some of the larger, more reputable companies, like Llalemand and Muntons, but there also are some available that may not have as discriminating a quality control department. Again, bad things can happen to yeast when it becomes stressed by drastic changes in pH, temperature and other factors, and there's just no way of getting around this in the drying process. Stressed yeast are far more vulnerable to infection, and you may be pouring those extra organisms into your prized batch of pale ale right along with the yeast.



Yeast in liquid suspension, however, is in its natural state, and with careful handling can be kept healthy and happy right up until the time you chuck it into your brew. That's not to say liquid yeast doesn't have its own drawbacks, however...

ILLUSTRATION BY BRENDAN DANIELSSON

Special Concerns

The nice thing about somebody who happens to be freeze-dried is that they're tough. You can leave them on a shelf in a shop at room temperature for months on end and, generally speaking, they'll be no worse for wear. Living bodies are far more perishable. Liquid yeast requires refrigeration to keep it happily dormant while you are preparing the medium in which it eventually will flourish, and any period of warming will decrease its viability. So don't leave it on your dashboard in the heat of summer while you run a few more errands. Keep it in a dark place, as close to the temperature at which it was being stored in the homebrew shop, and get it into your own refrigerator as soon as possible.

Even under refrigeration liquid yeast deteriorates far more quickly than dried. Freshness is imperative, especially when purchasing a vial of yeast slurry (like the White Labs brand), as opposed to a foil smack-pack, (like Wyeast) unless, of course, you plan to do a culture.

Yeast culturing is a whole different can of worms; Pierre Rajotte's *First Steps in Yeast Culture* is an excellent resource if you wish to try your hand at it. Ask your homebrew shop expert for the freshest yeast he or she has. All major brands date their yeast, so if their vials of slurry yeast are over two weeks old, realize that if you simply dump that yeast into five gallons of beer wort you're going to have some waiting to do. If you simply cannot get vials fresher than two weeks, consider either purchasing two or even three vials per five gallons or, again, preparing a culture.

For smack-pack type yeast, age is still a critical factor, but is more an inconvenience than a concern. For each month the pack has been sitting around you'll have to wait about a day for the product to reach its optimum state of readiness for pitching. It probably is not wise to use packs that are four months old or older.

Well OK, if colder is better as far as the storage of liquid yeast is concerned, how about freezing? Yes, you can do it, but without proper precautions, like the judicious use of a glycerin solution, you are likely to end up rupturing the cell membranes, which is generally a big bummer for everyone concerned. Generally, it is best to store yeast as cold as you can without freezing it.

The Lowdown on Yeasts

	Slurry Vial (White Labs)	XL Smack Pack (Wyeast)
Quantity	good: 30-50 billion cells	fair: 10.5-17.5 billion cells
Purity/Reliability	excellent	excellent
Time to pitching from refrigeration temperature:	1 hour from "smack"	about 1 day per month of age
Lag time	5-15 hrs (if vials are two weeks old or fresher) (pitch to ferment)	10-25 hrs (if pitched right as pack swells to 1 inch thick)
Perishability	poor: two-week-old vials will have a longer lag time	good: unsmacked packs will keep up to four months, but time to pitch is longer
Retail average	$4.00	$5.50
Availability	Nationwide	Nationwide

A low temperature is important for preserving yeast, but perhaps just as important is maintaining a constant temperature. It's easy to make the same mistake that some dry yeast companies make and subject your yeast to thermal shock. One of the most typical examples of this is forgetting to bring the yeast up to pitching temperature gradually before adding it to your beer. Say you are making an ale and have two vials of yeast in your refrigerator. You finish your boil, chill the wort down to 68 degrees F (20 degrees C) and rack it to your fermenter. Then, remembering that you were going to give liquid yeast a go for this batch, you grab it out of the fridge and dump it in. No! Wrong! You have just committed a liquid yeast faux pas. Your refrigerator probably is around 42 degrees F (6 degrees C). The beer wort is 68 degrees F (20 degrees C). That's a temperature difference of 26 degrees F (16 degrees C) in a matter of seconds! Jumping from sauna to snowbank may be invigorating for some, but in the case of yeast it is very likely to increase your lag time, which is one of the best ways homebrewers can encourage off-flavors and possibly even infection in their beer. Depending on how warm it is in your brewery, you should take the yeast out of cold storage about one hour before you plan to pitch it. That will give it ample time to adjust to the warmer temperatures. The rule of thumb is that any immediate (or at least within a matter of seconds) changes in temperature should never exceed a difference of 18 degrees F (10 degrees C). Ideally, you should try to stay within half that range.

Smack-packs or Vials?

Liquid yeast is available in two forms, each with its own advantages and disadvantages. As far as culture purity, both Wyeast and White Labs have an excellent record and are highly recommended. Wyeast currently has a wider variety of strains to offer, with several unusual offerings, especially in their Belgian line. White Labs' strains have the advantage of a higher number of cells per unit, which means a faster start and generally better beer. Wyeast does offer a large-sized version of their smack-packs, namely the XL packs, and I would recommend that brewers always use these for five-gallon batches, or use two of the smaller packs; without doing a culture one just isn't enough and your lag time will be maddeningly long.

One advantage White Labs has is convenience. You decide you want to brew and think you have some good yeast that you've saved from a previous batch, but when you open it, it smells like the inside of a used diaper. What do you do? Even in the unlikely event that your local brew shop has received a shipment of fresh Wyeast packs that day, they will still take four to six hours

until they're ready. That's a heck of a long time to wait if you are used to force cooling.

But in most areas you can still go down to your local shop and pick up a couple of vials of White Labs yeast and (with a proper warm-up!) pitch them right in. The down side to this convenience is that you have to get the vials with a very recent date on them. The Wyeast packs require that you break the inner seal of the pack by smacking it, which mixes the liquid yeast with a culture medium. The yeast then grows to a pitchable amount over a period of hours or days, depending on the pack's age and the surrounding temperature. Wyeast suggests 75 degrees F (24 degrees C). When the yeast is ready, the pack will swell to one inch or more, and that is the best time to pitch. Hopefully, this won't occur at one in the morning, but if it does and the pack overinflates, don't despair. Conditions may be a bit past optimum, but the yeast will do fine.

Although White Labs advertises its vials of slurry as containing "pitchable quantities," I hesitate to agree. They definitely have a larger quantity to offer than Wyeast, if one wishes to avoid culturing, but I prefer to pitch a minimum of two vials per five gallons if the date on the yeast is within a week. If it is not, I pitch more. It may seem like you are spending a small fortune on yeast by doing this, but if you can cut your lag time down to six hours or less and all your sanitation procedures are sound you can pretty much guarantee a healthy ferment.

There are other yeast companies out there with liquid yeast, among them the Yeast Culture Kit Co. and Brew Tek. They have some great and unusual strains, but as far as I know do not offer them in pitchable quantities. You need to culture them, which cuts down significantly on the convenience factor. But once you get used to using liquid yeast, you should definitely check them out.

Repitching Liquid Yeast

Thankfully, there is an alternative to going out and buying armloads of commercial yeast packages each time you brew. If you are confident of your sanitation and satisfied with the quality of the beer you brewed from a particular strain, you can save the yeast slurry that settles out at the bottom of your primary fermenter and pitch it back into your next beer, provided you take good care of it in the interim. If you use it within a couple of weeks, your next beer will have a decent pitching rate (since you'll have nearly a quart of the stuff per five gallons if all goes well) and will take off like a shot. Depending on the strain, your sanitation and the size of your...uh...risk-taking capabilities, you may be able to repitch that one strain several times in a row, just like the pros.

There are several different methods for saving yeast, but the simplest is to sanitize a clean, scratch-free plastic container with an airtight snap-on lid (or better, if you have the time, you can use a glass quart-sized Mason jar, which can be heated for 15 minutes in a pressure cooker to sterilize it). Clean and sanitize the top of your fermenter after racking the beer from it. It helps to leave a cup or so of beer on the bottom with the yeast. With the airlock still on, swirl the beery yeast slurry into a consistent, muddy mass. Then, working quickly, spray your counter top with sanitizer, open the plastic container and pour out the sanitizer (or open the cooled, sterile Mason jar) and pour the slurry into it. You can keep the plastic container closed; the lid may swell at first, but you can simply burp off the pressure. With the jar, remember that the yeast will continue to emit CO_2, and sealing it too tight may cause the jar to burst, causing all others who frequent that refrigerator to hate and despise you for several days. So remember to crank the lid down snugly, but so that gas can still escape. Using this method, I've kept the same yeast up to 20 generations!

For more information, please check out these sources:

Pierre Rajotte, *First Steps in Yeast Culture, Part One*. Alliage Editeur, copyright 1994.

Wyeast Laboratories, www.wyeastlab.com, (541) 354-1335

White Labs, www.whitelabs.com, (619) 693-3441

Amahl Turczyn is the former AHA Project Coordinator and has been apparently brewing forever.

WORLD OF WORTS

Charlie Papazian

Sinking Into a Cold Creek Lager

There's no end to the improvements in ingredients and supplies that homebrewers have experienced in the past 20 years. I remember stale hops and pale, crystal and black malt being the only choice of grain. I also recall the yeast we used. It made OK beer, but if you didn't like bananas or phenolic character you often skipped on to another hobby. Things have changed mightily. We're in a homebrewer's wonderland when it comes to access to great ingredients.

I started brewing with live wet yeast culture in 1983 when my friends at a brewery gave me two mysterious "good" yeasts—one a lager, the other an ale. I brewed great beer with both of them. In fact, I still brew regularly with the lager yeast, which I'm sure has mutated beyond recognition, but still brews a great beer, clean and attenuating. It turned out that the mysterious lager beer yeast had been cultured from a keg of Budweiser, which I found out only a couple of years ago. All those years I brewed imperial lager stouts, bocks, IPAs (or were they IPLs?), pilseners and everything else. I think these were some happy Bud yeasts!

But I must admit with a great degree of certainty that using dependable wet live yeast was the biggest jump in brewing quality in my homebrewing. In 1983, wet live yeast cultures were still not commercially developed for the market. Homebrewers were on their own. But then along came the innovations Wyeast introduced to craft brewing, and others followed.

When it comes to beer quality I don't mind one single iota paying extra for quality I can count on.

I once asked a group of homebrewers what would be their decision if they were at a bar, restaurant or tavern and were given the choice of paying 20 cents more for a bottle of beer if they knew it was something they would really enjoy more? Would 20

ILLUSTRATION BY STEPHEN COSTANZA

cents be an issue? Well, the answer was unanimously in favor of paying 20 cents more for the quality.

Putting this into another perspective: 20 cents more for each bottle of beer translates into spending $10 more on your next five-gallon batch of beer. Is it worth it? Every extra one dollar spent on a five gallon batch of homebrew adds only two cents cost to each bottle.

Soap Box Time

Now, why would I make this point? We were talking about yeast, weren't we?

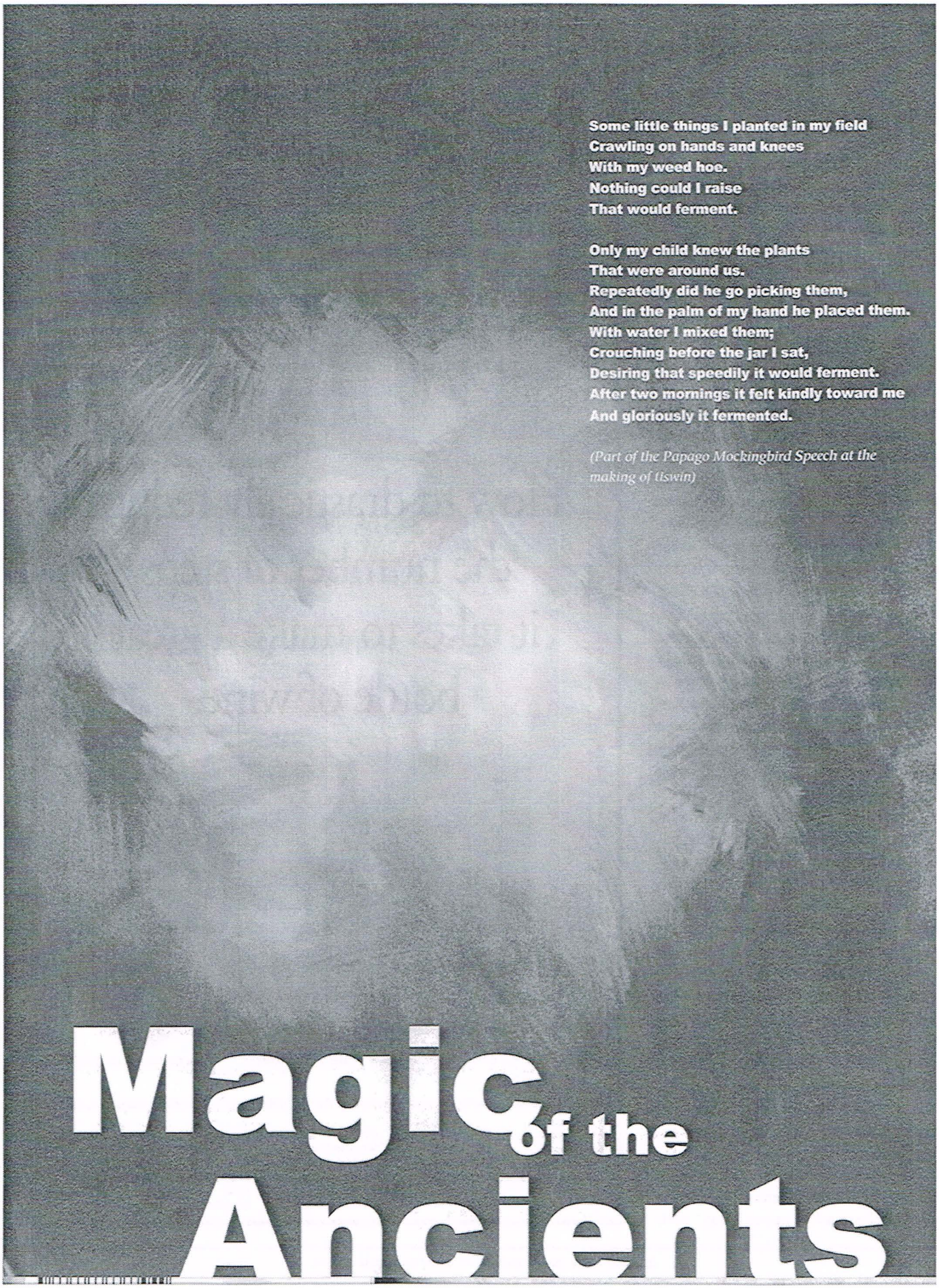
A little history is in order. I had a conversation with a manufacturer of dried yeast. They supply good dried yeast and excellent dried yeast. I was dumbfounded when I learned that a homebrew distributor hesitated to carry the better-quality yeast because it would translate into costing the homebrewer perhaps up to a dollar more per batch. The bottom line is that quality products cost more than their cheap competitors. And using quality products, whether they are hops, yeast, malt or other supplies, makes an enormous difference in the beer we take a great deal of care to make. I was a bit pissed off that a distributor (or even, for that matter, manufacturers of kit products) would sacrifice quality for a lower cost. Isn't that what homebrewing is a reaction against?

If the distributors and manufacturers believe this, I think they should reconsider and at least make the better-quality products available to us with the understanding that it costs a little more. But perhaps more importantly, homebrew enthusiasts need to reassess their values if there is a majority perception out there that we want cheapness and lower quality, because that's what lower prices must equate to. I believe for the most part the silent majority is after quality. Perhaps the inadvertent minority seeks out the lowest price without exception. You can't get around it. Supercheap prices mean lower quality and less access to variety and quality.

Furthermore, groups of homebrewers, I think, often sabotage their own hobby by seeking cheap prices at any "cost," such as going around their local supplier and trying to buy wholesale. Yes, homebrew groups deserve a little break, a discount from their local retailer if buying in volume on a regular basis. Of course, there's this other side—shops providing good service and reasonable discounts to volume buyers. That's normal business in any business. But when groups organize to buy in great discount through outlets other than their established retailer, they make it rough for their local supplier to provide the shelves of quality products and good service. They ultimately destroy their own access to supplies. The bottom line is if you want to make quality beer, you're dependent on quality products and service. I'll get down from the soap box. Thank you.

On with the Yeast

I have a 23-gram yellow package of S-23 Saflager dried lager yeast. This package inspired not only *(continued on page 76)*



Some little things I planted in my field
Crawling on hands and knees
With my weed hoe.
Nothing could I raise
That would ferment.

Only my child knew the plants
That were around us.
Repeatedly did he go picking them,
And in the palm of my hand he placed them.
With water I mixed them;
Crouching before the jar I sat,
Desiring that speedily it would ferment.
After two mornings it felt kindly toward me
And gloriously it fermented.

(Part of the Papago Mockingbird Speech at the making of tiswin)

Magic of the Ancients

Ancient peoples didn't have microscopes, but they knew there was a unique and special substance that came through the air and caused the wort to become ale. And to all ancient and indigenous peoples it was considered sacred and magical, filled with power.

Ancient Norwegian terms for this substance are suggestive of how it was thought of, its meaning: *gjar* = working, *gjester* = foaming, *berm* = boiling, *kveik* = a brood that renews a race, *nore* = to kindle a fire, *bryggjemann* = brewing man and *fro* = seed. All the terms are suggestive: there is a boiling, a fire being kindled, a new race being born. The commonness of terms associated with burning, boiling and kindling a fire, for instance, are interesting. Yeast works through a rapid oxidation of the sugar, a kind of burning. And when they are their most active the brew, the wort, actually bubbles energetically.

This association is clearly a part of older terms for yeast. A term meaning "boiling" is used throughout the world. And when preserved yeast is added to new batches of beer, it is a brood renewing a race that has been dormant. (It is interesting that *kveik* comes from the same root word as *kvaser*—the Nordic being from whose blood the original beer, the "mead of inspiration," was made).

Birth of a Good Spirit

The Charoti of South America view the moment of yeast activity as "the birth of the good spirit" in the wort. The Charoti also say there are many bad spirits that will try to prevent this birth, so the tribe sings and play musical instruments while exhorting the fermentation to begin. Once the good spirit enters the wort, they say, it is powerful enough to stop any bad spirits from getting into the beer.

Throughout the ceremony of encouraging the good spirit to enter and begin fermentation, the Charoti singers keep their attention focused on the essence of the good spirit, calling its intelligence into awakening, urging it to hear their call, exhorting it to come to them and settle into the home they've prepared for it.

Hearing this without prejudice and comparing it to the perspectives of Western brewers, it's not so different. We wish only one yeast, the good one, to come and ferment our beer. And we take steps to prevent the bad ones from getting there first. We know, too, that once the good yeast is in the wort, it is very difficult for a bad one to gain entry. Rightly or wrongly, we place our emphasis on sterility and using store-bought yeast.

Holding the Space

The Tarahumara of northern Mexico brew a beer called *pulque* from the sweet sap of the agave cactus and, as with many cultures, they, too, pray to usher in the spirit of fermentation. Like the Norwegians, they believe they must be of particular mindfulness when the moment comes because if they're not—if they don't "hold the space" for the spirit to enter the wort—it won't ferment. The Tarahumara call it "boiling" when fermentation begins, and they use special fermentation jars that are considered sacred and are never washed. Once a jar "learns to boil" it is placed near other jars (filled with unfermented *pulque*) that have not learned how to boil so that they might be taught to do so. Interestingly, the Tarahumara place wormwood, an *Artemisia* species, on top of the covered jars once they start fermenting to "frighten away the evil spirits who might want to spoil the liquor." *Artemisia* is strongly antibacterial, antiseptic and antifungal—it can be used in the treatment of yeast infections.

The Ainu, the indigenous tribal culture of Japan, see fermentation in much the same way. When the wort is ready they circle around it and make prayers and offerings to *Kamui Fuchi*, the hearth goddess and guardian spirit. They call on her to protect the wort from the intrusion of "bad spirits" that can infect the wort and to help bring the good spirit to awaken their rice or millet beer into potency. In return, like the majority of cultures on Earth, they make an offering of the first drink of beer, poured onto the hearth. While the beer is fermenting, they chew quantities of mugwort, another *Artemisia* species, and place it around the brewing vessel to protect it from infection.

Running Wild

One of the major teachings of ancient and indigenous cultures is that yeasts, like other plants, respond to being talked and sung to, to being "treated like a human being." Most beer recipes suggest the use of a domesticated store-bought, yeast. But, if you can bring yourself to experiment, you might try making some of them with wild yeast. When the wort is ready you might leave it out, uncovered, in a container with a wide opening. Then sit near it and begin to talk with the spirit of the yeast—to call on the *bryggjemann* or *kveik* to come—and see what it is like. To do so means reconnecting to an ancient tradition of fermentation—to connect to the thousands of wise women and wise men standing over their brewing vessels in small villages around the world calling on the spirits of fermentation to come to the wort and kindle the fire in it. Once you have brought a wild yeast to live at your home, like the Norwegian brewers, you can place a carved stick in the fermenter and allow the yeast to fall deeply within its carvings. When the beer is finished, take the stick out and hang it up to dry somewhere out of the way. At your next fermentation take it down and place it in the fermenter and call on it once again to awaken to life.

If you do take the risk to call on a wild yeast and the wort turns out badly, what will you do then?, you might ask. The ancient brewers might answer, "Perhaps you will have to dance harder the next time."

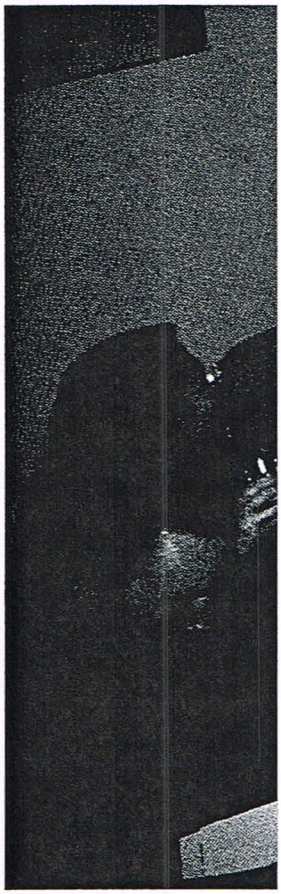
Stephen Harrod Buhner's new book *Sacred and Herbal Healing Beers: The Secrets of Ancient Fermentation*, was published by Siris Books in September.

By Stephen Harrod Buhner

God made yeast, as well as dough and loves fermentation just as he loves vegetation. —Ralph Waldo Emerson

Yeast is Yeast

...Or Is It?



"If all beers are made from malt, hops and yeast, why don't they all taste the same?"

This question has no doubt been posed to you by at least one curious acquaintance since you began brewing your own. When I first started homebrewing and was asked this question, I did my best to share my limited knowledge of the wide variety of grains and hops used in beermaking and their role in the creation of different types of beers.

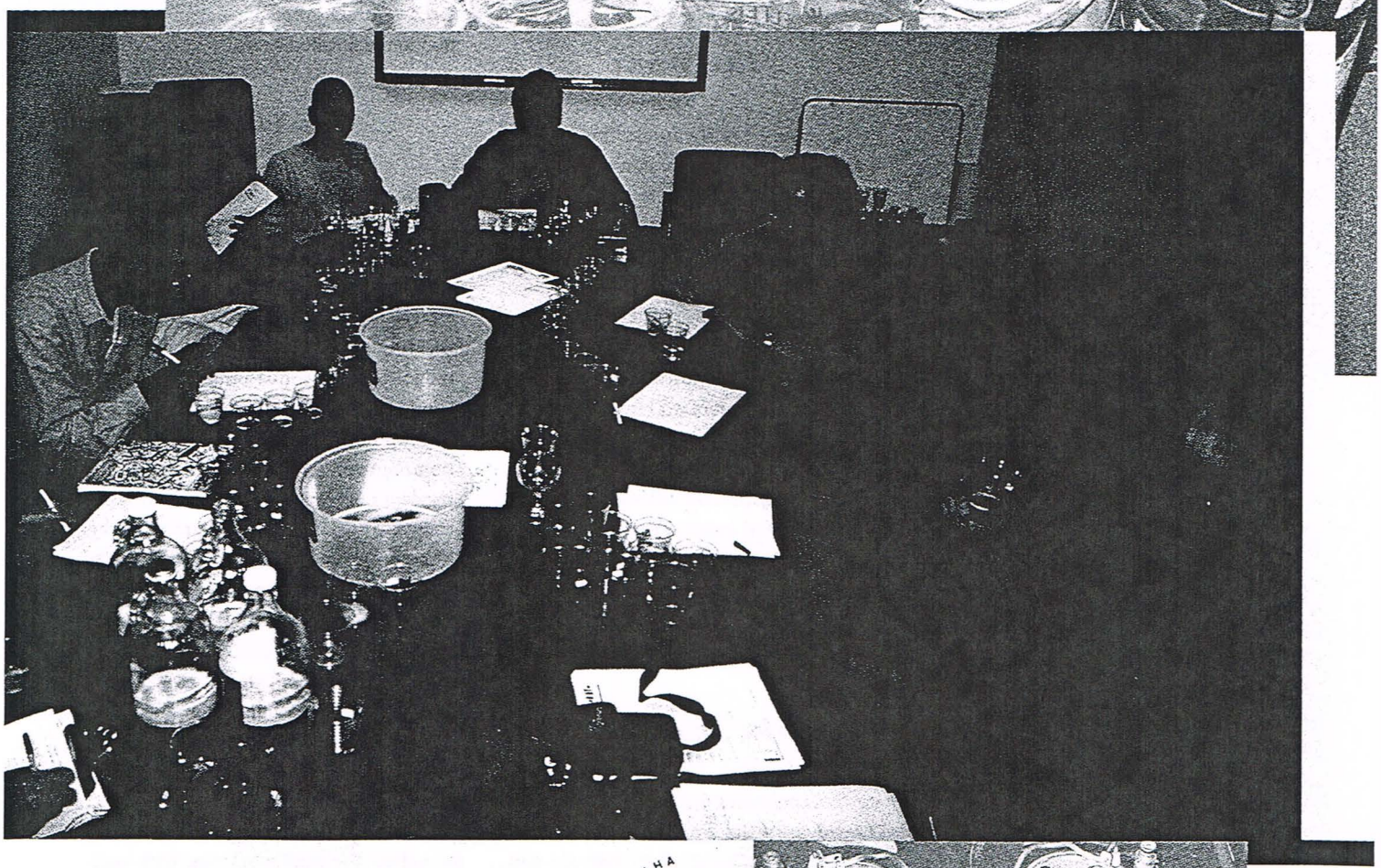
But for a long time yeast was a mystery to me. Like most homebrewers I knew at the time, I was fermenting my early, extract-based beers almost exclusively with dry ale yeasts. These beers varied so widely in flavor and quality that it was impossible for my inexperienced palate to distinguish what characteristics—good, bad or neutral—a particular yeast had on my creations.

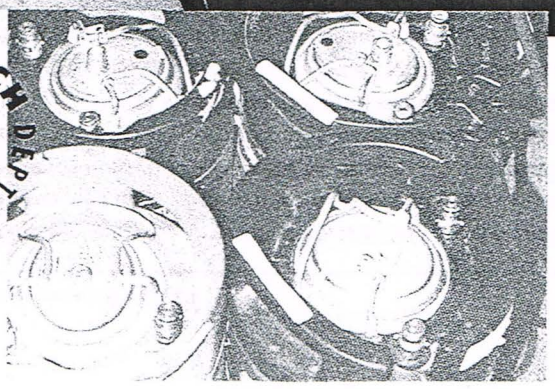
At that time, around 1991, a variety of liquid yeasts were beginning to appear in the homebrew shops I frequented. These yeasts were favored by the more advanced homebrewers I met. As I learned more about beer styles and sampled some well-made homebrews fermented with different yeast strains, I realized that the styles of beer I was able to brew using my dry ale yeast were limited.

Over time, as my brewing skills increased and the quality of my beers became more consistent, I began experimenting with a variety of liquid yeasts. More and more I came to appreciate the attributes that different yeasts imparted and the importance of selecting a suitable yeast for the style I was attempting to brew. While commercial brewers may be limited in the variety of yeasts they can maintain, there's no reason for you, a homebrewer, to limit your

A Yeast Road Test

By Dan Rabin





AHA RESEARCH DEPT.

An official AHA Road Test.

PHOTOS BY DENISE E. JACKSON © 1998

12 Yeasts Put to the Test

Edme Dry	Wyeast Abbey II #1762
Muntons Dry	Wyeast Trappist #3787
Nottingham Dry	Wyeast Belgian White #3944
White Labs British	Yeast Labs Australian
White Labs East Coast	Yeast Labs Canadian
White Labs English	Yeast Labs Strathcona

selection of yeasts to a few known performers. This is especially true if, like me, you derive much of the joy of homebrewing from creating quality beers in a variety of styles.

A problem with this is trying to stay current with the plethora of yeasts now available to homebrewers. In an attempt to help our readers stay up-to-date with current offerings, we conducted an evaluation of a diverse sampling of yeasts from several different yeast suppliers.

Coordinated by former AHA Project Coordinator Amahl Turczyn, and carried out by Amahl and myself, the experiment itself was quite simple. A quantity of wort was divided among 12 carboys. Each was fermented with a different yeast under identical conditions. A panel of experienced judges evaluated the beers in a head-to-head tasting. The results: not all yeasts are created equal.

The Yeasts

Three yeast supply companies—White Labs, Wyeast and Yeast Labs—were invited to submit "a pitchable quantity" of several varieties of their yeasts for inclusion in our assessment. Our goal was to assemble an assortment of yeasts, with an emphasis on varieties that recently have become available or varieties that many homebrewers may be unfamiliar with.

Three yeasts were chosen from each of the three suppliers, totaling nine different yeasts. In addition, three popular varieties of dry yeasts were purchased for inclusion in the evaluation. Only ale yeasts were accepted for this experiment. The 12 yeasts are listed above.

We received two vials of each of the White Lab yeasts, one extra-large smack-pack of each of the Wyeast yeasts, and one vial each of the Yeast Labs yeasts. In addition, we purchased two small (5-gram) packets of the Muntons and Nottingham dry yeasts, and one large (11.5-gram) packet of the Edme dry yeast.

The Wort

In order to fairly assess the different yeasts, it was necessary that they be used under identical conditions. This included using the same wort to ferment. We sought a well-balanced wort of medium gravity and IBUs, lacking any unusual ingredients or assertive flavors that might mask aromas, flavors or other characteristics of the beers.

We were fortunate and thankful to receive a donation of wort from the Redfish New Orleans Brewhouse in Boulder, CO. Redfish brewer, meadmaker and former homebrewer Brian Lutz offered a portion of a freshly brewed batch of his Wild Magnolia Pale Ale. According to Brian, the beer has a starting gravity 12.5 °Plato, and 29 IBUs. As it's served at Redfish, it displays both a medium malt and medium hop character.

The Process

We coordinated our efforts with Brian's brewing schedule, arriving at the Redfish brewery while a batch of the pale ale was nearing the end of a 90-minute boil. A while later, the wort passed through a heat exchanger and was transferred into our collection of sanitized five-gallon carboys. As four gallons of wort were collected in each carboy, the yeasts were pitched.

A day prior to collecting the wort the three Wyeast smack-packs were activated and were quite swollen by pitching time. Shortly before pitching time, the three dry yeasts were rehydrated in a small quantity of boiled, cooled water. The vials of yeast slurry from White Labs and Yeast Labs were pitched directly from their original packaging.

For the next two weeks, the 12 carboys were kept at 68-70 degrees F (20-21 degrees C). Within 24 hours of pitching all 12 worts were actively fermenting. A week later, when most fermentation activity had subsided in all the worts, the beers were racked and allowed to settle out for another week.

The beers were then transferred to five-gallon Cornelius kegs and stored at 38 degrees F (3 degrees C) for one more week. During that time, the kegs were injected twice with CO_2, producing a light carbonation in the finished beers.

The Tasting

To evaluate the 12 beers, we assembled a tasting panel comprised of six individuals with extensive beer-judging experience. The group included Matt Gilliland (cellar operator, New Belgium Brewing Co.), Jim Homer (Beer Judge Certification Program national judge, Great American Beer Festival and World Beer Cup judge, former co-director of BJCP), Bob Kauffman (award-winning homebrewer, experienced judge, former president of Hop Barley & the Alers homebrew club), Dan Rabin (award-winning homebrewer, experienced judge, beer writer), Amahl Turczyn (former American Homebrewers Association Project Coordinator), and Scott Voss (former Institute of Beer Studies Administrator). Several other individuals with varying amounts of beer-judging experience also were present, though their comments were not included in our evaluation.

Each beer was sampled several times throughout the session to assess their qualities at different serving temperatures. Tasters were encouraged to comment on aromas, flavors, mouthfeel, appropriateness for different beer styles and general drinkability. We were, unfortunately, unable to comment on how the yeasts flocculated, as some

Author Rabin gets serious about sampling.

yeast was put in suspension during transport of the kegs from cooler to tasting session.

Here, then is a summary of the comments of the tasting panel.

Edme Dry

Time to ferment: 4 days

FG 4.5 °Plato

An unpleasant mustiness and yeastiness was evident in the aroma. The flavor, described as yeasty and bready, was not unpleasant, and was far better than the aroma would have indicated. Several panel members preferred this over the other two dry yeasts.

Muntons Dry

Time to ferment: 5 days

FG 4.5 °Plato

This beer also displayed some yeastiness in the aroma, though it was much less pronounced than in the Nottingham yeast (see below). The flavor was clean, if somewhat thin, with an initial sweetness and a dry finish. The majority of the panel preferred this yeast over the other two dry yeasts.

Nottingham Dry

Time to ferment: 4 days

FG 2.5 °Plato

This brew had a pronounced yeasty, worty aroma. The flavor was described as thin, with a worty, bready homebrewlike character. Several tasters used the term "typical dry yeast taste" in describing the beer, though one taster preferred it over the other dry yeasts.

White Labs British

Time to ferment: 6 days

FG 4.0 °Plato

Slight raisinlike fruitiness in the aroma. Hops came through. Clean-tasting with some sweetness in the finish and a mineral-like character. Remains clean-tasting and pleasant when warm. Well-suited to this type of wort. One of the bestliked of the 12 yeasts tested.

White Labs East Coast

Time to ferment: 7 days

FG 3.0 °Plato

Slight fruitiness in aroma. Clean-tasting with a dry finish. Its neutral character allows hops and malt to express themselves. Versatile, if unexciting.

White Labs English

Time to ferment: 4 days

FG 2.0 °Plato

Mildly fruity aroma. Malt and hops come through. A complex progression of flavors

Welcome to Yeast-World

I had always wanted to do something like this and it is great that we can share the results with ***Zymurgy*** readers. If we'd only had the resources I would have been very happy to road test twice as many strains and have our unbiased panel of experts evaluate them all. By having the fermentation conditions so similar we were really able to see how drastically different so many of the commercially available liquid strains of yeast are. But although this road test was an interesting and enlightening experiment for all of us, we did recognize its inherent flaws, and anyone who seeks to benefit from our findings has to take these flaws into account.

First, and most obvious, some yeast varieties were simply mismatched with the style of beer into which they were pitched. Trappist ale yeast is just not something you normally would pitch into a 12.5-gravity wort; it deserves a gravity of at least 18 (with all due reverence to Orval, or course). Similarly, the Belgian white strain was very difficult to judge without all the other characteristics of its intended raw-wheat-and-spice beer to complement its yeasty, phenolic flavors.

So it was a challenge for the evaluators to be unbiased when obviously the strains more suited to a pale ale were being tasted head-to-head with ones that were not. Had Wyeast chosen to send three strains from its line of British ale yeasts we would have had more work to do, trying to pick apart those characteristics that made each one distinct. As it was, some strains were quite similar, and consensual differences were found only as the samples warmed.

Temperature Concerns

Another angle to the suitability question was the temperature at which the beer was fermented. Yes, we had to keep everything consistent, but I can't help thinking that some of the strains had a distinct advantage over others at 68 degrees F (20 degrees C). The Canadian ale, for example, probably would have been far happier at 64 degrees F (18 degrees C) than the Trappist ale strain. This also is true of postfermentation conditioning.

Keeping It Fresh

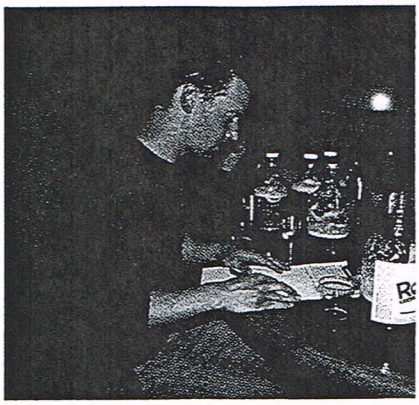
In terms of freshness, each company was very good about rushing us the most recently cultured strains they had, and I'm fairly certain that none of the liquid cultures was more than three days old when we pitched them. But what about the dry strains? Dry yeast airmailed directly from the manufacturer within hours of its production is undoubtedly better than a store-bought sample, so it could be said we were favoring liquid strains. Our reasoning here was that dry yeast is used because of its convenience and price, and is in a category of its own—no one in the group really expected it to hold its own against the others. It should be judged only against the others of its kind.

Finally, and probably most important, was the question of pitching amount. We didn't have the lab facilities available to check that the same number of cells (or even an approximation thereof) was being pitched from each yeast type. We were limited by what the companies sent as a "pitchable amount," even though many homebrewers are sensible and knowledgeable enough to realize that each of these strains would have performed better had a culture been made up first.

I believe this was one reason why the White Labs results were so good: two vials per five gallons is twice as much as the manufacturer recommends normally and, in terms of pitching rates, more really is better. Would the average homebrewer feel it was worth it to pay twice as much for yeast to make sure they got a healthy ferment? We sure hope so—if nothing else, this road test proves the importance of having a good quantity of fresh yeast on hand when you brew.

All in all, though, we hope that brewers will be inspired to make use of the huge variety of yeast strains now available, and to even conduct yeast road tests of their own. If you have the capacity, brew up a 15-gallon batch, or even three five-gallon batches using the same recipe, and pitch a few yeast strains you've never used before. Then have some unbiased, beer-loving friends judge their favorites and come up with some notes on the differences. As you get closer to brewing that Perfect Beer you'll be able to look back through your brew log and have that many more opportunities to match the perfect yeast to the perfect recipe.

By Amahl Turczyn



Turczyn organized the tasting, as well as fermented the samples.

leading to dry finish. Very pleasant. Would work well for most low- to medium-gravity English ales. Considered by most to be best of all yeasts sampled or, at least, the best-suited to this type of wort.

Wyeast Belgian Abbey II #1762

Time to ferment: 5 days

FG 3.5 °Plato

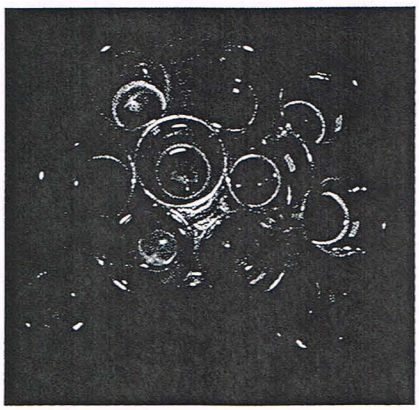
Fruity and slightly floral aroma. Some phenols. Some fruit flavor up front finishing clean and dry. Less assertive in character than the Trappist. Most liked of the three Belgian yeasts sampled.

Wyeast Belgian Trappist #3787

Time to ferment: 6 days

FG 1.5 °Plato

Intensely fruity and spicy aroma of bubble gum, banana, raisin and plum. Phenolic. Thin body with fruit flavors less intense than aroma would indicate. Quick, dry finish. Probably best for high-gravity beers where some residual sweetness is desired.



Note the different colors of the finished brews, despite the same wort.

Wyeast Belgian White #3944

Time to ferment: 7 days

FG 3.0 °Plato

Some sulfur in aroma that dissipates over time. Phenolic aroma took on burnt-plastic character when warm. Flavor better than aroma would indicate. Fruity, pleasant taste with some clovelike character. Though not appropriate for this type of wort, it is undoubtedly better-suited in its intended use, i.e., a Belgian white beer.

Yeast Labs Australian

Time to ferment: 6 days

FG 2.0 °Plato

Very little aroma at first. Some hop comes through as it warms. Neutral in flavor with some residual sweetness. As it warmed the complexity diminished, becoming thin and watery.

(continued on page 82)

The Secrets of Storing Yeast

By James Slaton

I once heard yeast described as the most wondrous creatures on the planet and, in fact, they are.

Consider this fact: they eat sugar and excrete alcohol. Wouldn't you like to be able to do that?

Despite how amazing yeast really is, it gets little press. When was the last time you heard a beer ad mention the kind of yeast they use? Barley, sure. Water too. Even rice, oddly enough. You'd think that beer was nothing but grain, water and adjuncts.

But the simple fact of the matter is that without yeast there would be no beer. Instead, we'd just have flat funny-tasting water. Yum.

So take care of your yeast by storing it properly.

The main thing to remember about yeast, dry or liquid, ale or lager, is that heat is bad. Heat kills or damages yeast, while cold only causes it to sleep, which is what you want. Think of it as hibernation, if you will. When a body isn't active, it's less likely to get hurt or wear itself out.

The Two-Part Solution

The topic of yeast storage has to be broken up into two parts: store-bought yeast and harvested yeast. Beginning brewers (and advanced brewers who don't see the point in making life any more difficult than it already is) typically use the store-bought, either a packet of dried yeast or a liquid. More advanced homebrewers like to harvest yeast from completed batches of beer.

Without getting into the merits or process of either, they have different needs when storing.

Store-bought yeast should, as a rule, be kept in the refrigerator. Your homebrew shop owner knows this; that's why he keeps it there. Refrigerators are perfect climate controllers; they not only regulate temperature but keep a constant humidity level as well.

Even if you live in a cool climate, without a fridge, you can't really control what your yeast is being subjected to.

"But what about the can of hopped extract I buy when I'm really feeling lazy?," you say. "It has a packet of yeast under the cap, which is hardly refrigerated."

Well, have you ever actually used those little packets of yeast? Your fermentation was likely sluggish, if it ever got started at all. Perhaps once it started it petered out prematurely and left you with a bizarrely high final gravity and very unsatisfying beer. Now you know why. Throw those packets away. Buy yeast fresh and store it in the refrigerator.

Keep It Cool, Dude

Charles Palmer, master brewer at Redmond Brewing Co. in Redmond, WA, says as long as a packet of yeast is kept cool, it should last about three months after the date on the package. After that time, he says, the yeast begins to lose some of its viability and may not reproduce fast enough to properly ferment a five-gallon batch of beer.

While both dry and liquid yeasts should be kept cool, it is more critical in the case of liquid than in dry. Because dry yeast is not in a medium of any sort, it's already dormant and less susceptible to harm than liquid. Liquid yeast is more "alive," so to speak, because it is ready to go once it warms up enough *(continued on page 83)*

PHOTO BY RICHARD HARRIS
SPECIAL THANKS TO WHAT'S BREWIN', BOULDER, CO

Inside the Yeast Cell

By David Allaben

Yeasts are unicellular fungi that have characteristics of higher organisms, but simple organization. Like humans, yeasts are classified as eukaryotic organisms. This means yeast has a distinct nucleus surrounded by a nuclear membrane. In contrast, prokaryotes, such as bacteria, do not have a membrane-bound nucleus. Bacteria also lack other cellular structures characteristic of eukaryotes.

Besides a nucleus, other components and organelles comprising yeast cells are: a rigid cell wall, a plasma membrane, cytosol and cytoplasm, mitochondria, ribosomes, endoplasmic reticulum and a Golgi complex and vacuoles. Organelles are specialized structures having characteristic appearances. Organelles contain specialized chemical environments and enzymes that perform a multitude of chemical reactions. Since yeasts are not photosynthetic, they require organic (carbon) substances for their energy requirement and carbon sources.

The nucleus is a mass surrounded by a nuclear membrane. The dense area in the nucleus is called the nucleolus, which contains genetic material and serves as the control center for cellular activity.

The Cell Wall

The cell wall is largely made up of organic material (glucans, phosphomannan, lipids and proteins) and some inorganic materials, such as phosphate. In addition, there is a small amount of chitin, a tough, resistant polysaccharide, in yeast cell walls. Polysaccharides are formed by linking many monosaccharides (single/simple sugars) together. Therefore, the cell wall functions in protection and shape. According to *The Handbook of Brewing*, other functions of the cell wall are cell interaction, reception, attachment and specialized enzymatic activity. Brewing strains are usually spherical or ellipsoidal. Size varies depending on species and strain. Since yeast primarily reproduce by budding, cell walls commonly exhibit one or more bud scars.

The plasma membrane surrounds the yeast cell and separates it from other cells and the external environment. It's mainly composed of lipids, primarily phospholipids. It also contains proteins and sterols. The main purpose of oxygen uptake by yeast cells is to produce new lipids and sterols for maintaining plasma membrane health and performance. The plasma membrane regulates nutrient uptake and excretion of waste products created in metabolism. Lastly, the plasma membrane is involved in cell wall synthesis, assembly and secretion of extracellular enzymes. Enzymes are large proteins that speed up chemical reactions. The cytoplasm is a substance inside the yeast cell between the plasma membrane and nucleus. The semi-fluid portion of the cytoplasm is called cytosol. It contains inclusions (a diverse group of chemical substances produced by yeast cells), dissolved solutes and enzymes which are necessary for the many chemical reactions in metabolism.

The mitochondria are elongated structures composed of an inner and outer membrane. The inner membrane folds in upon itself forming invaginations called cristae.

The mitochondria are the "powerhouse" of the yeast cell because they are involved in cellular respiration, which refers to energy production for cellular activity by generating adenine triphosphate (ATP). The volume of mitochondria depends on the energy demands of the yeast cell and its particular phase in the growth cycle.

Ribosomes are structures that occur "free" or together with endoplasmic reticulum. They are associated with protein synthesis.

The Transport Mechanism

Continuous with the nuclear membrane is a network of membrane-enclosed channels called the endoplasmic reticulum. The endoplasmic reticulum transports substances from one part of the yeast cell to another area. It also stores newly synthesized substances and packages materials with the help of the Golgi complex. The Golgi complex is stacked, flattened membranous sacs that process, sort and deliver proteins and lipids to the plasma membrane.

Vacuoles are part of an intramembranous system that includes the endoplasmic reticulum. The form and size of the vacuoles change during the yeast cell cycle. Mature cells in the stationary phase usually have one large vacuole. During the exponential growth phase there may be one or several smaller vacuoles. After reproduction by budding, small vacuoles fuse again to produce single vacuoles in both the mother and daughter cell. The single membrane vacuoles contain hydrolytic enzymes and also store other substances such as amino acids. Amino acids serve as building blocks for proteins. Destruction of the vacuole membrane results in autolysis. Conditions increasing autolysis are increased temperature, alkaline mediums (high pH), inadequate wort nutrients and various organic solvents.

Yeast Behavior

Although the basic physical biology of yeast is the same from strain to strain, this does not mean that each strain will behave in the same manner during fermentation. Some of the most distinct physical behavior can be seen by comparing top (ale) and bottom (lager) yeasts. Close to the end of fermentation, top yeast will rise near the surface. On the other hand, bottom yeast will fall near the base of the fermentation vessel. Although there are other physical forces influencing this behavior, the fact that top yeast will rise and bottom yeast will fall near the completion of fermentation is an inherent physical characteristic of these yeast types. Another example is the density of yeast barm (yeast-head) during fermentation. Although other conditions can influence this physical behavior as well, some yeasts are prone to forming heavy barms; others are not. Chemical differences, measured by different flavor characteristics in finished beer, are also evident.

Understanding all the biology of yeast is not necessarily going to help the homebrewer produce a better beer. Even so, there is one important structure to remember—the plasma membrane. For proper nutrient uptake and elimination of cellular byproducts, it is critical to have a healthy plasma membrane. To ensure that yeast can synthesize lipids and sterols for plasma membrane repair and maintenance, remember to oxygenate the wort during pitching.

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Capturing Your Favorites

The ability to culture a particular strain of yeast from a commercially available bottle of beer opens up literally hundreds of possibilities for brewing new styles of beer at home. Finding and using new yeast strains, or combinations of strains, without the intervention of a professional yeast laboratory, however, is not without risks. There are two ways to salvage yeast from a bottle, the easiest of which is unfortunately not always reliable.

The best way to go about culturing yeast from the bottle is to duplicate the procedures of a professional laboratory as closely as possible. This means first isolating a clean, strong yeast colony from the sediment of a bottle of bottle-conditioned beer on a slant or plate of growth medium. Then you would propagate that colony using progressively larger volumes of liquid growth medium until you have a large enough volume of yeast slurry to pitch into a batch of homebrew. You must know how to make up slants or petri dishes of gel medium, how to properly sterilize equipment using an autoclave or pressure cooker, how to deftly wield an inoculation loop, prepare sterile wort culturing medium and above all, how to prevent infection at each and every step of the way. An excellent introduction to these professional procedures is Pierre Rajotte's *First Steps in Yeast Culture, Part One*, part of which is included in this issue of ***Zymurgy***.

If you are unfamiliar with how the beer was packaged, however, your efforts to culture the yeast may prove to be futile no matter how careful and scientific your approach. First of all, there is no way to know if any living cells are in the sediment you are trying to propagate. Many breweries mark their bottles with a bottling date, and the freshest sample is obviously more likely to contain living cells, but there is never any guarantee. Bottles may have yeast in them, but the product may also have been flash-pasteurized to prolong shelf life, in which case all the culturing in the world won't bring that yeast back from the dead.

A bottle of 1968 Thomas Hardy's may taste incredible, but you can pretty much forget culturing yeast from it. Second, many breweries ferment with one strain of yeast, then filter it out after fermentation and pitch a different, more stable strain for bottle storage. This is typical of most German hefeweizen beers, with the possible exception of Schneider. These "bottle strains" are often lager yeast, and while they are alive and culturable, a beer brewed with them very often will not resemble the character of the beer you are trying to reproduce. Third, a brewery may use multiple strains to ferment their beer. Orval, Duvel and many other Belgian brewers practice this technique.

By Amahl Turczyn

PHOTO BY BOB GOLDMAN

Not a Sure Bet

Using the lab method, isolating only one of them may not give you a beer characteristic of the brand you wish to duplicate. Using the simpler method outlined below, even if you get lucky enough to have living representatives from all the strains used, some may either mutate or gain dominance over the other strains, so trying to repitch the yeast successively may result in a beer with different character each time. Cooper's Sparkling Ale from Adelaide, Australia, is a wonderful and complex multistrain yeast, but repitch it more than a few times and the heartier, blander-flavored strains will win out leaving you with a beer quite different from your original batch.

But even with all these risks, bottle culturing is a fun and exciting way to expand the possibilities of duplicating, or at least mimicking, world styles of beer. And it doesn't have to be a long, time-consuming and difficult process. A time-saving alternative method to following lab procedures can be used, as long as one realizes that while reliable, it is somewhat less so than doing it like the pros.

The Necessities of Sterile Wort

Regardless of the method you use, however, one thing is necessary: making your own sterile wort for propagation. Most serious brewers should have this on hand anyway. One of the main problems homebrewers run into, at least initially, is underpitching. You have to pitch a sufficient quantity of fresh yeast slurry to make good beer, and that means for an average strength beer, you'll need a minimum of two ounces for ales and four to six ounces for lagers. If you are starting from scratch, i.e., not repitching a harvested batch of yeast, that means you need to do some culturing. And that in turn means making a starter. Sure, you can pitch several packages of a store-bought strain, but why spend a fortune? A little attention to sanitation and you can have as much yeast as you need from just a few cells. So whether or not you want to try culturing yeast from the bottle, it is always a good idea to have a lot of this stuff on hand. Luckily, if you do it right, it keeps very well even unrefrigerated, so you can make up large quantities at one time and store it for future use.

Making the Medium

The first thing you need to decide is how strong the culturing wort should be. That depends on how strong your beer will be. You want to make your culturing wort resemble your beer wort as closely as possible, in terms of strength up to S.G. of 1.060, temperature and pH. Most culturing worts can be made using malt extract, but if you're going to be pitching the resulting yeast slurry into an imperial stout, your first concern would be to make a culturing wort that's stronger than the average 1.030 strength. Your second concern for a beer of that strength is to make sure you culture up enough; the stronger the beer, the more yeast you need, so five or six ounces of slurry becomes the minimum amount you'll need. For high-gravity beers, keep your starter below 1.060 to maintain proper oxygen solubility or pitch clean yeast slurry from a previous batch. And finally, if you can swing it, remember that stouts are a bit more acidic than most beers due to the inclusion of roast malts. If you can take steps to lower the pH of your starter culture accordingly, all the better for your yeast.

Beyond tailoring the culturing wort for the beer you'll be brewing, you have a few choices as far as what ingredients you use. The dry malt or syrup doesn't matter much. Just remember that because of the extra water weight, four pounds (1.8 kg) of malt extract syrup has approximately the same amount of fermentable sugars as three pounds (1.36 kg) of dry. Neither does the variety or form of hop matter, though you should try to use a relatively high level of bitterness for culturing wort, regardless of the beer style you are brewing. For example, even if you are making a weizen, which calls for a very low bittering rate, shooting for somewhere around 30 IBUs for your culturing medium will give it a better chance of holding off infection during the culturing, and since you are in most cases only pitching the slurry, you needn't worry about your wheat beer coming out too bitter.

Some brewers do subscribe to pitching the entire volume of the yeast starter, medium

A Good Recipe

Here's a recipe for one gallon (3.79 L) of culturing wort, though it's a good idea to double or triple it if you have the time and storage space. A one-gallon recipe will fill approximately eight half-liter bottles, or 11 12-oz bottles. It is best to do a combination of sizes.

1.25 gal filtered (dechlorinated) water (4.73 L)
1 lb dry malt extract (.45 kg) or 1.3 lb (.62 kg) malt extract syrup
.25 oz hop pellets (7 g)

Soak an appropriate number of bottle caps in sanitizer, or boil them for 15 minutes. Heat your one and a one-quarter gallons of water to boiling. Remove from heat, add the malt extract and stir to dissolve thoroughly. Bring back to a boil and add the hop pellets. Boil for 20 minutes. Meanwhile, rinse the clean bottles with the hottest tap water you have, then fill them and set aside to heat up. Heat-sanitizing the bottles beforehand by boiling them in a covered kettle for 20 minutes or so is more effective, if you have the time. When the wort has boiled for 10 minutes, sanitize a Pyrex glass cup measure with a handle and pouring spout, heat it with tap water and set it into the boiling wort to boil another 10 minutes. When done, lower the heat so the wort is simmering. It's a good idea to wear protective gloves for this. Empty each bottle as needed, and fill immediately with boiling wort using the cup measure. The bottles must be hot before they are filled or they will crack! Fill them to the very top, making sure the mouth of the bottle is free of hops or any other debris and cap immediately. Set them on their side and proceed until all are filled.

Liquid Yeast Characteristics

• Edited by Al Korzonas •

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The information presented here in quotation marks is copied, with permission, from sales literature or personal communications with the respective yeast laboratories. Mr. Korzonas would like to thank the yeast laboratories for their help and permission to reprint their yeasts' descriptions here. Mr. Korzonas' book contains additional information on most of the yeasts listed here, specifically information about possible sources, suggested uses and additional information on aroma and flavor characteristics. For more information, call (708) 430-HOPS.

Yeast	Attenuation	Flocculation	Characteristics and Notes
ALE YEASTS			
Advanced Brewers Scientific			
ABS001 Northwest Microbrewery Ale	—	—	"This yeast is a fruity, top-fermenting strain with a signature diacetyl character. It is used in several breweries in the Pacific Northwest."
ABS002 Australian Ale	—	—	"Crisp, yet fruity character typifies this top-fermenter."
ABS003 La Chouffe Belgian Ale	—	—	"This yeast is a distinctive, estery, phenolic strain from the land of distinctive beers."
Brewers Resource			
BrewTek CL-10 American Microbrewery 1	High	Medium	"A smooth, clean, strong-fermenting ale yeast that works well down to 56° F (13° C). The neutral character of this yeast makes it ideal for Cream Ales and other beers in which you want to maintain a clean malt flavor."
BrewTek CL-20 American Microbrewery 2	Medium	Medium	"Gives an accentuated, rich and creamy malt profile with detectable amounts of diacetyl. Use it in lower gravity beers where the malt character should not be missed or in Strong Ales for a robust character."
BrewTek CL-50 California Pub Brewery Ale	Medium	Medium	"This yeast is good for that classic U.S. small brewery flavor. This yeast produces terrific American Red and Pale Ale styles. While attenuation is normal, this yeast produces a big, soft, well-rounded malt flavor that really lets caramel malt flavors shine. Threshold diacetyl, and esters play only to support the silky-smooth profile, even in well-hopped beers."
BrewTek CL-110 British Microbrewery Ale	Medium	Medium	"Provides a complex, oaky, fruity ester profile and slightly full-flavored finish suitable to low-and medium-gravity British ale styles. Very distinct, this classic, old fashioned yeast is great for traditional bitters and is a rare find for Mild Ale fans."
BrewTek CL-120 British Pale Ale 1	Medium	High	"Produces a bold, citrusy character which accentuates mineral and hop flavors. The distinct character of this yeast makes it best suited for use in your classic British Pale Ales or Bitters."
BrewTek CL-130 British Pale Ale 2	High	Medium	"This is a smooth, full-flavored ale yeast. Mildly estery, this yeast is a strong fermenter and highly recommended for strong or spiced ales. This yeast is smooth, well-rounded and accentuates caramel and other malt nuances."
BrewTek CL-150 British Real Ale	Low	Medium	"This is the yeast for those longing for the character of a real pub bitter. This yeast has a complex, woody, almost musty ester profile that characterizes many real ales. Typically underattenuating, the malt profile is left intact with a mild sweetness in the finish."
BrewTek CL-160 British Draft Ale	Medium to high	Medium	"One of our favorite ale yeasts, it gives a full-bodied, well-rounded flavor with a touch of diacetyl. This yeast has a way of emphasizing malt character like no other yeast we've used. Highly recommended for Porters and Bitters."
BrewTek CL-170 Classic British Ale	Medium to high	Medium	"Like CL-160, this yeast produces a beautiful draft Bitter or Porter. This yeast leaves a complex ale with very British tones and fruity esters, it also produces a classic Scottish Heavy and plays well in high-gravity worts."
BrewTek CL-200 Scottish Ale	Medium	Medium	"This is a truly unique yeast for a classic Scottish Heavy, 90/- or strong ale. This yeast produces a soft, fruity malt profile with a subtle woody, oaky aroma reminiscent of malt whisky. A mild, mineral-like dryness in the finish makes this a very complex yeast strain."
BrewTek CL-210 Scottish Bitter	High	Medium	"This yeast will produce a bitter like you've never experienced. The soft, yeasty, fruity nose yields to a well-attenuated malt flavor and big ester complex of ripe fruit, apricots and rose petals. This yeast has a teasing finish with a dry and complex, yet smooth, fruity character."
BrewTek CL-240 Irish Dry Stout	High	Medium	"A true, old fashioned, top-fermenting yeast which leaves a very recognizable character to Dry Stouts. Has a vinous, almost lactic character which blends exceptionally well with roasted malts. Highly attenuative." [vinous and lactic characters are unrelated -Ed]
BrewTek CL-260 Canadian Ale	High	Medium	"A clean, strong-fermenting and well-attenuating ale yeast that leaves a pleasant, lightly fruity, complex finish. Well suited for light Canadian Ales as well as fuller-flavored Porters and British styles such as Bitter and Pale Ale."
BrewTek CL-270 Australian Ale	Medium	Medium	"This yeast produces a malty, bready, nutty character with a pleasant honey-like finish. This yeast emphasizes malt nuances and is very forgiving in warmer fermentations for those who cannot ferment under controlled conditions."
BrewTek CL-300 Belgian Ale #1	Medium	Medium	"This yeast produces a truly classic Belgian Ale flavor—robust and estery with big notes of clove and fruit in the aroma and flavor."
BrewTek CL-320 Belgian Ale #2	High	Medium	"This is a traditional Trappist strain that is particularly good in doubles and triples. This strong-fermenting yeast attenuates well and produces a complex, dry, fruity and estery malt [sic] sought after in fine imported Belgian Ales."
BrewTek CL-340 Belgian Ale #3	Medium	Medium	"Slightly more refined than our CL-300, this yeast also produces a classic Trappist character, with notes of spice and fruit. Mildly phenolic, this is a strong fermenting yeast, well-suited to Trappist and other Belgian Ales."

Yeast	Attenuation	Flocculation	Characteristics and Notes
BrewTek CL-380 Saison	Medium	Medium	"A pleasant yeast best used to recreate country French and Belgian Ales. This yeast leaves a smooth, full character to the malt with mild yet pleasant esters and flavors reminiscent of apple pie spices."
BrewTek CL-400 Old German Ale	Medium	Medium	"For traditional Alt Biers, this yeast is a strong fermenter which leaves a smooth, attenuated, yet subtle ester profile. Use this yeast in your favorite German Ale recipes. This yeast also makes a slightly dry but clean, quenching wheat beer."
BrewTek CL-450 Kölsch	High	Medium	"This yeast produces an astonishingly clean, lager-like flavor at ale temperatures which smoothes with time into a clean, well-attenuated flavor. Mineral and malt characters come through well, with a clean, lightly yeasty flavor and aroma in the finish."
BrewTek CL-900 Belgian Wheat	Medium	Medium	"A top-fermenting yeast which produces a soft, bread-like flavor and leaves a sweet, mildly estery finish. Although this yeast lends its delicious Belgian character to any beer, it is best when made with Belgian Pils and finished with coriander and orange peel."
BrewTek CL-920 German Wheat	High	High	"This is a true, top-fermenting Weizenbier yeast: intensely spicy, clovey and phenolic. This yeast is highly attenuative and flocs in large, loose clumps. Use this yeast for all Weizen recipes. This yeast is particularly good in Weizenbocks."
BrewTek CL-930 German Weiss	Medium	Medium	"Milder than our German Wheat above, our 930 strain, from a famous German yeast bank, still produces the sought-after clove and phenolic characters, but to a lesser degree, with a fuller, earthier character underneath."
BrewTek CL-980 American White Ale	Medium	Low	"This is a smooth, American-style wheat beer yeast with an exceptionally round, clean malt flavor. The poor flocculation of this yeast leaves a cloudy "Hefe-Weizen" appearance, yet its smooth flavor makes it an integral part of a true, unfiltered wheat beer." [Hefe-Weizen is cloudy as a result of the yeast in the bottom of the bottle being intentionally stirred-up during pouring; in all but a few commercial examples, the top-fermenting yeast is filtered out and the beer is bottled with a lager yeast -Ed]
Head Start Brewing Cultures			
Head Start #100. No. 1 Ale	—	High	"Origin: US; This yeast is used by many Micro- and Pub-breweries. It is an excellent, clean fermenter. It may finish slowly."
Head Start #101. American Ale	—	Medium-high	"Origin: US; Another popular strain used by several Pub-breweries in California, it is slightly sulfury and drier than #100."
Head Start #111. Scotch Ale	—	Medium	"Origin: Great Britain; Isolated from one of the classic Scottish Ale breweries, this yeast is neutral to somewhat dry in flavor."
Head Start #112. Wee Heavy	—	Medium	"Origin: Great Britain; This is a Scottish Ale strain from one of Scotland's finest ale breweries."
Head Start #140. Cambrai Nord	—	Low	"Origin: France; This is a French Ale pure culture, which is neutral in flavor."
Head Start #141. Calais	—	Low-medium	"Origin: France; This is a Biere de Garde mixed culture. It is vinous and slightly phenolic in flavor."
Head Start #142. De Saison	High	—	"Origin: Belgium; This yeast is from a small Belgian brewery. It is very fruity and attenuative to balance the high mashing temperatures used for this style. This strain was formerly known as AB321."
Head Start #150. English Ale	High	Medium	"Origin: Great Britain; This yeast ferments dry and crisp with a slight fruitiness."
Head Start #151. Best Bitter	—	Medium	"Origin: US; this strain is from a Northwest Microbrewery brewing authentic, cask-conditioned ales."
Head Start #152. London Tap	—	Medium	"Origin: Great Britain; this is a cask-conditioned, Best Bitter strain from a London Microbrewery."
Head Start #160. ESB	—	Medium	"Origin: Great Britain; this yeast ferments malty and complex."
Head Start #161. IPA	—	Medium	"Origin: Great Britain; producing slightly more diacetyl than most yeasts, this strain has a mildly sulfury note that will age away."
Head Start #170. Düsseldorfer	—	High	"Origin: Germany; this is a classic Alt strain which produces a beer with dry and clean flavor."
Head Start #171. Kölsch	—	Medium-high	"Origin: Germany; This strain is from a German Kölsch Microbrewery."
Head Start #190. SnP	—	Medium	"Origin: Ireland; this is a Stout and Porter strain from Ireland. It ferments fruity with some residual diacetyl."
Head Start #300. Weizen 66	—	Medium	"Origin: Germany; this is the same strain used by many of Munich's Wheat Beer Breweries. To increase clove and phenolic flavors ferment at warmer temperatures (70-80° F [21 to 27° C])."
Head Start #301. Weizen 68	—	Medium	"Origin: Germany; Classic Weizen strain producing more clove and phenolic flavors as compared to #300. Ferment at 70° F [21° C] for best results."
Head Start #302. Steinweizen	—	Medium	"Origin: Germany; Top-fermenting yeast from a German Steinbier brewery. This yeast does not produce the Bavarian Weizen style's phenolics. This is the same yeast used by the brewery for their Steinbier as well as their Steinweizen."
Head Start #303. Torulaspora delbrückii (a.k.a. Saccharomyces delbrückii)	—	—	"Origin: Germany; This yeast was isolated from a German wheat beer."
Head Start #120. Two Monks	—	—	"Origin: Belgium; This is pair of yeast cultures. One is an ale yeast of Trappist origin (#120A) and the other is a mixture of bottling yeasts (#120B). The yeasts are alcohol tolerant."
Head Start #121. Trappist	—	—	"Origin: Belgium; This is another pair of yeast cultures. The first is a mixture of ale yeasts of Trappist origin (#121A) and the other is a mixture of bottling yeasts (#121B). These yeasts are alcohol tolerant."
Head Start #370. Witbier	—	Medium	"Origin: Belgium; this is a popular Wit culture from Belgium. It produces tart and phenolic flavors."
Head Start #371. Nit-Wit	—	Medium	"Origin: Belgium; this is a Witbier yeast from Bruxelles. It is a mixed culture and results in a drier beer than with #370."
Saccharomyces Supply Company			
[Note that these yeasts are also known as "RTP" or "Ready To Pitch" yeasts. They are provided at volumes that do not require you to make a starter, however, freshness is therefore a much more important factor with these yeasts.]			
RTP Acme Ale	Medium (72-76%)	Low-medium	"Ferments dry and clean, well-balanced."
RTP English Ale	Medium (72-76%)	Medium	"Ferments clean with mild fruitiness and slight diacetyl."
RTP Irish Ale	Medium-low (70-75%)	Medium	"Fruity and clean, slight diacetyl, great for Stouts."

Yeast	Attenuation	Flocculation	Characteristics and Notes
RTP Belgian Ale	Medium-low (70-75%)	Low-medium	"Good for strong abbey-style ales, Dubbels, Tripels or Barleywines. It lends a spicy character with a sweet finish."
RTP German Alt Ale	Medium (72-76%)	High	"Dry and clean, well-balanced."
RTP London Special Bitter Ale	Low (68-73%)	Very High	"Rich malty character with some fruitiness."
RTP U.S. Ale	Medium (72-77%)	Medium	"From a large American Microbrewery, this yeast is a fast fermenter, producing a fruity, clean, mildly estery ale. It is similar to the RTP Acme strain."
RTP German Wheat	Medium (72-77%)	Low	"Ferments warm, producing a spicy Weizen with a nice balance of banana and clove flavors."
RTP Scotch Ale	Low (68-73%)	Medium-high	"Produces malty sweet ales. Good for Scottish styles, and high-gravity ales such as Barleywines."
White Labs			
WLP001- California Ale	73-80%	Medium	"Our best selling strain. This yeast is famous for its clean flavors, balance and ability to be used in almost any style ale. Optimum fermentation temperature is 68-73 degrees."
WLP002- English Ale	63-70%	Very High	"A classic ESB strain from one of England's largest [independent] breweries. This yeast is best suited for English style ales including Milds, Bitters, Porters, and English style Stouts. Attenuation is 63-70% which leaves behind some residual sweetness not found in our California Ale Yeast. Optimum fermentation temperature is 65-68 degrees."
WLP004-Irish Ale	69-74%	Medium to High	"This is the yeast from one of the oldest stout producing breweries in the world. It produces a slight hint of diacetyl, balanced by a light fruitiness. Great for Irish ales, Stouts, Porters, Browns, Reds and a very interesting Pale Ale. Optimum fermentation temperature is 65-68 degrees."
WLP005-British Ale	67-74%	High	"Used by several of our breweries, this yeast is a little more attenuative than WLP002. Like most [many-Ed] English strains, this yeast produces malty beers. Excellent for all English style ales including bitter, pale ale, porter, and brown ale. Optimum fermentation temperature is 65-70 degrees."
WLP008- East Coast Ale	70-75%	Medium to High	"Our 'Brewer Patriot' strain can be used to reproduce many of the American versions of classic beer styles. Similar neutral character of WLP001, but less attenuation, less accentuation of hop bitterness, increased flocculation, and a little tartness. Very clean and low esters. Great yeast for golden, blonde, honey, and German alt style ales. Optimum fermentation temperature is 68-73 degrees."
WLP023- Burton Ale	69-75%	Medium	"From the famous brewing town of Burton upon Trent, England, this yeast is packed with character. It provides delicious subtle fruity flavors like green apple, clover honey and pear. Great for all English styles, IPA's Bitters, Pales. Excellent in Porters and Stouts. Optimum fermentation temperature is 68-73 degrees."
WLP028-Edinburgh Ale	70-75%	Medium	"Scotland is famous for its malty, strong ales. This yeast can reproduce these complex, flavorful Scottish style ales. Optimum fermentation temperature is 65-70 degrees."
WLP029- German Ale/Kölsch	72-78%	Medium	"From a small brewpub in Cologne, Germany, this yeast works great in Kölsch and Alt style beers. Slight sulfur produced during fermentation will disappear with age and leave a super clean, lager-like ale. Optimum fermentation temperature is 65-69 degrees."
WLP300- Hefeweizen Ale	72-76%	Low	"This infamous German yeast is a strain used in the production of traditional, authentic wheat beers. It produces the banana and clove nose traditionally associated with German wheat beers. Flocculation is low which leaves the desired cloudy look of traditional German wheat beers. Optimum fermentation temperature is 68-72 degrees." [most German Hefeweizens are filtered, then bottled with lager yeast which is intentionally stirred up during the pour—these beers are not cloudy because of unflocculent yeast-Ed]
WLP320- American Hefeweizen Ale	70-75%	Low	"This yeast is used to produce Oregon [West Coast -Ed] style Hefeweizen, which is characterized by yeast in suspension but clean flavors. Unlike WLP030, this yeast does not produce the banana and clove notes. It produces some sulfur, but is otherwise a clean fermenting yeast which does not Flocculate well, producing a cloudy beer. Optimum fermentation is 65-69 degrees."
WLP400- Belgian Wit	74-78%	Low to Medium	"Slightly phenolic and tart, this is the yeast used to produce Wit in Belgium. Optimum fermentation temperature is 67-74 degrees."
WLP500- Trappist Ale	73-78%	Medium	"From one of the six Trappist breweries remaining in the world, this yeast produces the distinctive fruitiness and plum characteristics. Excellent yeast for high gravity beers, Belgian ales, Dubbels and Tripels. Fermentation should be held below 65 degrees for best results."
Wyeast Laboratories			
[Note: the names of yeasts have been known to change, but numbers have always been constant]			
Wyeast #1007 German Ale	Medium (73-77%)	Low	"This yeast ferments dry and crisp, leaving a complex yet mild flavor. It produces an extremely rocky head and ferments well down to 55° F [13° C]. Recommended fermentation temperatures: 55-66° F [13-19° C]."
Wyeast #1028 London Ale	Medium (73-77%)	Medium	"This yeast has a rich, minerally profile, producing a beer that's bold and crisp with some residual diacetyl. Recommended fermentation temperature: 60-72° F [16-22° C]."
Wyeast #1056 American Ale	Medium (73-77%)	Low-medium	"Used commercially for several classic American Ales, this strain ferments dry, finishes soft, smooth and clean, and is very well-balanced. Recommended fermentation temperatures: 60-72° F [16-22° C]."
Wyeast #1084 Irish Ale	Medium-low (71-75%)	Medium	"This yeast leaves a slight residual diacetyl and fruitiness, and is great for Stouts. It makes clean, smooth, soft and full-bodied beers. Recommended fermentation temperature: 62-72° F [17-22° C]."
Wyeast #1087 Wyeast Ale Blend	Medium-low (71-75%)	Good	"These packages contain a higher volume of yeast (2.75 fl. oz.-80 ml) for larger batches. The blends have been selected to insure a quick start, good flavor and good flocculation. Recommended fermentation temperature: 64-68° F [18-20° C]."
Wyeast #1098 British Ale	Medium (73-75%)	Medium	"This yeast is from Whitbread. It ferments dry and crisp, slightly tart, fruity and well-balanced. It ferments well down to 64° F [18° C]. Recommended fermentation temperature: 64-72° F [18-22° C]."
Wyeast #1214 Belgian Ale	Medium (72-76%)	Medium	"Abbey-style top-fermenting yeast, suitable for high-gravity beers. Estery. Recommended fermentation temperature: 58-68° F [14-20° C]."
Wyeast #1272 American Ale II	Medium (72-76%)	High	"Fruitier and more flocculant than 1056. Slightly nutty, this yeast produces a soft, clean beer with a slightly tart finish."
Wyeast #1275 Thames Valley Ale	Medium (72-76%)	Medium	"Produces classic British bitters, rich complex flavor profile with a clean, well-balanced, light malt character and low fruitiness."

Yeast	Attenuation	Flocculation	Characteristics and Notes
Wyeast #1318 London Ale III	Medium-low (71-75%)	High	"From traditional London brewery with great malt and hop profile. A true top-cropping strain [a strong tendency to flocculate to the top of the fermenter-Ed] this yeast is fruity with a very light, soft, balanced palate and finishes slightly sweet."
Wyeast #1335 British Ale II	Medium (73-76%)	High	"Typical of British ale fermentation profile with good flocculating and malty flavor characteristics. Crisp finish; fairly dry."
Wyeast #1338 European Ale	Low (67-72%)	Medium	"From Wissenschaftliche in Munich. Full-bodied, complex strain finishing very malty. Produces a dense, rocky .head during fermentation. Recommended fermentation temperature: 60-72° F [16-22° C]."
Wyeast #1388 Belgian Strong Ale	Medium (73-77%)	Low	"Neutral flavor yeast with moderate to high alcohol tolerance. Fruity nose and palate-dry, tart finish."
Wyeast #1728 Scottish Ale	Low (69-73%)	High	"Ideally suited for Scottish-style ales and high-gravity ales of all types. Recommended fermentation temperature: 55-70° F [13-22° C]."
Wyeast #1742 Swedish Ale (a.k.a. Swedish Porter)	Low (69-73%)	Medium	"Stark beer Nordic style yeast of unknown origin. This yeast lends a floral nose and malty finish."
Wyeast #1762 Belgian Abbey II	Medium (73-77%)	Medium	"High gravity yeast with distinct warming character from ethanol production. It results in a beer that is slightly fruity with a dry finish."
Wyeast #1968 Special London (a.k.a. London ESB)	Low (67-71%)	High	"Highly flocculant top-fermenting strain with rich, malty character and balanced fruitiness. This strain is so flocculant that additional aeration and agitation is needed. An excellent strain for cask-conditioned ales. Recommended fermentation temperature: 64-72° F [18-22° C]."
Wyeast #2565 Kölsch	Medium (73-77%)	Low	"With a hybrid of ale and lager characteristics, this strain develops excellent maltiness with subdued fruitiness and a crisp finish. Ferment well at moderate temperatures. Recommended fermentation temperatures: 56-64° F [13-18° C]."
Wyeast #3056 Bavarian Wheat	Medium (73-77%)	Medium	"This yeast is a blend of top-fermenting strains producing mildly estery and phenolic wheat beers. Recommended fermentation temperatures: 64-70° F [18-21° C]."
Wyeast #3068 Weihenstephan Wheat	Medium (73-77%)	Low	"This is unique top-fermenting yeast which produces the unique and spicy Weizen character, rich with clove, vanilla and banana. Best results are achieved when fermentations are held around 68° F [20° C]. Recommended fermentation temperatures: 64-70° F [18-21° C]."
Wyeast #3333 German Wheat	Medium-low (70-76%)	High	"This yeast strain has a subtle flavor profile for a German wheat yeast with the classic Weisse profile. It has a fruity, sharp, tart crispness."
Wyeast #3787 Trappist (a.k.a. Trappist High Gravity)	High (75-80%)	Medium	"A robust top-cropping yeast [this means that the yeast has a strong tendency to flocculate on top of the fermenting beer-Ed] with a phenolic character, this strain can tolerate alcohol levels of up to 12%. It is ideal for Biere de Garde. This strain ferments dry with a rich ester profile and malty palate."
Wyeast #3942 Belgian Wheat	Medium (72-76%)	Medium	"An estery, low phenol-producing yeast, this strain is from a small Belgian brewery. It lends apple and plum notes and a dry finish."
Wyeast #3944 Belgian White Beer	Medium (72-76%)	Medium	"This yeast has a tart, slightly phenolic character and is capable of producing distinctive Witbiers and Belgian ales. This string is quite alcohol tolerant. Recommended fermentation temperature: 60-68° F [16-20° C]."
Yeast Culture Kit Company			
A01 American Ale	—	—	"Recommended Styles: Barleywine, Brown Ale, IPA, Bitter. Origin: California, USA. Clean, crisp and neutral. Easy to use."
A04 German Ale	—	—	"Styles: Kölsch, Cream Ale. Origin: Germany. Description: Clean and fruity; produces exquisitely flavorful light-bodied ales."
A06 Stout Ale	—	—	"Styles: Brown Ale, Porter, Stout, Imperial Stout. Origin: Ireland. Description: low attenuation; slight diacetyl."
A08 Barleywine Ale	—	—	"Styles: Barleywine, Old Ale. Origin: Dorchester, England. Description: tends to leave a high residual sweetness."
A13 Irish Ale	—	—	"Styles: Stout, Imperial Stout. Origin: Dublin, Ireland. Description: The Real Thing from Ireland. Nutty, woody and complex."
A15 English Ale	—	—	"Styles: Brown Ale, English Bitter, Mild, IPA. Origin: Ireland. Description: Complex with strong yeast flavors."
A16 Trappe Ale	—	—	"Styles: Trappist Ales. Origin: Belgian Monastery. Description: Typical Trappist esters and aroma."
A17 Pale Ale	—	—	"Styles: Brown Ale, English Bitter, Mild, IPA. Origin: London, England. Description: Very smooth and mellow with a distinct yeast signature."
YCKC A18	—	—	[English Ale]
YCKC A19	—	—	[Belgian Witbier]
YCKC A20	—	—	[English Ale]
YCKC A21	—	—	[English Burton Ale]
YCKC A25	—	—	[Trappist/Abbey Ale]
YCKC A26	—	—	[Belgian Ale]
YCKC A34 Scotch Ale	—	—	"Styles: Barleywine, Scottish Ale, Scottish Bitter, Strong Ale. Origin, Edinburgh, Scotland. Description: Clean, ferments well at cool temperatures."
YCKC A35 Belgian Wit	—	—	"Styles: Wit. Origin: Central Belgium. Description: Spicy, slight phenolic character compliments orange and coriander."
YCKC A36 Belgian Ale	—	—	"Styles: Belgian Ales, Dubbel, Tripel. Origin: Houffalize, Belgium. Description: Distinct yeast signature. Very fruity."
YCKC A37 Altbier	—	—	"Styles: Alt. Origin: Bavaria, Germany. Description: This strain is used by many Alt breweries. It has a distinct profile."
YCKC A38	—	—	[Belgian Strong Ale]
YCKC A39	—	—	[Flanders Brown Ale]
YCKC A41	—	—	[Belgian Witbier]
YCKC A42	—	High	[Northern English Ale]

Yeast	Attenuation	Flocculation	Characteristics and Notes
YCKC A43	—	—	[Scottish Ale]
YCKC A44	—	—	[Scottish Ale]
YCKC A48	—	—	[Belgian Strong Ale]
YCKC A49	—	—	[German Altbier]
YCKC A50 Bavarian Weizen	—	—	"Styles: Weizen, Weizenbock. Origin: Bavaria, Germany. Description: Clove and banana esters blend well with the sweet fruitiness of wheat malt to produce a classic Weizen. Recommended fermentation temperatures: 64-66° F [18-19° C]."
YCKC A51	—	—	[American Microbrewery Ale]
YCKC A53	—	—	[English Burton Ale]
YCKC A58	—	—	[American Microbrewery Ale]
YCKC A59	—	—	[English Burton Ale]
YCKC A60	—	—	[English Ale]
YCKC A61	—	—	[English Ale]
YCKC A62	—	—	[English Ale]
YCKC A64	—	—	[English Ale]
YCKC A65	—	—	[Welsh Ale]
YCKC A66	—	—	[Belgian Ale]
YCKC A67	—	—	[Belgian Ale]
YCKC A68	—	—	[Belgian Strong Ale]
YCKC A69	—	—	[Belgian Strong Ale]
YCKC A70	—	—	[Belgian Strong Ale]
YCKC A71	—	—	[Belgian Ale]
YCKC A72	—	—	[Belgian Ale]
YCKC A73	—	—	[Belgian Ale]
YCKC A74	—	—	[Trappist/Abbey Ale]
YCKC A75	—	—	[Belgian Saison]
YCKC A76	—	—	[Belgian Saison]
YCKC A78	—	—	[Belgian Ale]
YCKC A79	—	—	[Belgian Witbier]
YCKC A85	—	—	[Bavarian Weizen]
YCKC A88	—	—	[Belgian Ale]
YCKC A90	—	—	[English Burton Ale]
YCKC A93	—	—	[Scottish Ale]
YCKC A94	—	—	[Scottish Ale]
YCKC A95	—	—	[English Ale]
YCKC A96	—	—	[American Microbrewery Ale]
YCKC A97	—	—	[English Ale]
YCKC A107	—	—	"Belgian High Temperature"
W06 Barleywine (Champagne yeast)	—	—	"Styles: Barleywine, Mead. Origin: Montreal, Canada. Description: Extremely clean, malty and full-bodied. Ferments well down to 48° F [9° C]."
Yeast Lab			
A01 Australian Ale	Medium	Medium	"This all-purpose strain produces a very complex, woody and flavorful beer. It is of Australian origin. Great for Brown Ales and Porters."
A02 American Ale	Medium	Low	"This clean strain produces a very fruity aroma with a soft and smooth flavor when fermented cool. This is an all-purpose ale yeast."
A03 London Ale	Medium	Medium	"Classic Pale Ale strain, very dry. A powdery yeast with a hint of diacetyl and rich minerally profile, crisp and clean."
A04 British Ale	Medium	Medium	"This strain produces a great light-bodied ale, excellent for Pale Ales and Brown Ales, with a complex estery flavor. Ferments dry with a sharp finish."
A05 Irish Ale	High	High	"This top-fermenting strain is ideal for Stouts and Porters. Slightly acidic, with a hint of butterscotch in the finish, soft and full-bodied."
A06 Düsseldorf Ale	Medium	High	"This German Altbier yeast strain finishes with full body, complex flavor and spicy sweetness."
A07 Canadian Ale	High	Medium	"This strain produces a light-bodied, clean and flavorful beer, very fruity when fermented cool. Good for light and cream ales."
A08 Trappist Ale	High	High	"This is a typical Trappist strain, producing a malty flavor with a balance of fruity, phenolic overtones when fermented warm. This yeast is quite alcohol tolerant."
A09 —	—	High	[English Ale/American Microbrewery Ale]
A10 Brewpub	—	—	[American Microbrewery Ale]
W51 Bavarian Weizen	Medium	Moderate	"This strain produces a classic German-style wheat beer, with moderately high, spicy phenolic overtones reminiscent of cloves."

Yeast	Attenuation	Flocculation	Characteristics and Notes
LAGER YEASTS			
Advanced Brewers Scientific			
ABS004 Swedish Lager	—	—	"This is a Swedish lager yeast for Nordic-style lager beers."
ABS005 Czech Lager	—	—	"Not one of the many 'pilsner' strains, this yeast is from the oldest brewery in Prague."
Brewers Resource			
BrewTek CL-600 Original Pilsner	Low-medium	Medium	"This yeast leaves a full-bodied lager with a sweet, mildly under-attenuated finish and subdued diacetyl character. Use this distinct, flavorful strain in classic Czechoslovakian Pilsners or any lager in which you would like to emphasize a big, malty palate."
BrewTek CL-620 American Megabrewery	Medium	Medium	"This is a smooth yeast with slightly fruity character when fresh which lagers into a smooth, clean-tasting beer. Use this strain for your lightest, cleanest lagers or those in which you want an unobtrusive yeast character."
BrewTek CL-630 American Microbrewery Lager	Medium	Medium	"A strong fermenter, this yeast leaves a clean, full-flavored, malty finish despite its strong attenuation. This is a very old strain, commonly used by pre-prohibition American breweries. Being quite versatile, use CL-630 in all lager styles in which you wish to get a clean, full flavor."
BrewTek CL-650 Old Bavarian Lager	Medium-high	Medium	"Well-rounded and malty with a subtle ester complex and citrus undertones, this distinct, Southern German yeast strain is great for full-flavored, classic German lagers such as Bock, Dunkel and Helles styles."
BrewTek CL-660 Northern German Lager	Medium	Medium	"This yeast exhibits the classic clean, crisp, traditional Northern German Lager character. Used in German Pilsners, Mexican and Canadian lagers, this strong-fermenting, forgiving lager yeast is an excellent strain for everything from general-purpose lagers to the finest European beers."
BrewTek CL-670 Swiss Lager	Medium	Medium	"A unique strain that has both a clean, crisp lager flavor and a soft, smooth maltiness, this yeast is perfect for European Pilsners. Like our CL-660 strain, this is an excellent all-purpose lager yeast for those wanting a fuller, rounder palate."
BrewTek CL-680 East European Lager	Medium	Medium	"From a very old European brewery, CL-680 imparts a smooth, rich, almost creamy character, emphasizing a big malt flavor and clean finish. This is our choice when brewing lagers in which the malt character should be full and smooth, such as Märzens, Oktoberfests and Dunkels."
BrewTek CL-690 California Gold	Medium-high	Medium	"Used to recreate 'California Common beers' this yeast leaves a slightly estery, well-attenuated finish. The character of this yeast is quite distinct, try it in American or Robust Porters for a new and unique flavor profile."
Head Start Brewing Cultures			
Head Start #200. Americana	—	Medium-High	"Origin: US. This strain ferments clean and is a good attenuator. It is very characteristic for this style of beer."
Head Start #201. American Pils	—	Medium	"Origin: US. This is a Pilsner lager strain used by a large American brewery."
Head Start #220. Ur-Pils	—	—	"Origin: Czech Republic. This is a famous Pils pure culture strain obtained in the Czech Republic. It ferments malty and clean. Optimum fermentation temperature: 50° F [10° C]."
Head Start #221. Präger	—	Medium	"Origin: Czech Republic. This is an old classic from Prague (a mixed culture containing two known strains). Expect minor sulfury flavors early in fermentation."
Head Start #230. California Common	—	Medium-High	"Origin: US. Warm-temperature lager strain. Optimum fermentation temperature: 50° F [10° C]. However, this yeast will ferment well up to 60° F [16° C] while still producing classic lager flavors."
Head Start #231. Dampfbier	—	—	"Origin: Germany. This is a German steam beer yeast. Slightly fruity, but otherwise similar to #230."
Head Start #240. Continental Dry	—	Low-Medium	"Origin: Denmark. This is a Danish lager strain and it ferments dry and crisp."
Head Start #241. Viking	—	Medium	"Origin: Sweden. This strain is used by one of Sweden's largest breweries to make a Pils. It is a clean fermenter."
Head Start #250. Festbier	—	Low-Medium	"Origin: Germany. This yeast results in a rich and full-bodied beer."
Head Start #251. Weisenfest	—	Medium	"Origin: Germany. This strain from Munich makes a typical festbier. It can also be used for any lager style."
Head Start #260. Strassbourger	—	Medium	"Origin: France. This is a German-style lager yeast used in the Strasbourg region of France. It is slightly sulfury."
Head Start #261. Continental Lager	—	Medium	"Origin: France. This yeast is used in several small French lager breweries."
Head Start #270. Leitpold	—	Medium	"Origin: Germany. This is a classic Munich lager yeast that ferments clean. Optimal temperatures: 8° C [46° F] for fermentation and 4° C [40° F] for lagering."
Head Start #271. Kellerbier/Rauchbier	—	High	"Origin: Bamberg, Germany. Used in this brewery's Kellerbier (an unfiltered hoppy lager) and also in their world-renown Rauchbier, this yeast is an exceptional flocculator."
Head Start #272. Nürnburger	—	Medium	"Origin: Germany. This is a German Pils and Kellerbier strain used by one of Nuremberg's largest breweries."
Head Start #280. Hansen	—	Medium	"Origin: Germany. This is an alcohol-tolerant lager strain. It withstands up to 13% alcohol."
Saccharomyces Supply Company			
[Note that these yeasts are also known as "RTP" or "Ready To Pitch" yeasts. They are provided at volumes that do not require you to make a starter, however, freshness is therefore a much more important factor with these yeasts.]			
RTP German Lager	Medium (72-76%)	Medium	"Used by many German breweries and American Brewpubs. It gives a beer that is full-bodied and rich with a malty sweetness."
RTP Czech Pilsner Lager	Medium-low (70-75%)	Medium-high	"A classic Pilsner yeast, which produces malty and clean lagers. Moderate sulfur produced early in the fermentation."
WLP800-Pilsner Lager	72-77%	Medium to High	"Classic Pilsner strain from the premier Pilsner producer in the Czech Republic. Somewhat dry with a malty finish, this yeast is best suited for European Pilsner production. Optimum fermentation temperature is 50-55 degrees."
WLP810-San Francisco Lager	65-70%	High	"This yeast used is used to produce the "California Common" style beer. A unique lager strain which has the ability to ferment up to 65 degrees while retaining lager characteristics. Optimum fermentation temperature is 58-65 degrees. Can also be fermented down to 50 degrees for production of Märzens, Pilsners and other style lagers."
WLP830- German Lager	74-79%.	Medium	"This yeast is one of the most widely used lager yeasts in the world. Very malty and clean, great for all German lagers, including Pilsner and Oktoberfest/Märzen. Optimum fermentation temperature is 50-55 degrees."

Yeast	Attenuation	Flocculation	Characteristics and Notes
Wyeast Laboratories			
[Note: the names of yeasts have been known to change, but numbers have always been constant]			
Wyeast #2007 Pilsen Lager	Medium-low (71-75%)	Medium	"A classic American pilsner strain, it is sturdy and simple to use. It ferments dry and crisp. Recommended fermentation temperature: 48-56° F [9-13° C]."
Wyeast #2035 American Lager	Medium (73-77%)	Medium	"Not a Pilsner strain, this yeast produces a bold, complex and woody beer with a slight diacetyl note. Recommended fermentation temperature: 48-58° F [9-14° C]."
Wyeast #2042 Danish Lager	Medium (73-77%)	Low	"This yeast produces beer that is rich, crisp and dry. Its soft profile accentuates hop characteristics. Recommended fermentation temperature: 46-56° F [8-13° C]."
Wyeast #2112 California Lager	Low (67-71%)	High	"This yeast is particularly well-suited for producing 19th-century-style West Coast beers. It retains lager characteristics at temperatures up to 65° F [18° C] and produces malty, brilliantly-clear beers."
Wyeast #2124 Bohemian Lager	Low (69-73%)	Medium	"This is a Pilsner yeast From Weihenstephan. It ferments clean and malty and leaves a lot of residual sugars in higher-gravity beers. Recommended fermentation temperature: 46-54° F [8-12° C]."
Wyeast #2178 Wyeast Lager Blend	Medium-low (71-75%)	Good	"These packages contain a higher volume of yeast (2.75 fl. oz.-80 ml) for larger batches. The blends have been selected to insure a quick start, good flavor and good flocculation. Recommended fermentation temperature: 46-56° F [8-13° C]."
Wyeast #2206 Bavarian Lager	Medium (73-77%)	Medium	"Used by many German breweries, this yeast produces beers that are rich, full-bodied and malty. Recommended fermentation temperature: 48-58° F [9-14° C]."
Wyeast #2247 Danish Lager II	Medium (73-77%)	Low	"This yeast has a clean, dry flavor profile and is often used in aggressively-hopped Pilsners. It has a clean, very mild flavor, slight sulfur production during fermentation and a dry finish. Recommended fermentation temperature: 46-56° F [8-13° C]."
Wyeast #2272 North American Lager	Medium-low (70-76%)	High	"A traditional culture of North American Lagers (US and Canadian) and light Pilsners, this strain flocculates well. This yeast gives a malty finish. Recommended fermentation temperature: 48-56° F [9-13° C]."
Wyeast #2278 Czech Pils	Medium-low (70-74%)	Medium-high	"A classic Pilsner strain from the home of Pilsners which gives a dry but malty finish. It is the perfect choice for Pilsners and Bock beers. The sulfur aroma produced during fermentation dissipates with conditioning. Recommended fermentation temperature: 46-54° F [8-12° C]."
Wyeast #2308 Munich Lager	Medium (73-77%)	Medium	"This is a demanding strain, but is capable of producing some of the finest lagers made. It produces a beer that is very smooth, well-rounded and full-bodied. Recommended fermentation temperature: 48-56° F [9-13° C]."
Yeast Culture Kit Company			
L02 Bavarian Lager	Medium	Medium	"Use this classic strain for medium-bodied lagers and Bocks, as well as Vienna and Märzen styles. It will produce a beer that is rich in flavor with a clean, malty sweetness. Recommended fermentation temperature: 50-52° F [10-11° C]."
L05 Munich Lager	Medium	Medium	"This is a German brewing strain for medium-bodied lagers and Bocks. Its flavor profile is subtle yet complex, smooth and soft. It will produce a hint of sulfur during fermentation which will fade during lagering. Recommended fermentation temperature: 48-50° F [9-10° C]."
L09 German Lager	High	Medium	"Styles: German lagers, including Bocks, most other lager styles. Origin: Bavaria, Germany. This classic strain produces a light lager in both flavor and body, fermenting dry and clean. It is a common strain used in many German lager breweries. Recommended fermentation temperature: 48-52° F [9-11° C]."
L17 Pilsen Lager	—	—	"Styles: Bohemian Pilsner, American lagers. Origin: Pilsen. Description: This yeast produces beers that are extremely clean, malty and full-bodied. It ferments well down to 48° F [9° C]. Recommended fermentation temp: 48-50° F [9-10° C]."
L20 St. Louis Lager	High	Medium	"This strain produces a round, very crisp and clean fruity-flavored beer with medium body. It is recommended for American-style lagers. Recommended fermentation temperature: 50-52° F [10-11° C]."
L21 California Lager	Medium	High	"A California Common beer strain, this yeast produces a beer that is malty with a sweet, woody flavor and subtle fruitiness. Recommended fermentation temperature: 64-65° F [18° C]."
Yeast Lab			
L31 Pilsner Lager	High	Medium	"This classic strain produces a light lager in both flavor and body, fermenting dry and clean."
L32 Bavarian Lager	Medium	Medium	"Use this classic strain for medium-bodied lagers and Bocks, as well as Vienna and Märzen styles. It will produce a beer that is rich in flavor with a clean malty sweetness."
L33 Munich Lager	Medium	Medium	"This is a Wissenschaftliche strain for medium-bodied lagers and Bocks. It gives subtle but complex flavors, smooth and soft, with a hint of sulfur when fresh."
L34 St. Louis Lager	High	Medium	"This strain produces a round, very crisp and clean fruity flavor. It is a good choice for American-style lagers."
L35 California Lager	Medium	High	"A California Common beer strain, this yeast produces a beer that is malty with sweet woody flavor and subtle fruitiness."

OTHER YEASTS AND BACTERIAL CULTURES

Brewers Resource			
BrewTek CL-5200 Brettanomyces lambicus & BrewTek CL-5600 Pediococcus damnosus	—	—	"The unique flavor profile associated with Belgium's Lambic beers is in large measure due to the unusual fermentation they undergo. In addition to *S. Cerevisiae* [common ale yeast-Ed], other organisms are involved. The greatest contributors are *Brettanomyces lambicus* [or *Brettanomyces bruxellensis*-Ed] and *Pediococcus damnosus*. *Brettanomyces* yeasts contribute a unique and complex flavor, often described as 'horsey' or 'old leather.' This flavor seems to be encouraged by the presence of wood. [I believe it is the slight porosity of wooden casks that encourages the development of *Brettanomyces* yeast contributions, not simply contact.-Ed] *Pediococcus damnosus* bacteria is the primary acid producer in Lambic fermentations."

Yeast	Attenuation	Flocculation	Characteristics and Notes
Head Start Brewing Cultures			
Head Start #310 Berliner Weisse-B	–	–	"Origin: Germany. This is a Berliner ale strain (AB310) and a Lactobacillus bacteria (AB335). Includes a recipe for Berliner Kindl-style Weiss. Allow at least several weeks for acidity to develop. Split fermentations are recommended. Recipe and instructions provided."
Head Start #310B Berliner Weisse-B with Lacto-Capsules	–	–	"Origin: Germany. This is the same as #310 except that Lacto-Capsules are substituted for the *Lactobacillus* liquid culture. Lacto-Capsules require no starter and are very easy to use."
Head Start #311 Berliner Weiss-S	–	–	"Origin: Germany. This is a Berliner ale strain (AB310) along with AB333 Lactobacillus culture and AB341 *Brettanomyces bruxellensis*. Includes a recipe and instructions for a Schultheiss-style Weiss. Allow at least 3 weeks for acidity to develop and 3 months for *Brettanomyces* character to appear."
Head Start #320 Flanders Red	–	–	"Origin: Belgium. This is a mixture of yeasts, some wild, (AB320) and *Lactobacillus flanderii* (AB333). It will produce the lactic and acetic tartness and unusual flavors characteristic of Flanders' styles. It's 'slow good.' Expect fermentation to last several weeks. Recipes and instructions are included."
Head Start #321 Flanders Brown	–	–	"Origin: Belgium. A clean, fruity yeast (AB321) and *Lactobacillus flanderii* (AB333), it will produce the lactic and acetic tartness and unusual flavors characteristic of Flanders' styles. It's 'slow good.' Expect fermentation to last several weeks. Recipes and instructions included."
Head Start #330 Lactobacillus delbrückii	—	—	"Origin: US. This is a very fastidious [bacterial] culture [i.e. one that has very demanding nutritional needs], a slow acid producer and is homofermentative [i.e. it creates only one product—in this case lactic acid-Ed]. It ferments glucose and maltose, but not dextrin. Optimum fermentation is 37° C [99° F] and it does not grow below 25° C [77° F]. Use this culture to sour authentic Berliner Weiss beers."
Head Start #331 Pediococcus damnosus (a.k.a. P. cerevisiae)	–	–	"Origin: US. This bacterial culture is a slow acid producer, is homofermentative and produces diacetyl. It ferments glucose and maltose quickly and dextrins only very slowly. Optimum fermentation temperature is 25° C [77° F] and will not grow above 37° C [99° F]. Use this culture to sour Lambics or in sour beers where some diacetyl is desired."
Head Start #333 Lactobacillus "flanderii"	–	–	"Origin: the Flanders region of Belgium. This culture was isolated from AB320. It is a very hardy culture and will quickly sour beer or wort in 3 weeks. This culture is heterofermentative, producing lactic acid, acetic acid, ethanol and CO_2 from glucose and maltose, but not dextrin. It tolerates hop alpha acids. Optimum fermentation temperature: 25-37° C [77-99° F]. Use this culture to sour Lambics, Flanders [Brown Ales] or Berliner Schultheiss-style beers or in sour beers where both lactic and acetic acids are desired."
Head Start #334 Lactobacillus delbrückii spp. lactis	–	–	"Origin: US. This culture is for experienced brewers. It is homofermentative and can be used for sour beers or for sour mashing. Optimum fermentation temperature: 37° C [99° F]. This bacteria will not grow below 25° C [77° F]."
Head Start #335 Lactobacillus mixed culture	–	–	"Origin: US. This is the same culture as the Lacto-Capsules. Optimum fermentation temperature: 25-37° C [77-99° F]. It is homofermentative. This culture ferments glucose, maltose, dextrins and lactose. Can be used post-fermentation to adjust lactic acid content with the use of lactose. Use this culture to sour wit beers or Berliner Kindl style Weisse. Do not use this culture in sour beers where lactose will be used to sweeten the beer."
Head Start #340 Brettanomyces lambicus	–	–	"Origin: US. This is the 'country' strain found more commonly in Lambic beers outside of Bruxelles."
Head Start #341 Brettanomyces bruxellensis	–	–	"Origin: US. This is the 'city' strain found originally in Lambic beers made in Bruxelles."
Head Start #342 Kloeckera apiculata	–	–	"Origin: US. This culture rapidly ferments glucose to acetic and lactic acids and produces a protease considered desirable in Lambic beers."
Head Start #343 Brettanomyces anomala	–	–	"Origin: Netherlands. Isolated from Lambic beer, it is another 'Brett' in the strain arsenal for Lambics."
Head Start #344 Candida lambicus	–	–	"Origin: US. Isolated from Lambic beer, this culture is an oxidative yeast that forms a protective pellicle on the surface of lambic beers during fermentation. It also contributes slightly to ester formation."
Head Start #350. Brettanomyces bruxellensis	–	–	"Origin: Great Britain. This is a cask conditioning strain isolated from English Ale in the early 1900's."
Head Start #351 Brettanomyces dublinensis (anomala)	–	–	"Origin: Ireland. This is a cask conditioning strain isolated from Dublin Stout in the late 1800's. This strain is very filamentous, growing like rubber on agar."
Head Start #372 Sour-Wit	–	–	"Origin: Belgium. This is Wit yeast (AB370) and Lacto-Capsules for acidification. Instructions included."
Head Start #400 Saccharomyces diastaticus	–	–	"Isolated from Lambic beer, this is a super-attenuative yeast. It will create strong phenolics and a pellicle. It is recommended only for experienced brewers."
White Labs			
WLP715- Champagne	High	Low	"Classic yeast, use to produce Champagne, Cider, Dry Meads, Dry Wines, or to fully attenuate barley wines/strong ales. Can tolerate alcohol concentrations up to 17%."
WLP720- Sweet Mead/Wine	Low	Low	"A wine yeast strain that is less attenuative then WLP715, leaving some residual sweetness. Slightly fruity, and will tolerate alcohol concentration up to 15%."
Wyeast Laboratories			
Wyeast #3278B Belgian Lambic Blend	Variable	Low-medium	"Belgian Lambic-style yeast blend with lactic bacteria. It lends a rich earthy aroma and acidic finish. Suitable for Gueuze, Fruit Lambics and Faro."
Yeast Culture Kit Company			
M 3220 Brettanomyces	–	–	[This yeast needs to be used along with (at the least) a strain of *Saccharomyces* and a lactic bacteria to attempt to make something similar to Belgian Lambic/Lambick beers.-Ed]
M3200 Pediococcus	–	–	[A lactic bacteria which can be used along with M3220 and a *Saccharomyces* yeast to make something similar to Belgian Lambic/Lambiek beer.-Ed]

and all, at high kraeusen, in which case there could actually be a problem with this scenario. But unless you have the time and expertise to know just when that point will be and have synchronized your beer brewing as well, the benefits of pitching at high kraeusen versus later, when the yeast has finished and settled out, are minimal. High-alpha hop varieties are handy for use in cultures simply because you get more preservative bang for your buck, and the resulting bitterness will more likely than not be going down the drain anyway.

Storing the Medium

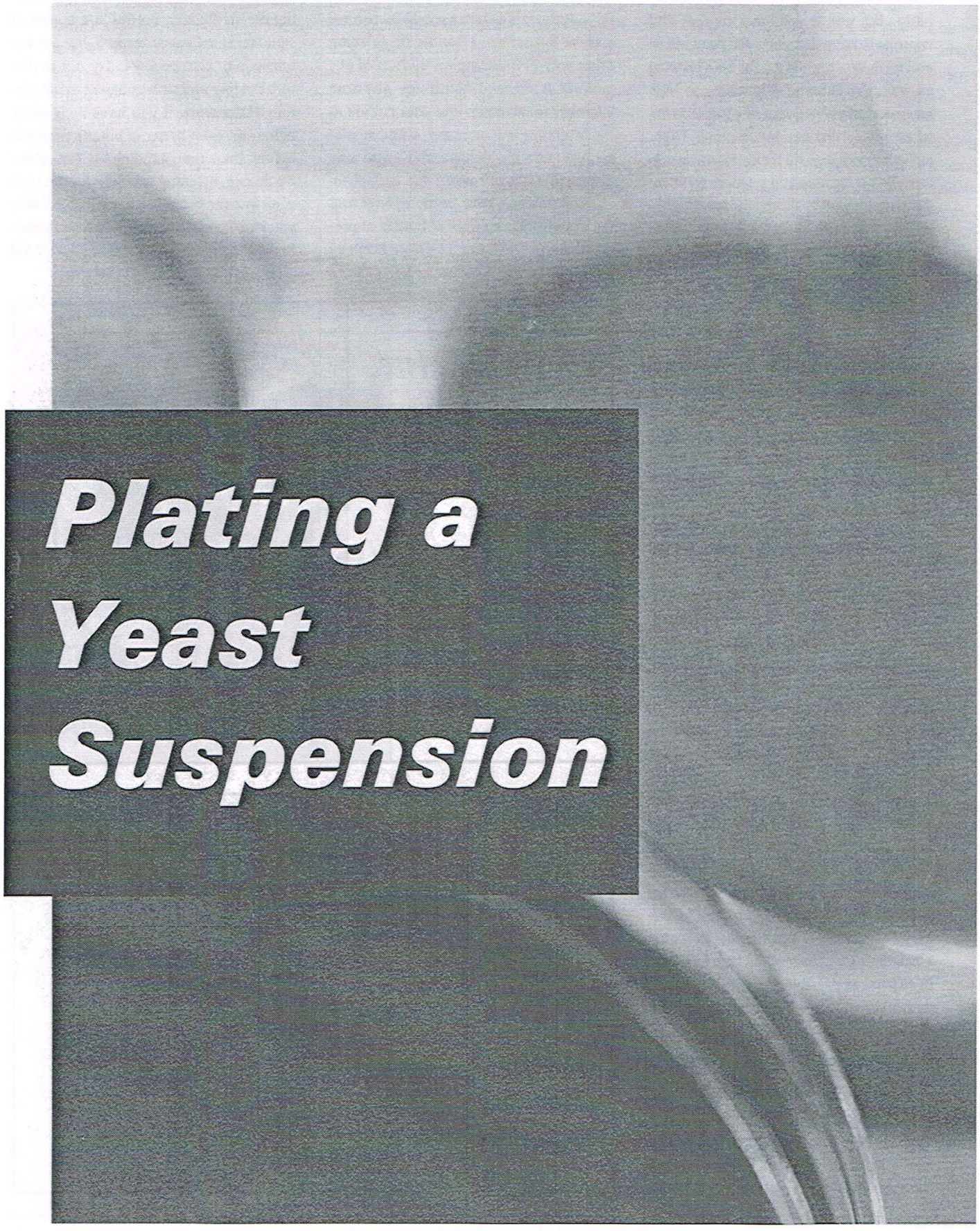
Storing the medium in a combination of heavy-gauge 17-ounce (500-mL) and 12-ounce (355-mL) glass bottles is a safe and convenient way to go. If you are starting from a store-bought smack-pack, it's best to start the small volume of yeast cells off with 17-ounce bottles, which yield about 15 ounces (444 mL) of clear wort, as recommended by Wyeast. But for culturing from the bottle, you probably won't be working with as many live, vigorous cells, so you'll need a smaller volume of wort in which they can reproduce. Twelve-ounce (355-mL) bottles yield about 10 ounces (296 mL) of clear wort, which may still be a bit much for some samples. But they work for most.

You also will need culturing containers in which to conduct the propagation. These containers can be any glass jug that holds one-half to two gallons (1.89-7.57 L) and can be fitted easily with a stopper and airlock; half-gallon "growlers" are a good bet for ale cultures, and will yield the proper amount of slurry when filled one-half to three-quarters full of starter, depending on the beer's gravity. One-gallon juice jugs are great for lagers. Then, once that has reached high kraeusen or as soon as possible afterwards, you can double the volume with more wort until the desired volume is reached.

Be Sure to Label

Once cool, they should be marked as sterile wort, so no one mistakenly opens them thinking they contain fermented beer, and stored in the refrigerator. Once you are ready for the wort, sanitize your work area thoroughly. It is always a good idea to have a stove burner on, a candle lit, or some other way of inducing an updraft of air, making it more difficult for airborne microbes to fall down into your culture in the brief time it is exposed. A fine mist of sanitizer into the airspace above you may also be partially effective.

Now sanitize your bottle opener and the appropriate number of bottles of prepared wort. Again, one 12-ounce bottle of wort is sufficient for the sediment from one or two bottles of commercial beer. Dunking the sterile wort bottles in a bucket of sanitizer is the surest method, but a spray bottle may also be used. Try not to disturb the hop and trub sediment at the bottom of the wort. If you have a cigarette lighter or, even better, a butane fireplace lighter, have that standing by. Pry off the bottle cap, listening carefully for the rush of air into the bottle (if it goes the other way you know not to use that particular bottle), flame the mouth *(continued on page 84)*


Plating a
Yeast
Suspension

All fermenting liquid contains a great quantity of yeast cells. At the start of fermentation, an acceptable quantity is normally 5 to 10 million cells per ml. Toward the end, this figure can go as high as 60 million cell per ml. If you take a sample containing this amount of yeast cells and examine it under the microscope, you'll find that the cells are so close together, it is almost impossible to get a good look at an individual cell or group of cells.

This article deals only with manipulations that give significant results without the use of a microscope. At times however, we will mention the results of microscopic observations as a reference.

Ways of Obtaining Individual Colonies with Plates

To successfully investigate cells on an individual or small group basis, you have to dilute them. Two methods can be used to accomplish this easily.

The first method consists in taking a sterile sample directly with the inoculating needle and spreading it out on a plate.

The second method consists in first diluting a sample in sterile water and then spreading it out on a plate.

Which Method is Most Suitable?

The first method leads to wide streaks of growing microorganisms on the plate. It looks like a carpet of yeast. It is difficult or impossible to select well defined colonies. Those that are present are normally quite close to one another and are quite small.

The second method gets the colonies well separated on the first spread. The colonies are easy to select individually. The results in both cases can be the same. However, I prefer the second method, as it is more precise and gives better results.

Another means of separating individual cells is to pour an agar solution over a yeast suspension in a sterile Petri dish. This manipulation is useful when you want to know how many living cells are present in a suspension.

Remarks on Plating

First, let's look at the proper way of spreading a liquid suspension on a plate, commonly referred to as plating.

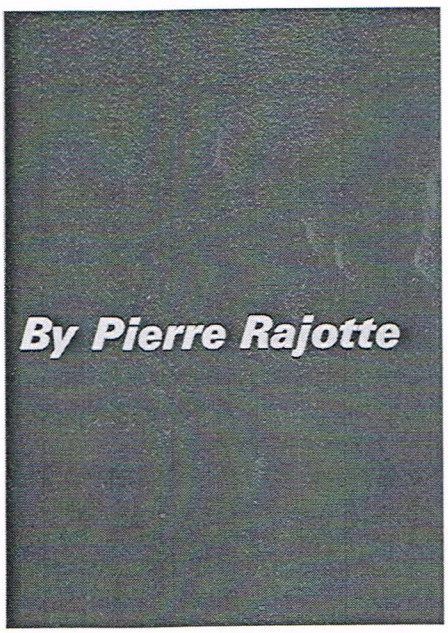
The whole operation can be summarized as follows: plating involves taking a sample of a microorganism suspension and placing it in a sterile manner over the media surface enclosed in a petri dish. The suspension is then spread out over the surface of the media to obtain individual colonies growing separately from each other.

Many authors have given different details regarding this type of operation. They all have their significance and merits, depending on the type of bacteria or cells you are working with. Microbiologists working in hospital laboratories or medical research institutes have to be very careful with manipulations of this nature, because they are often working with pathogenic germs. Strict precautionary measures must be observed. Let's not forget that all of these manipulations were originally devised by medical researchers and were subsequently adapted to fermentation investigation.

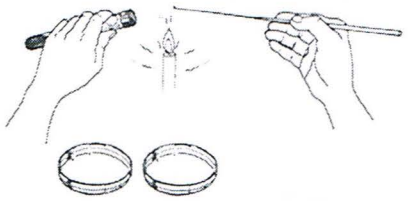
In the case of brewery fermentation and operations, we are not dealing with anything of a dangerous or infectious nature. Performing the following manipulations in a suitable environment will give good results on a consistent basis.

The Operation, Step by Step

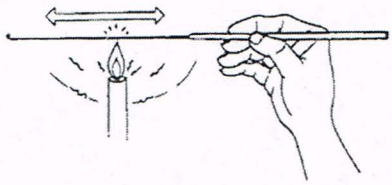
- Put the plate upside down on the working table, that is, with the smaller half containing the media on top.



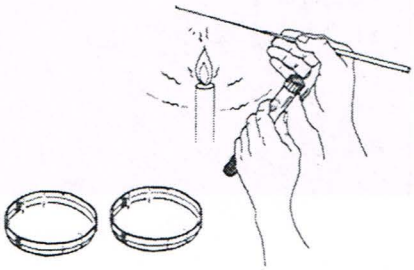
How to Plate a Suspension



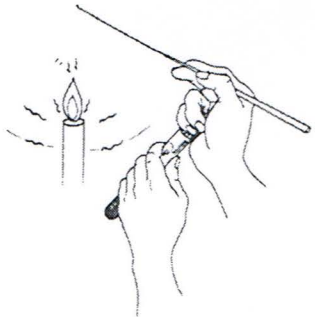
STEP 1. The tube in the left hand holds well homogenized fermenting wort. The flame is on. The inoculating loop is in the right hand. Two wort agar plates are on the left with the media half on top.



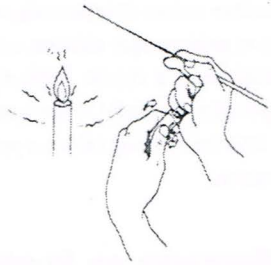
STEP 2. Starting at the tip, flame the inoculating loop all the way to the gripping jaws.



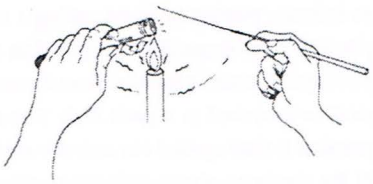
STEP 3. Keep the loop in the zone of the flame, and bring the tube to the palm of your right hand.



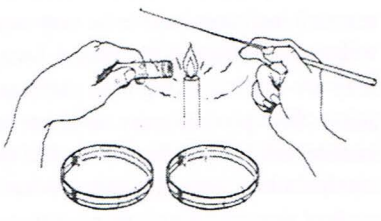
STEP 4. Grasp the cap with the little finger.



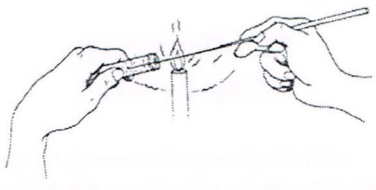
STEP 5. Unscrew the tube by twisting the left hand.



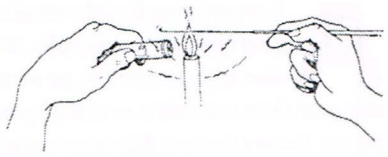
STEP 6. Holding the tube at a slight angle, bring it near the flame. Twist the tube all the way around in the flame. Keep the loop 5 to 6 cm away from the flame.



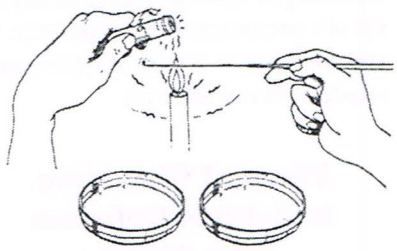
STEP 7. Withdraw the tube to about 5 or 6 cm away from the flame. Keep the tube at an angle to prevent liquid from flowing out.



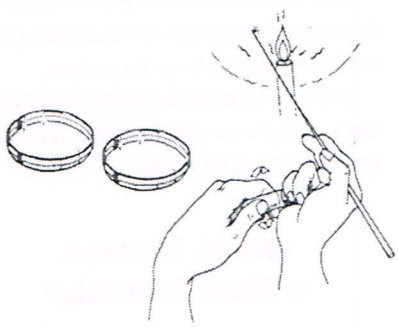
STEP 8. Plunge the wire inside the tube, and twist it lightly in the fermenting liquid. Do not touch the inside of the tube.



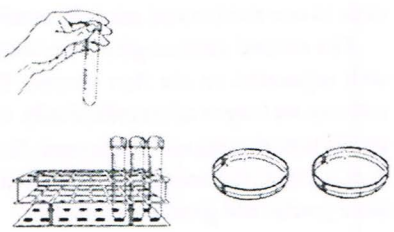
STEP 9. Carefully withdraw the wire with a drop of fermenting liquid on the loop. Keep the loop approximately 5 to 6 cm away from the flame.



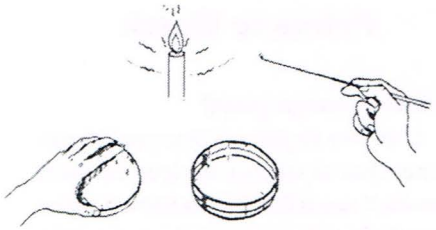
STEP 10. Twist and turn the tube in the flame gain. Keep the loop approximately 5 to 6 cm away from the flame.



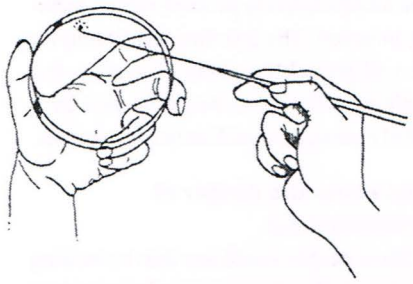
STEP 11. Screw the tube back in its cap. All this time, keep the loop 5 to 6 cm away from the flame.



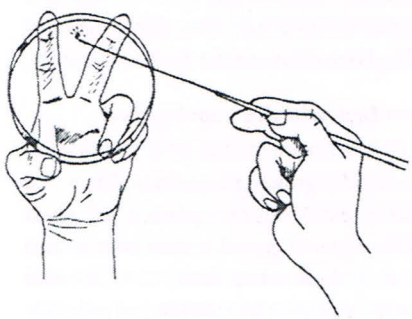
STEP 12. Place the tube in the test tube rack.



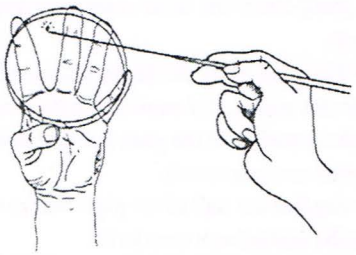
STEP 13. With the left hand, take the media half of the petri dish and place it in a vertical position.



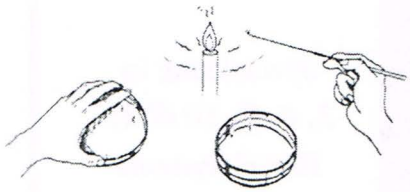
STEP 14. Starting at the top of the plate, drag the loop in an elongated "S" manner. Go one third of the way down. Keep the loop near the plate. Do not flame the loop.



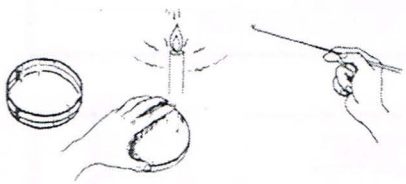
STEP 15. Rotate the plate approximately 60 degrees with your fingers. Starting at the top again, proceed in the same manner. You are now going over the first series of streaks. Go one third of the way down. Keep the loop near the plate. Do not flame the loop.



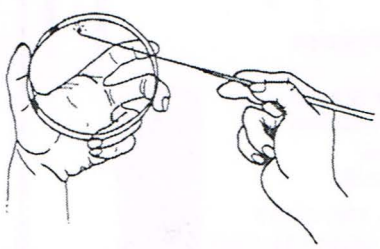
STEP 16. Turn the plate again approximately 60 degrees. Starting at the top, proceed in the same manner. You are now going over the first and second series of streaks. Go one third of the way down. Streak the rest of the plate.



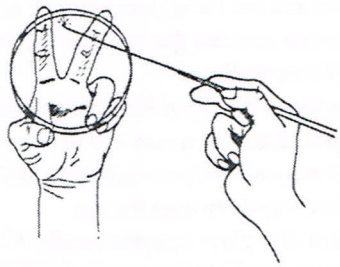
STEP 17. Immediately replace the media half of the plate in its lid. Place the tip of the loop in the zone of the flame, but not in the flame.



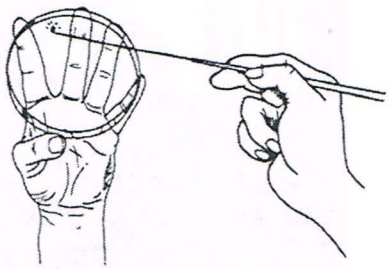
STEP 18. With the left hand, take the media half of a second petri dish, and hold it in a vertical position. Do not flame or reinoculate the loop.



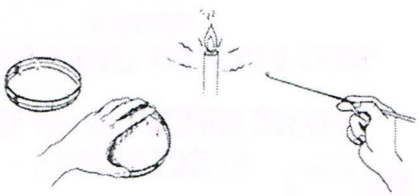
STEP 19. Starting at the top of the plate, drag the loop in an elongated "S" manner, exactly as for the first plate. There is almost no yeast present and the streak marks are less visible.



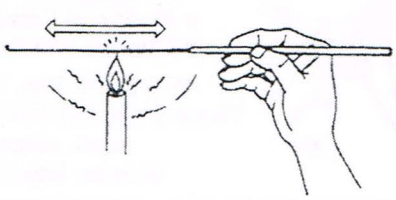
STEP 20. Rotate the plate approximately 60 degrees with your fingers, and proceed exactly as for the first plate. Very few yeast cells are on the loop now.



STEP 21. Turn the plate again approximately 60 degrees. Starting at the top, proceed in the same manner. You are now going over the first and second series of streaks. This last streaking will produce well defined colonies.



STEP 22. Immediately replace the media half of the plate in its lid.



STEP 23. Flame the loop and put it away.

• Flame sterilize the opening of the test tube holding the yeast suspension, and draw a loopful, with the inoculating loop.

• Reflame and close the test tube.

• With the left hand, take the half of the plate that contains the media, lift it up and hold it vertically.

• Starting at the top of the plate, streak the loopful smoothly across it in an elongated "S" manner until you reach about one third of the way down from the top.

• Turn the plate approximately 60 degrees counterclockwise, and repeat the streaking motion. In between streaks, keep the inoculating loop close to the plate.

• Now go over the streak line that you have just made. Continue in the same manner, going down one third of the way from the top.

• Turn the plate 60 degrees counterclockwise again, and repeat a third time. Streak the surface of the plate that you have not gone over previously.

• Replace the half of the plate that contains the media back onto its lid.

From now on, keep the plate with the media on top. Turning clockwise or counterclockwise is a matter of personal preference and comfort.

Points to Watch

Is there enough yeast?

It is very important that you do not reinoculate or sterilize the loop between streaks. It seems that there is nothing on the loop. In fact, there are very few cells on it. But this is what you want: a limited number of cells that will grow distinctly and separately from each other. You have to do this operation to appreciate its results.

Practice Makes Perfect

Before you attempt to perform this operation, you may think that it is a long and difficult manipulation to perform without incurring infection. The first time you attempt it you will probably fumble. In reality, the whole operation can be performed by a skilled operator in just four to five seconds.

What about the danger of contamination?

Some people would say that by holding the plate in the air, you are submitting it to all kinds of airborne contamination. Although it might appear so, practically speaking this is untrue. First, you are holding the plate vertically. The chance that a microorganism present in the air would land on a vertical plate is quite slim. Microorganisms are more likely to fall on the exposed half of the plate lying on the table. Keeping the media half on top will prevent possible contamination, since it eliminates the possibility of any stray microorganism falling back down on the media surface.

How fast will the yeast grow?

Another point in your favor is that yeast is a rapidly growing organism. Once you have spread it out on a plate, it will show visible signs of growth within twenty-four hours. In three to four days you will be able to select and pick fully developed colonies. Any strange and undesirable microorganism that might have fallen on the plate will most likely be a mold spore. It will be overcome or at least impeded in its development by the rapidly growing yeast.

This article is excerpted from: *First Steps in Yeast Culture, Part One* and is available from:

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At what temperature should I keep the plate?

Plates have a short shelf life. I consider that a properly made and inoculated plate has a shelf life of about two to three weeks. Suppose that you are using a freshly poured plate that is one day old. As soon as you have inoculated the plate, you have to keep it warm for the yeast colony to grow quickly. The best temperature is around 86 degrees F (30 degrees C), which is most favorable for yeast growth.

How long is the plate useful for?

Because of the warmth, water from the media is slowly evaporating. The evaporation is insignificant during the first week. You have plenty of time to pick cells and store them away. The yeast will continue to grow for some time, but the work of the plate is over. The best means of preserving the plates is to keep them in a sealed plastic bag in a cool basement. I have kept plates in this manner for up to four weeks. This allows you to further examine the growing of the cells.

If kept warm, the media will shrink visibly after about two weeks. If kept cold and unsealed in a refrigerator, the same drying out will occur. At times you might see some molds developing on the edge of the plate. This is nothing to worry about. The initial purpose, to spread out the yeast and pick individual colonies, has been achieved.

What about sealing the plate?

Some people go to the trouble of sealing the two halves of the plate together with masking tape or "parafilm". I personally consider this a wasted effort. It merely delays the drying effect for a short while. Plates should not be considered a means of keeping cultures. They are just a useful intermediary tool.

How to Obtain Single Colonies Without Diluting

If a great number of yeast cells were present in the yeast suspension streaked on the plate, a solid accumulation of yeast colonies will grow. There will be very few individual cell colonies on the plate. Those present will most likely be very small. This is quite common when the plate is streaked with actively fermenting wort.

To get well defined single colonies, streak a second plate right after the first one. Do this second streaking without reinoculating your loop. After streaking the first plate, lay it back down on the table. Immediately pick up another one and repeat the same streaking motion three times across the plate. Between streaks do not put the loop in the flame. Just keep it near the flame. Do not pick up any more yeast suspension than what is left clinging to the loop. It might seem that there is nothing left, but there are a few cells attached to it. The streak mark will be less visible on the second plate than on the first one.

In a few days, you will be rewarded with distinct individual colonies. I often use this method when I have spare plates to use before they age too much. No special preparation is needed. It is a good method when working with only one yeast strain.

Longtime homebrewer Pierre Rajotte has been involved in the installation of more than a dozen breweries in the U.S. and Canada. He is the author of *Belgian Ale* (Brewers Publications, 1992) and *First Steps In Yeast Culture, Part One* (Alliage Editeur, 1994), from which this article is taken.

HOMEBREWING.-

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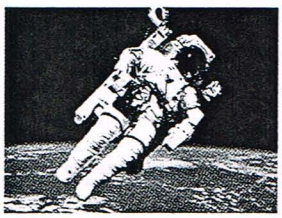

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Paul Gatza
Director, American Homebrewers Association

How to Avoid Alien Encounters

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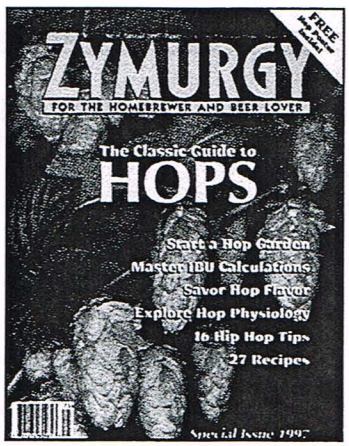

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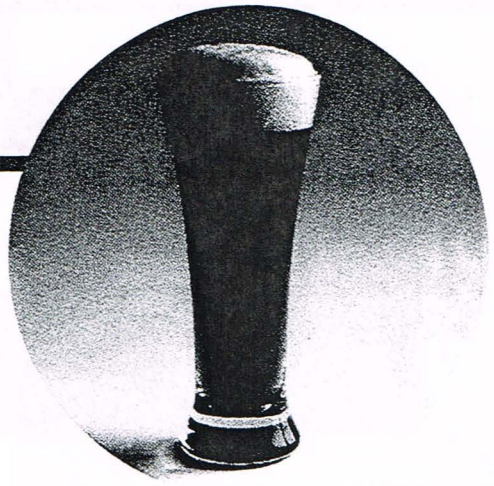

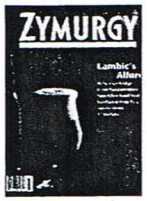

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12 Steps to

Contrary to popular belief, yeast has more influence on beer flavor than just about any other ingredient. An incredible number of beer problems can be traced to "unhappy" yeast. In fact, if you follow these 12 steps, your yeasts may be so happy they'll cover up other weaknesses you may have in your brewing. The following 12 steps are roughly in order of importance, so concentrate first on steps one through five.

1. Pitch Enough Yeast

The most important thing you can do is to pitch enough yeast. The general rule of thumb is that for a normal gravity (let's say below 1.050) ale wort, you want to pitch either five grams of dry yeast or the equivalent of a two-liter starter into a five-gallon batch (see Starter sidebar). For lagers and high-gravity worts you should pitch twice that amount. You can safely pitch two or three times these amounts without any problems. In my experience, there is no increased risk of autolysis from overpitching, as some authors have suggested in the past.

Starters should be made from malt, not sugar. Sugar-based starters do result in high yeast mass, but the yeast can have trouble fermenting more complex sugars such as those found in wort. I've found that adding a pinch of yeast energizer—I prefer to use Fermax from Siebel, your homebrew shop can get it from Crosby and Baker—results in more vigorous yeast. There is some debate on what the proper gravity should be of starter wort. I use 1.040, but anything from 1.020 to 1.040 should be fine. I've also been asked whether lager starters should be fermented cold. I ferment my lager starters on the cool side (55 to 60 degrees F, 13 to 16 degrees C), but not necessarily cold.

For the really big beers like barley wines and doppelbocks, I believe the only way to get reasonable attenuation is to use a yeast slurry from a previous batch of beer (see Attenuation sidebar). When I know that I'm making a barley wine, I'll make a batch of ordinary or special bitter a week earlier, rack the bitter into a secondary or priming vessel, then rack the barley wine wort right on top of the entire slurry. This has worked well for me, but lately I've been having second thoughts about this method.

When you reuse the entire yeast slurry from a previous batch, the oxygen you dissolve in the wort (and it is increasingly difficult to dissolve oxygen in wort as the gravity goes up) is split among a very large yeast population. Each yeast cell gets proportionately less oxygen. Now, granted, oxygen is most important for the yeast when it has to reproduce and, because you pitched so much yeast, it won't have to reproduce much at all. However, what you then have is a relatively old yeast population whose cell walls are heavily scarred from reproduction. My current philosophy with high-gravity beers is to pitch around one-third of the slurry from a previous normal-gravity batch.

If you have pitched enough yeast and follow steps two through five below, you should see activity within 12 hours. Normal-gravity ale fermentations will be all but complete within a week. Usually I see activity within six hours of pitching, and I can bottle most normal-gravity ales 10 days after pitching, depending on the yeast strain and how quickly it flocculates.

Happier Yeast

By Al Korzonas

2. Aerate/Oxygenate Starters and Wort Well

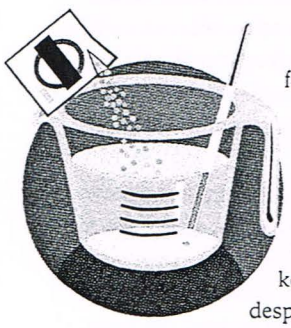
Once you have cooled your wort (and not before) you should aerate it well. Different strains of yeast require varying amounts of dissolved oxygen. Some need very little; others demand a lot or they simply don't perform well. "Aeration tubes" (a.k.a., Venturi tubes) are remarkably poor at introducing dissolved oxygen. Pouring between containers or using aquarium pumps and oxygen tanks are far better ways of introducing oxygen to the wort. Even shaking a half-filled carboy for three minutes was found to be more than five times better than an aeration tube.

Oxygen is used by the yeast to synthesize unsaturated fatty acids and sterols, important for growth and alcohol tolerance. You may have read that yeast's oxygen requirements are reduced if you provide some break material for them. This is true, but because break only contains fatty acids (which the yeast can use) and not sterols, the yeast still needs oxygen for sterol synthesis, unless you specifically add sterols to the wort. The more the yeast reproduces, and the more growth you expect from it, the more oxygen you need to provide.

I found that I got much better yeast performance (and better attenuation) when I switched to using pure oxygen instead of simple aeration. The main reason I switched to oxygen was because I found that in the summertime my room air contained a significant quantity of wild yeasts, which gave my beers an off flavor. First, I switched to an aquarium pump, which pumped the air first through a submicron filter that removed the airborne wild yeasts, and then through an airstone. The problem was that to get sufficient dissolved oxygen I needed to run the pump for three to four minutes. Alas, foam spewed from the fermenter after only a minute, so I had to stop the pump many times. With pure oxygen you can get an equivalent amount of dissolved oxygen from only one minute of bubbling.

Once fermentation has begun don't aerate your wort. Once alcohols begin to be produced oxygen will lead to unpleasant aldehydes and will increase the diacetyl level of the finished beer. See step eight if you think you have a stuck fermentation.

3. Rehydrate and Temper Dry Yeast



I've known about yeast rehydration for many years, but had been rehydrating it much cooler than some yeast manufacturers suggest. If you get rehydration instructions from the yeast manufacturer, use those, because they appear to vary with yeast strain. I've spoken to several yeast manufacturers and, despite the differences in temperature, each assures me that they have tested the viability of their yeasts at their recommended rehydration temperatures and, for their strains, the instructions are indeed correct.

If you don't get instructions, I suggest you do the following:

• While you're boiling your wort, boil a cup of tap water and pour it into a Pyrex container or coffee mug.

ILLUSTRATIONS BY ANTONIA MANDA

Starters

A commonly asked question is "Why make a starter—can't you just grow the yeast in the main fermenter in the entire volume of wort?" The answer is yes, but it's not the best way for yeast to grow.

There are two reasons that you should use a starter: because it is easier for your yeast of choice to outcompete uninvited yeasts and bacteria for the limited oxygen and nutrients, and because there simply isn't enough oxygen for proper yeast health if you pitch a 50 mL package of yeast into five gallons of beer.

The commercial brewers' rule of thumb is that you want to step your yeast up only five- to ten-fold. In other words, for five gallons of wort, you want between a 1- and 1/2-gallon starter.

Now, you just spent eight hours making five gallons of the most perfect triple-decocted Bohemian Pilsener and you are standing over the fermenter about to pitch your yeast when you realize that you are about to also introduce a gallon of spent starter wort that was made from discounted malt extract. Yikes!

How can you use these big starters that are recommended for lagers and strong beers without diluting your wort with spent starter wort? One solution is to use slurry from a previous batch. A second is to allow the yeast to settle in the starter and then pour off the spent wort. Ahh, but didn't we read that the starter should be pitched at high kraeusen and that letting the yeast sit around too long will begin to deplete their glycogen reserves? I use a method that allows you to reduce the amount of spent starter wort you introduce into the batch, while keeping the glycogen levels of the yeast high.

Build up a one gallon starter of your chosen yeast. Let it ferment out and settle (incidentally, adding a tiny pinch Irish moss to your starter wort will help your yeast settle faster). The day before brewing, pour off the spent wort and add 500 mL of fresh, aerated starter wort. When it comes time to pitch, you will have the equivalent of a one-gallon starter at high kraeusen, but you will only have to introduce 500 mL of starter wort.

Another common question is "Should I make a starter for my dry yeast?" In my opinion, the benefit is much, much smaller for dry yeast because there are many times the yeast cells in a package of dry yeast than in a package of liquid yeast. If you do choose to make a starter for your dry yeast, by all means, please rehydrate them in *water* first!

- Insert a thermometer and cover the top with cling wrap so you don't have any uninvited guests.
- Wait for the water to cool to between 90 and 110 degrees F (32 and 43 degrees C).
- Sprinkle—don't stir—the dry yeast onto the water.
- Let the yeast rehydrate between 15 and 30 minutes.
- If the yeast is more than 20 degrees F (11 degrees C) hotter than your wort, don't just let it cool naturally. Double the volume of the "tempering" yeast, which prepares the yeast for the cooler wort more gradually.
- Pitch the yeast into your wort.

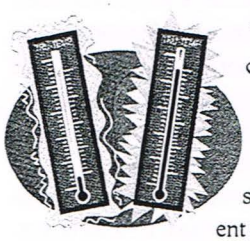
Note that it does not help to rehydrate the yeast in wort or sugar water. In fact, the yeast prefers dechlorinated (e.g., carbon-filtered) hard tap water to distilled water. A small amount of yeast hulls or yeast extract in the rehydration water has shown to decrease lag times and speed the initial reproduction. You can add a pinch of dry yeast from an old package to the boiling water in place of the yeast hulls.

4. Don't Starve the Yeast

Yeast's primary method of energy storage is a carbohydrate called glycogen. When yeasts are introduced into wort, they use their glycogen reserves during the initial phase of their life in the new environment. One study has found that low glycogen levels in the yeast at pitching time results in higher production of diacetyl, acetaldehyde and sulfur dioxide, and can lead to higher final gravities (lower attenuation). As it turns out, glycogen levels in yeast are lowest just as the yeast reaches high kraeusen, soon after it begins to be replenished. My recommendation is that the ideal time to pitch your starter is eight to 12 hours past high kraeusen.

When yeast runs out of sugars in its environment, it begins to use glycogen for sustenance. If you make a starter and your plans change, you can put it in a cool place for safekeeping, but you should feed your yeast again 24 hours before use. Long-term storage is not recommended, although I've cheated and revived (by decanting and feeding) starters that have sat around at cellar temperatures for weeks. It would be much better to get rid of most of the yeast and build up a starter from a small culture again.

5. Don't Temperature Shock the Yeast



Yeast doesn't like sudden temperature changes any more than we do. I mentioned tempering above, when I wrote about yeast rehydration. Tempering is even more important for liquid yeast starters. Each strain of yeast has a different sensitivity to temperature changes (drops are more dangerous than rises), but I feel that you should try to minimize your temperature drop between the starter and wort to 10 degrees F (6 degrees C). Shocking the yeast will kill many of the cells, and the rest will be sluggish for quite a while.

6. Provide Proper Amount of Nutrition for the Yeast

Although uncommon with all-malt beers, sufficient nutrition for the yeast can be a problem when you are making meads or adding a lot of honey, refined sugars or grains like rice or corn to your recipe. A teaspoon of yeast energizer is enough for five gallons of mead, so a beer should require no more than one-quarter teaspoon (1.2 mL). Excessive levels of amino acids will result in increased production of higher alcohols.

7. Don't Ferment Too Hot or Cold

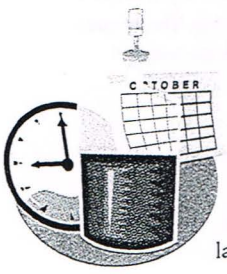
If you ferment too hot, your beer will have increased levels of higher alcohols and esters. A moderate-gravity beer can taste and smell alcoholic and have a "hot" mouthfeel. If you ferment too cold, your yeast can poop out before its time. Usually this can be fixed by simply warming the fermenter and swirling to re-suspend the yeast.

8. Don't Expect Too Much from Your Yeast (Attenuation, NOT Final Gravity).

Many homebrewers think they have a stuck ferment when really they have a beer that simply has a high final gravity (FG). What you should do is find out the expected apparent attenuation of your yeast, then adjust your target FG based on your recipe. Some extracts (e.g., "Dutch," "Hollander," Laaglander or Northwestern "European") are not very fermentable and can have apparent attenuations of only 55%. Crystal malt, lactose and maltoldextrin will decrease fermentability and, therefore, result in a lower apparent attenuation. If you suspect a stuck ferment, measure your SG and calculate the current apparent attenuation (see Attenuation sidebar).

If the apparent attenuation is much lower than expected—don't forget to account for ingredients that reduce attenuation—strongly resist the temptation to aerate the wort! My recommendation is to make up another big starter of the same yeast strain and add that to the fermenter. If you are making a very high original-gravity beer, say 1.130, you may have reached the alcohol limit of the yeast. You can try getting slightly more attenuation by pitching Champagne yeast, but I suggest trying more of the original yeast first.

9. Don't Separate the Yeast and Beer Too Early



Yeast takes time to do its work. Especially in lagers, you need to give the yeast plenty of time to absorb the acetaldehyde, diacetyl and hydrogen sulfide that was produced. Don't give up on those sulfury lagers! Give them four, five or six months of lagering. Finally, don't even think of filtering those lagers until the yeast has finished lagering the beer.

Attenuation

Apparent attenuation = (1 – (SG – 1) / (OG – 1)) × 100%

Therefore, if the original gravity was 1.072 and the current specific gravity is 1.018:

$$\begin{aligned}\text{Apparent attenuation} &= (1 - (1.018 - 1)/(1.072 - 1)) \times 100\% \\ &= (1 - 0.018/0.072) \times 100\% \\ &= (1 - 0.25) \times 100\% \\ &= 0.75 \times 100\% \\ &= 75\%\end{aligned}$$

10. Don't Repitch Damaged Yeast

This might seem obvious, but I've made this mistake myself. If you have a batch of beer that turns out to be high in diacetyl or acetaldehyde, or the yeast simply doesn't want to flocculate, don't reuse this yeast.

11. Don't Reuse Yeast from High-Gravity Brews

I've read where it is recommended that you not reuse yeast from high-gravity batches, but some homebrewers report no problems. It could simply be a strain-dependent problem. I've chosen to play it safe and not reuse yeast from high-gravity batches. It is especially unwise to reuse a yeast from a high-gravity batch in another high-gravity batch. Oxygen solubility decreases as the gravity of the wort goes up and, as I pointed out above, yeast's alcohol tolerance is dependent on getting sufficient oxygen at pitching time.

12. Get a Good Hot and Cold Break

A good hot and cold break are important for a variety of reasons, two of which are directly related to yeast. If you don't get a good cold break, the compounds stay in solution in the wort and can coat the yeast, resulting in poor yeast performance. Boiling vigorously will give you a good hot break and chilling quickly will give you a good cold break. Irish moss will help, too. Making sure your boil pH is not too low (below 4.8) is important for both hot and cold break formation. Another effect of break is that if you ferment on the break, you can increase higher alcohol and ester production. On the other hand, some studies have shown that removal of all the break can result in sluggish and even stuck fermentations.

Following these 12 steps will help make your yeast happier, which will result in cleaner, better beer and subsequently make you a happier brewmaster.

(continued on page 85)

WINNERS CIRCLE

Amahl Turczyn

Here are the best-of-the-best gold-medal-winning recipes of the AHA 1998 National Homebrew Competition.

The Homebrewer of the Year award, sponsored by Muntons p.l.c., goes to the brewer of the best beer in the NHC. Adding an international flavor to the competition was this year's winner, Ichiri Fujiura, from Tokyo, Japan with a toasted coconut porter. Ichiri also gets a trip to the 1998 GABF as part of his prize. The Ninkasi Award goes to the brewer with the most second round points (six for a gold, three for a silver, one for a bronze). The winner was Art Beall of Hudson, OH. The generous sponsor of this award is the Boston Beer Company, which will bring Art to the brewery to brew a batch of his beer and send him to the Seibel Institute in Chicago for the short course.

The Meadmaker of the Year award, sponsored by Madhava's Mountain Gold Honey, once again went to Ron Badley of Reno, NV. Ron won the Invitational Brew-Off of last year's NHC winners as well. The winner of Cidermaker of the Year, sponsored by Widmer Brothers Brewing Company, was Gloria Franconi of Red Hook, NY.

The Homebrew Club of the Year traveling trophy went to the Capitol Brewers of Salem, OR. The Capitol Brewers were in attendance for the presentation and celebrated on the podium like Rocky Balboa on the art museum steps. Sponsored by Cooper's Brewery, this award goes to the homebrew club whose members accumulate the most points in the first and second rounds of the NHC and in the six annual AHA club-only competitions. Congratulations to all the winners.

—Paul Gatza
Director, AHA

Barley Wine

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Pike's Brewery, Seattle, WA

DAVE COWIE, NEVADA CITY, CA
"THREE QUARTER TON ALE"
AMERICAN-STYLE BARLEY WINE

Ingredients for 5 U.S. gal (19 L)

- 8 lb Briess pale malt (3.63 kg)
- 5 lb light dry malt extract (2.27 kg)
- 3 lb Munich malt (1.36 kg)
- 1 lb Vienna malt (.45 kg)
- 1 lb wheat malt (.45 kg)
- 1 lb Cara-pils malt (.45 kg)
- 1 lb 40 °L crystal malt (.45 kg)
- 18 oz 60 °L crystal malt (.50 kg)
- 2 oz chocolate malt (57 g)
- 2 oz Chinook pellet hops, 12% alpha acid (57 g) (60 min.)
- 1 oz Cascade pellet hops, 5.5% alpha acid (28 g) (30 min.)
- .5 oz Centennial pellet hops, 9.9% alpha acid (14 g) (30 min.)
- 1 oz Cascade pellet hops, 5.5% alpha acid (28 g) (finish)
- .5 oz Centennial pellet hops, 9.9% alpha acid (28 g) (finish)
- 1 oz Cascade pellet hops, 6.1% alpha acid (28 g) (dry)
- .5 oz Centennial pellet hops, 9.9% alpha acid (14 g) (dry)

Wyeast No. 1056 American ale yeast
Seibel No. 96 ale yeast
force carbonate in keg

- Original specific gravity: 1.119
- Final specific gravity: 1.040
- Boiling time: 90 min.
- Primary fermentation: 10 days at 65-70 degrees F (18-21 degrees C) in glass
- Secondary fermentation: 14 days at 62-68 degrees F (17-20 degrees C) in glass
- Tertiary fermentation: 12 days at 32-34 degrees F (0-1 degrees C) in glass

Brewer's Specifics

Mash grains at 145-158 degrees F (63-70 degrees C) for 90 minutes. Boil extract for 60 minutes.

Judges' Comments

"Rich, sweet malt aroma dominates; lots of hop flavors; high hop bitterness; alcohol warming is evident. This is a huge beer. Excellent effort."

"Very big; malt and alcohol dominates, followed by a long, bitter finish. Good example of style. Slight harshness may mellow with age."

Brewer's Comments

"This was my first effort at a barley wine in seven years of homebrewing. I wish I hadn't waited so long! Think big. Throw caution to the wind and hops in the kettle."

Runners-Up

Silver Medal: Ron Raike, Orlando, FL, "Big Daddy Barley Wine"
Bronze Medal: Ross Kahn, Boulder, CO, "Olde Lumpy XXXX"

Belgian Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Manneken-Brussel Imports, Inc., S.A. Bières de Chimay, Austin, Texas

MARK TOMUSIAK, BOULDER, CO
"ALL-SAISON TRIPEL GARDE"
BELGIAN-STYLE PALE STRONG ALE

Ingredients for 5 U.S. gal (19 L)

6 lb light malt extract (2.72 kg)
3 lb Pilsener malt (1.36 kg)
.75 lb Munich malt (.34 kg)
.75 lb flaked corn (.34 kg)
1 lb 0 °L Belgian candi sugar (.45 kg)
1 oz E. Kent Goldings whole hops, 6.7% alpha acid (28 g) (60 min.)
1.5 oz E. Kent Goldings whole hops, 6.7% alpha acid (42 g) (15 min.)
.33 oz ground coriander seed (9 g) (5 min.)
Wyeast No. 3787 Trappist high gravity ale yeast
.87 cup corn sugar (210 mL) (to prime)

- Original specific gravity: 1.074
- Final specific gravity: 1.015
- Boiling time: 60 min.
- Primary fermentation: seven days at 65 degrees F (18 degrees C) in glass
- Secondary fermentation: 55 days at 58 degrees F (14 degrees C) in glass

Brewer's Specifics

Mash grains at 122 degrees F (50 degrees C) for 15 minutes. Raise temperature to 135 degrees F (57 degrees C) for 20 minutes. Complete the mash at 152 degrees F (67 degrees C) for 75 minutes. Boil extract for 60 minutes.

Judges' Comments

"A nice pale strong ale. No off-flavors. Aromas are pleasant; aftertaste lingers on palate. A great ale!"

"An outstanding beer with great complexity and a wonderful yeast-induced flavor. Just a little more malt for added complexity would be nice."

Brewer's Comments

Subtlety and balance are important when brewing Belgian ales; the individual components should blend together seamlessly to create a unique beer. The relatively small amount of coriander in this recipe does not create a discernable aroma on its own, but rather combines with the yeast to create a wonderful new aroma. Corn and candi sugar lighten the body and help make this strong beer easily drinkable. At bottling time, a fresh culture of yeast was used to ensure strong carbonation and a healthy head of foam.

Runners-Up

Silver Medal: Ted Manahan, Albany, OR, "Home Brew Grand Cru"
Bronze Medal: Ed Bloom, Gibsonia, PA, "Blabby-Ale"

English-Style Pale Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Wynkoop Brewing Co., Denver, CO

THOMAS J. O'CONNOR III M.D.,
ROCKPORT, ME
"J. DUCK'S IPA"
INDIA PALE ALE

Ingredients for 5 U.S. gal (19 L)

8.5 lb pale malt (3.86 kg)
.5 lb light Munich malt (.23 kg)
.25 lb crystal malt (.11 kg)
.25 lb Cara-Vienne malt (.11 kg)
.75 oz Galena whole hops, 12.9% alpha acid (21 g) (first wort)
1 oz Cascade whole hops, 6.4% alpha acid (28 g) (30 min.)
1 oz Cascade whole hops, 5.8% alpha acid (28 g) (15 min.)
1.75 oz Columbus pellet hops, 12.4% alpha acid (50 g) (finish)
Wyeast No. 1056 American ale yeast
forced CO_2 to carbonate

- Original specific gravity: 1.060
- Final specific gravity: 1.016
- Boiling time: 60 min.
- Primary fermentation: 12 days at 65 degrees F (18 degrees C) in glass

Brewer's Specifics

Mash grains at 130 degrees F (54 degrees C) for 40 minutes. Raise mash temperature to 155 degrees F (68 degrees C) and hold for 120 minutes.

Runners-Up

Silver Medal: Dave Shaffer, Lafayette, CO, "Mullethead Ale"
Bronze Medal: David Welch, Long Beach, CA, "Hop City IPA"

Belgian-Style Lambic

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by New Belgium Brewing Company, Ft. Collins, CO

BRIAN BLISS, FREMONT, CA
"PECHE LAMBIC #82"
BELGIAN-STYLE FRUIT LAMBIC

Ingredients for 5 U.S. gal (19 L)

20 lb peaches (9.08 kg)
9 lb Pilsener malt (4.08 kg)
4 lb flaked wheat (1.81 kg)
1 oz Hallertauer whole hops, 6.7% alpha acid (28 g) (90 min.)
Wyeast No. 3278 Belgian Lambic Blend ale yeast
1 bottle Noirot peach extract (added at bottling)
Edme dry ale yeast (added at bottling)
Wyeast 1275 American II ale yeast (added at bottling)
6 oz corn sugar (170 g) (to prime)

- Original specific gravity: 1.069
- Final specific gravity: 1.006
- Boiling time: 2 hrs. 30 min.
- Primary fermentation: two months at 60-75 degrees F (16-24 degrees C) in glass
- Secondary fermentation: 11 months at 60-75 degrees F (16-24 degrees C) in glass

Brewer's Specifics

Mash grains using a double-decoction mash schedule. Add peaches in secondary.

Judges' Comments

"Good lambic flavor but no peach."

"Excellent sourness. Fruit is a little weak. Lactic character outstanding. Excellent lambic."

Brewer's Comments

"I get a lot of evaporation and caramelization on an electric stove. I purposely let the wort cool slowly to build up DMS. The peaches were flash frozen, so they were relatively fresh, though they didn't have much aroma. I let them warm up to room temperature, blanketed them with CO_2, and then siphoned the wort over them."

Runners-Up

Silver Medal: Tony DeMarse, Greeley, CO, "Marlee Wine"

Bronze Medal: Charlie Gottenkieny, Dallas, TX, "Krippel Kriek"

Mild and Brown Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Premier Malt Products, Grosse Pointe, MI

JOE HUGHES, JUPITER, FL
"BROWN 41098"
ENGLISH-STYLE MILD ALE

Ingredients for 11 U.S. gal (41.6 L)

15 lb pale malt (6.81 kg)
1.2 lb Cara-Munich III malt (.52 kg)
.2 lb chocolate malt (.09 kg)
1 lb wheat malt (.45 kg)
2 oz Kent Golding pellet hops, 5% alpha acid (56 g) (50 min.)
1 oz Kent Golding whole hops, 4.5% alpha acid (28 g) (30 min.)
1 oz Kent Golding pellet hops, 4.5% alpha acid (28 g) (4 min.)
Wyeast No.1318 London III ale yeast cask conditioned

- Original specific gravity: 1.046
- Final specific gravity: 1.008
- Boiling time: 90 min.
- Primary fermentation: 14 days at 65 degrees F (18 degrees C) in glass

Brewer's Specifics

Mash grain at 152-154 degrees F (67-68 degrees C) for one hour.

Judges' Comments

"Very nice, delicate malt flavors. Hop flavors and bitterness are properly subdued. Pleasant finish with some hop bitterness for balance. Very tasty and true to style."

"Good balance, light body as appropriate. Good representation of the style."

"Somewhat sweet, caramelly start. Mild, smooth finish with minimal bitterness. Appropriate balance. A good effort for a difficult style."

Brewer's Comments

"This has been my favorite 'House' beer since I first brewed it, November '97. Since then I've been tweaking the recipe. I guess I got it right this time. I owe the inspiration for this beer to Shipyard Brewing Co.'s Mild Ale (Orlando, Florida/Portland, Maine)."

Runners-Up

Silver Medal: Jack Sykes, Overland Park, KS, "East Kent II"
Bronze Medal: Dave Shaffer, Lafayette, CO, "Buffalo Pass Brown Ale"

American-Style Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Northwestern Extract Co., Brookfield, WI

KEN BROWN, FREMONT, CA
"ARDENWOOD PALE ALE"
AMERICAN-STYLE PALE ALE

Ingredients for 6 U.S. gal (22.7 L)

- 9 lb pale malt (4.08 kg)
- 1 lb 17 °L crystal malt (.45 kg)
- .5 lb light Munich malt (.23 kg)
- .5 lb Cara-Pils malt (.23 kg)
- .5 oz Chinook pellet hops, 10.5% alpha acid (14 g) (60 min.)
- .25 oz Chinook pellet hops, 10.5% alpha acid (7 g) (30 min.)
- 1 oz Centennial pellet hops, 8.8% alpha acid (28 g) (15 min.)
- 1 oz Centennial pellet hops, 8.8% alpha acid (28 g) (dry)
- White Labs California ale yeast
- .5 cup corn sugar (118 mL) (to prime)

- Original specific gravity: 1.065
- Final specific gravity: 1.015
- Boiling time: 70 minutes
- Primary fermentation: 14 days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 14 days at 68 degrees F (20 degrees C) in glass
- Tertiary fermentation: seven days at 50 degrees F (10 degrees C) in glass

Brewer's Specifics

Mash grains at 153 degrees F (67 degrees C) for 90 minutes.

Judges' Comments

"Pleasing, full malt and hop flavors. Well done. Very pleasant from start to finish."

Malty sweetness dominates, hops in flavor and finish. Great beer, excellent balance between all aspects."

Brewer's Comments

"I've brewed American pale ales several times and have usually experienced difficulty balancing the malt and hops. I finally got lucky with this recipe. Also, dry hopping with Centennial achieves an incredible floral character unlike any other dry hopped beer I've had."

Runners-Up

Silver Medal: Dan Morley, Calgary, AB, "Weiss Ass Ale"
Bronze Medal: Chris Lavoie, Glenmont, NY, "Donner Party Pale Bitter"

English Bitter

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Deschutes Brewing Co., Bend, OR

BILL CLARK AND STEVE OLSEN, DULUTH, MN
"PEDIGREE EXTRA SPECIAL BITTER"
STRONG EXTRA SPECIAL BITTER

Ingredients for 6 U.S. gal (22.7 L)

- 9.9 lb pale malt (4.5 kg)
- .55 lb 80 °L crystal malt (.25 kg)
- .55 lb light Munich malt (.25 kg)
- .5 lb Ashburne malt (.25 kg)
- 1.6 oz Perle pellet hops, 6.7% alpha acid (45 g) (70 min.)
- 1.5 oz Fuggle whole hops, 4.5% alpha acid (43 g) (30 min.)
- 1 oz Goldings whole hops, 5% alpha acid (28 g) (15 min.)
- 1 oz Goldings whole hops, 5% alpha acid (28 g) (finish)
- White Labs Burton ale yeast
- .75 cup corn sugar (177 mL) (to prime)

- Original specific gravity: 1.057
- Final specific gravity: 1.012
- Boiling time: 80 minutes
- Primary fermentation: five days at 72 degrees F (22 degrees C) in steel
- Secondary fermentation: seven days at 68 degrees F (20 degrees C) in glass

Brewer's Specifics

Mash grains at 153 degrees F (67 degrees C) for 90 minutes.

Runners-Up

Silver Medal: Paul Fiorino, Falls Church, VA, "Closet Cleaner"

Bronze Medal: John Avard, Chris Columbus, Matthew Goody and Paul Hallock, Manchester, New Hampshire, "Theneye Bitter"

Scottish Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Yakima Brewing Co., Yakima, WA

CHARLES COPE, ALTO, MI
"MCMUGGY'S ALE"
SCOTTISH-STYLE LIGHT ALE

Ingredients for 5 U.S. gal (19 L)

- 8 lb Maris Otter pale malt (3.6 kg)
- .5 lb Belgian biscuit malt (.23 kg)
- .5 lb Belgian Cara-Vienne malt (.23 kg)
- .5 lb smoked malt (.23 kg)
- .5 lb 50 °L crystal malt (.23 kg)
- 1 oz E. Kent Goldings pellet hops, 4.5% alpha acid (28 g) (60 min.)
- 1 oz Fuggles pellet hops, 4.5% alpha acid (28 g) (30 min.)
- Prime Time Brewers Bank London Ale No. A19
- forced CO_2 to carbonate

- Original specific gravity: 1.056
- Final specific gravity: 1.014
- Boiling time: 90 minutes
- Primary fermentation: seven days at 66 degrees F (19 degrees C) in glass
- Secondary fermentation: 20 days at 66 degrees F (19 degrees C) in glass

Brewer's Specifics

Mash grains at 150 degrees F (66 degrees C) for 60 minutes.

Judges' Comments

"Creamy profile for lightness. This is a very good beer; might be a little too hoppy for style, but still drinks like a four star beer. Good job."

"Great malt profile. Deep and complex with caramel notes. Hop to malt balance is right on. Great beer."

Brewer's Comments

"McMuggy's Ale was cold conditioned in a soda keg for about five months before being entered in the NHC. This allowed any hop aroma of flavor to dissapate and satisfy the style. I also think that a high quality English (or Scottish, if you can get it) pale malt is essential to the finished body. I dedicate this brew to my grandfather, born on the high seas, on the family's pilgrimage from Glasgow to the United States."

Runners-Up

Silver Medal: Mike Kilian, Fenton, MO, "Scotch Ale 4"

Bronze Medal: Harrison Gibbs, Los Angeles, CA,"Highlander Heavy"

Porter

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Left Hand Brewing Co., Longmont, CO

KENT BREHM AND BRUCE HAMMELL, HAMILTON, NJ
"B&K PORTER"
ROBUST PORTER

Ingredients for 14 U.S. gal (53 L)

- 25 lb Maris Otter pale malt (11.3 kg)
- 2 lb torrified wheat (.91 kg)
- 3 lb chocolate malt (1.36 kg)
- 3 lb crystal malt (1.36 kg)
- 1 lb rauch malt (.45 kg)
- 4 oz black patent malt (113 g)
- 1 oz Target pellet hops, 8% alpha acid (28 g) (60 min.)
- .5 oz Bramling Cross pellet hops, 7.1% alpha acid (14 g) (40 min.)
- 1 oz Bramling Cross pellet hops, 7.1% alpha acid (28 g) (30 min.)
- 1 oz Bramling Cross pellet hops, 7.1% alpha acid (28 g) (20 min.)
- 1 oz E. Kent Goldings pellet hops, 5% alpha acid (28 g) (5 min.)
- Yeast Culture Kit Co. "Samuel Smith" ale yeast
- 1 cup dextrose (237 mL) (to prime)

- Original specific gravity: 1.070
- Final specific gravity: 1.022
- Boiling time: 60 minutes
- Primary fermentation: five days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 14 days at 68 degrees F (20 degrees C) in glass

Brewer's Specifics

Mash grains at 152 degrees F (67 degrees C) for 60 minutes.

Judges' Comments

"Very good porter. Clean, light fruitiness & warmth add a lot to a well-balanced porter."

"Immensely complex beer. Lots of stuff going on. Plenty of flavor and several balances happening."

Runners-Up

Silver Medal: Terry and Gary Durant, Westminster, CO, "Brett's Portland Porter"
Bronze Medal: Jeffrey Swearengin,Tulsa, OK,"Swedish Porter"

Herb and Spice Mead

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Colorado Spice, Inc., Boulder, CO

KATHLEEN LOTZ, QUINCY, IL
"LAVENDER"
STILL METHEGLIN

Ingredients for 1 U.S. gal (3.8 L)

- 4 lb clover honey (1.8 kg)
- 3 tsp acid blend (14.8 mL)
- .12 tsp tannin (.59 mL)
- 1 tsp yeast nutrient (4.9 mL)
- 2 oz dried lavender flowers (57 g)
- Vierka mead yeast

- Original specific gravity: 1.090
- Final specific gravity: 1.012
- Boiling time: 5 minutes
- Primary fermentation: 90 days at 65 degrees F (18 degrees C) in glass
- Secondary fermentation: 120 days at 58 degrees F (14 degrees C) in glass.

Judges' Comments

"Good floral flavor, some alcoholic warming, some acidity, but could use a little more for balance. Very nice mead!"

Brewer's Comments

Bring one gallon of water to a boil. Remove two cups (473 mL) of the boiling water and use this water to steep 2 ounces (57 g) of dried lavender flowers. Let flowers steep for 1 to 1 1/2 hours. Dissolve honey in remaining water. Add acid blend, yeast nutrient and tannin. Cool water in ice bath to 70 degrees F (21 degrees C). Pour must into fermenter and pitch yeast. After steeping flowers, strain flowers from water and add this water to must in fermenter.

Runners-Up

Silver Medal: John Alton Slusher, Glen Burnie, MD, "Russian Imperial Mead"
Bronze Medal: Gunther Jensen, Kagel Canyon, CA, "Cinnamon Girl"

English and Scottish Strong Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Rogue Ales/ Oregon Brewing Co., Newport, OR

LESTER LEWIS, SALEM, OR
"BARLEYCORN RIDES AGAIN"
ENGLISH OLD ALE/STRONG ALE

Ingredients for 10 U.S. gal (37.9 L)

20 lb pale malt (9 kg)
5 lb Belgian Special B malt (2.27 kg)
5 lb wheat malt (2.27 kg)
3 lb six row malt (1.36 kg)
3 oz Saaz whole hops (85 g) (45 min.)
1 oz Nugget whole hops (28 g) (45 min.)
1 oz Kent Goldings whole hops (28 g) (45 min.)
1 oz Columbus whole hops (28 g) (45 min.)
Wyeast No. 1084 Irish ale yeast
6 cups unfermented wort (1419 mL) to carbonate

- Original specific gravity: 1.096
- Final specific gravity: 1.024
- Boiling time: 85 minutes
- Primary fermentation: 18 days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 30 days at 68 degrees F (20 degrees C) in glass

Brewer's Specifics

Mash grains at 120 degrees F (49 degrees C) for 15 minutes. Raise temperature to 130 degrees F (54 degrees C) and hold for 15 minutes. Raise temperature to 148 degrees F (64 degrees C) and hold for 60 minutes. Raise temperature to 158 degrees F (70 degrees C) and hold for 60 minutes.

Judges' Comments

"Outstanding beer with no flaws. The more I drink it, the more I like it. Bring some to the Great American Beer Festival, please."

"Starts out malty, with some diacetyl. Balanced bitterness. Good job! Very drinkable."

Runners-Up

Silver Medal: Bradley Maxfield, New Berlin, WI, "Red Tartan Scotch Wee Heavy"
Bronze Medal: Dirk Bridgedale, Concord, CA, "The Bladder Buster"

Stout

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Alternative Garden Supply DBA Brew & Grow, Steamwood, IL

MIKE FROST AND MIKE KOWAL, ADDISON, IL
"JERRY GARCIA RUSSIAN IMPERIAL STOUT"
IMPERIAL STOUT

Ingredients for 10 U.S. gal (37.9 L)

23 lb pale malt (10.4 kg)
6.6 lb dark malt extract (3 kg)
2 lb 20 °L crystal malt (.91 kg)
2 lb roast barley (.91 kg)
1 lb 120 °L crystal malt (.45 kg)
1 lb chocolate malt (.45 kg)
1 lb black patent malt (.45 kg)
1 lb biscuit malt (.45 kg)
1 lb flaked wheat (.45 kg)
.5 lb flaked barley (.23 kg)
2 oz Chinook pellet hops, 10.9% alpha acid (57 g) (60 min.)
2 oz Perle whole hops, 8.4% alpha acid (57 g) (60 min.)
2 oz Northern Brewer whole hops, 7% alpha acid (57 g) (30 min.)
4 oz Cascade whole hops, 5.9% alpha acid (113 g) (finish)
1 oz Challenger pellet hops, 8.2% alpha acid (28 g) (dry)
1 oz Styrian Golding pellet hops, 3% alpha acid (28 g) (dry)
Wyeast No. 1056 American ale yeast
.75 cup dextrose (177 mL) (to prime)
.25 cup lactose (59 mL) (at bottling)

- Original specific gravity: 1.100
- Final specific gravity: 1.033
- Boiling time: 90 minutes
- Primary fermentation: 19 days at 65 degrees F (18 degrees C) in glass
- Secondary fermentation: 31 days at 60 degrees F (16 degrees C) in glass

Brewer's Specifics

Mash grains at 152 degrees F (67 degrees C) for 75 minutes. Boil extract for 90 minutes.

Judges' Comments

"Sweet roast malt balanced by aggressive hop bitterness. Bang-up job. Think about a little less sweetness."

"Nice, well-balanced imperial stout. Lots of hops, big malt. Good job."

Runners-Up

Silver Medal: Mark Deorio, Bridgeport, PA, "Victory II"

Bronze Medal: Joe Formanek, Lisle, IL,"Jooky Rainy Day Stout"

German Dark Lager

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Saxer Brewing Co., Lake Oswego, OR

JACK WILLIS, WINDHAM, OH
"G.N.'S DUNKEL"
MUNICH-STYLE DUNKEL

Ingredients for 16.5 U.S. gal (62.5 L)

- 29 lb Munich malt (13.16 kg)
- 3 lb 60 °L crystal malt (1.36 kg)
- .75 lb 80 °L crystal malt (.34 kg)
- .75 lb chocolate malt (.34 kg)
- 4 oz Hallertauer whole hops, 3.9% alpha acid (113 g) (60 min.)
- 3.5 oz Hallertauer whole hops, 3.9% alpha acid (99 g) (30 min.)
- Wyeast No. 2124 Bohemian lager yeast
- forced CO_2 to carbonate

- Original specific gravity: 1.058
- Final specific gravity: 1.017
- Boiling time: 90 minutes
- Primary fermentation: 21 days at 48 degrees F (9 degrees C) in glass
- Secondary fermentation: 42 days at 32-48 degrees F (0-9 degrees C) in glass

Brewer's Specifics

Mash grains at 155 degrees F (68 degrees C) for 60 minutes.

Judges' Comments

"Rich, toasty malt flavor, but a little of a roasted bite to it. A very pleasant beer. Could use fewer roasty flavors."

Runners-Up

Silver Medal: Art Beall, Hudson, OH, "Tomb Raider Lager"

Bronze Medal: Ed Miles, Olathe, KS, "Honey Do Dunkel"

German Light Lager

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Briess Malting Co., Chilton, CO

DAVE SHAFFER, LAFAYETTE, CO
"DAS SCHVINDLIG BLONT"
MUNICH-STYLE HELLES

Ingredients for 5 U.S. gal (19 L)

- 8 lb Vienna malt (3.63 kg)
- 4 lb pale malt (1.8 kg)
- 1 lb Cara-Pils malt (.45 kg)
- .5 lb wheat malt (.23 kg)
- 1 oz Hersbrucker pellet hops, 3.6% alpha acid (28 g) (60 min.)
- .5 oz Saaz pellet hops, 3.2% alpha acid (14 g) (60 min.)
- .5 oz Hersbrucker pellet hops, 3.6% alpha acid (14 g) (20 min.)
- .5 oz Hersbrucker pellet hops, 3.6% alpha acid (14 g) (5 min.)
- Wyeast No. 2308 Munich lager yeast
- .75 cup corn sugar (177 mL) (to prime)

- Original specific gravity: 1.052
- Final specific gravity: 1.013
- Boiling time: 80 minutes
- Primary fermentation: 28 days at 47 degrees F (8 degrees C) in glass
- Secondary fermentation: 7 days at 47 degrees F (8 degrees C) in glass

Brewer's Specifics

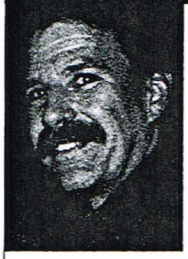
Mash grains at 128 degrees F (53 degrees C) for 25 minutes. Raise temperature to 150 degrees F (66 degrees C) for 60 minutes. Raise temperature to 154 degrees F (68 degrees C) for 30 minutes.

Runners-Up

Silver Medal: Richard Dwenger, Wentzville, MO, (Untitled)

Bronze Medal: Randy Norman, Madera, CA, (Untitled)

Classic Pilsener



GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Red Ass Brewing, Fort Collins, CO

RUSS BEE, ROCKWALL, TX
"BOHEMIAN RHAPSODY"
BOHEMIAN-STYLE PILSENER

Ingredients for 10 U.S. gal (37.9 L)

- 20 lb Pilsener malt (9.08 kg)
- 2.5 lb Cara-Pils malt (1.13 kg)
- 1.25 oz Saaz pellet hops, 3.5% alpha acid (35 g) (90 min.)
- 1 oz Hallertauer pellet hops, 3.2% alpha acid (28 g) (90 min.)
- 2.15 oz Saaz pellet hops, 3.5% alpha acid (61 g) (75 min.)
- 1.75 oz Hallertauer pellet hops, 3.2% alpha acid (50 g) (75 min.)
- 2 oz Saaz pellet hops, 3.5% alpha acid (57 g) (dry, 7 days)
- Wyeast No. 2007 Pilsen lager yeast
- 6 oz corn sugar (170 g) to prime

- Original specific gravity: 1.054
- Final specific gravity: 1.008
- Boiling time: 90 minutes
- Primary fermentation: 25 days at 50 degrees F (10 degrees C) in glass
- Secondary fermentation: 7 days at 40 degrees F (4 degrees C) in glass

Brewer's Specifics

Mash grains using a decoction mash schedule.

Judges' Comments

"Very good beer; nice balance. Could drink this all day. Well done."

Runners-Up

Silver Medal: George Fix, Arlington, TX, "Pre-Pro"
Bronze Medal: Michael Weaver, Cincinnati, OH, "D'oh Bohpils"

American Lager

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Jacob Linenkugel's Brewing Co., Chippewa Falls, WI

JOHN AND SUSAN TANTILLO, WILMINGTON, NC
(UNITITLED)
AMERICAN LAGER/ALE OR CREAM ALE

Ingredients for 5 U.S. gal (19 L)

- 6 lb pale malt (2.72 kg)
- 1 lb rice solids (.45 kg)
- .5 lb Cara-Pils malt (.23 kg)
- .5 lb wheat malt (.23 kg)
- .5 oz Cluster pellet hops, 6.8% alpha acid (14 g) (60 min.)
- .5 oz Tettnanger pellet hops, 3.8% alpha acid (14 g) (2 min.)
- Wyeast No. 2035 American lager yeast
- 1 cup corn sugar (237 mL) to prime

- Original specific gravity: 1.045
- Final specific gravity: 1.009
- Boiling time: 60 minutes
- Primary fermentation: 14 days at 50 degrees F (10 degrees C) in glass
- Secondary fermentation: 14 days at 40 degrees F (4 degrees C) in glass
- Tertiary fermentation: 4 days at 35 degrees F (2 degrees C) in glass

Brewer's Specifics

Mash grains at 122 degrees F (50 degrees C) and hold for 30 minutes. Raise temperature to 146 degrees F (63 degrees C) and hold for 60 minutes. Raise temperature to 152 degrees F (67 degrees C) and hold for 30 minutes. Raise temperature to 158 degrees F (70 degrees C) and hold for 15 minutes. Mash out at 168 degrees F (76 degrees C) for 30 minutes. Boil rice solids for 60 minutes.

Judges' Comments

"Almost creamy smooth on palate. Clean aftertaste."

"Malt flavor dominates. Very clean. Nice balance of hops and malt. I'd have another."

Brewers Comments

Good recipe for Miller Genuine Draft clone; a little maltier, though. Use gelatin and Polyclar for clarity: add to secondary and leave in for two weeks. Use Irish moss in the boil. Treat water with a Brita water filter.

Runners-Up

Silver Medal: Thomas Plunkard, Warren, MI, "Big Daddy Lager"
Bronze Medal: Bill Pierce, Des Moines, IA, "Bill's Swill"

Vienna/Märzen/ Oktoberfest

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by F.H. Steinbart, Portland, OR

BRIAN BECKMANN, ANDOVER, NJ
"OLD WORLD DELIGHT"
VIENNA

Ingredients for 5.5 U.S. gal (20.8 L)

7 lb pale malt (3.18 kg)
.75 lb light crystal malt (.34 kg)
3 lb Munich malt (1.36 kg)
.5 lb wheat malt (.23 kg)
1 oz Liberty pellet hops, 5.6% alpha acid (28 g) (75 min.)
.5 oz Liberty pellet hops, 5.6% alpha acid (14 g) (5 min.)
Wyeast No. 2206 Bavarian lager yeast
forced CO_2 to carbonate

- Original specific gravity: 1.045
- Final specific gravity: Unknown
- Boiling time: 75 minutes
- Primary fermentation: 21 days at 45-50 degrees F (7-10 degrees C) in glass
- Secondary fermentation: 45 days at 45-50 degrees F (7-10 degrees C) in glass

Brewer's Specifics

Mash grains at 122 degrees F (50 degrees C) and hold for 20 minutes. Raise temperature to 155 degrees F (69 degrees C) and hold for 60 minutes.

Judges' Comments

"This is a very good beer. Great balance with malt and hops. The sweet malt notes are well done."

"Wonderful Vienna. Cut back on bittering hops a pinch and increase malt slightly."

Brewers Comments

"You can't brew by the seat of your pants. Brewing is not an exact science, but it does require scientific techniques. It is important to develop a brewing procedure that works for your system. Only after a procedure is established and followed during each brewing session can a beer be consistently reproduced. In this way, the effect on beer taste due to changes in ingredients and times can be evaluated. This is where the art of brewing comes into play."

Runners-Up

Silver Medal: Thomas J. O'Connor III, M.D., Rockport, ME, "J. Duck's Oktoberfest"
Bronze Medal: Cory Buenning, Jackson, WY, "Red Beard Lager"

German-Style Wheat Beer

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Tabernash Brewing Co., Denver, CO

TOM BELL, PARKER, CO
(UNTITLED)
WEIZEN

Ingredients for 10 U.S. gal (37.9 L)

10 lb wheat malt (4.54 kg)
9 lb pale two row malt (4.08 kg)
1 lb pale six row malt (.45 kg)
1 oz Perle plug hops, 9.5% alpha acid (28 g) (90 min.)
Wyeast No. 3068 Weihenstephan ale yeast
.75 cup corn sugar (177 mL) (to prime)

- Original specific gravity: 1.050
- Final specific gravity: 1.014
- Boiling time: 90 minutes
- Primary fermentation: seven days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 7 days at 68 degrees F (20 degrees C) in glass

Brewer's Specifics

Mash grains at 122 degrees F (50 degrees C) for 30 minutes. Raise temperature to 149 degrees F (65 degrees C) and hold for 30 minutes. Raise temperature to 155 degrees F (68 degrees C) and hold for 60 minutes. Mash out at 170 degrees F (77 degrees C) for five minutes.

Judges' Comments

"Wheat flavor, also some fruitiness. Crisp, clean finish, slightly tart. Very impressive. Don't change a thing."

Runners-Up

Silver Medal: Art Beall, Hudson, OH, "Wise Guy Bock"
Bronze Medal: Scott Boeke, North Augusta, SC, "Weizen No. 3"

German-Style Ale

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by H.C. Berger, Fort Collins, CO

JEREMY PRICE, COVINGTON, KY
"J'S COMPETITION KÖLSCH"
KÖLSCH

Ingredients for 5 U.S. gal (19 L)

6 lb pale lager malt (2.72 kg)
2.5 lb Munich malt (1.13 kg)
.5 lb wheat malt (.23 kg)
1 oz Hallertauer pellet hops, 3.2% alpha acid (28 g) (first wort)
1 oz Tettnanger whole hops, 4.4% alpha acid (28 g) (60 min.)
.5 oz Tettnanger whole hops, 4.4% alpha acid (14 g) (20 min.)
Wyeast No. 2565 Kölsch yeast
.66 cup corn sugar (156 mL) (to prime)

- Original specific gravity: 1.048
- Final specific gravity: 1.008
- Boiling time: 60 minutes
- Primary fermentation: 21 days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 10 days at 50 degrees F (10 degrees C) in glass

Brewer's Specifics

Mash grains at 153 degrees F (67 degrees C) for 45 minutes.

Judges' Comments

"A very good beer, fits style except for slightly high bitterness in finish."

"Great balance; good flavor profile. Very enjoyable judging this brew. Excellent."

Brewers Comments

"I believe the most important ingredient in brewing beers which are authentic to style is to use the correct yeast. The Kölsch yeast in combination with the wheat produces that authentic Kölsch taste, which you can't get from other ale or lager strains. Warm fermentation and a bit of cold conditioning produces a balance of both ale and lager characteristics."

Runners-Up

Silver Medal: Mike Riddle, San Rafael, CA, "My Old Man"
Bronze Medal: Dean Fikar, Ft. Worth, TX, "Madeline's Altbier"

Smoked Beer

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Jim's Homebrew Supply, Spokane, WA

BOB JOHNSON, TEWKSBURY, MA
"SMOKEHOUSE I"
BAMBERG-STYLE RAUCHBIER

Ingredients for 5 U.S. gal (19 L)

9.75 lb Rauch malt (4.42 kg)
.33 lb Cara-Vienne malt (.15 kg)
.33 lb Cara-Munich malt (.15 kg)
1.5 oz Northern Brewer pellet hops, 7% alpha acid (43 g) (60 min.)
Wyeast No. 1056 American ale yeast
.75 cup corn sugar (177 mL) (to prime)

- Original specific gravity: 1.054
- Final specific gravity: Unknown
- Boiling time: 90 minutes
- Primary fermentation: 10 days at 64 degrees F (18 degrees C) in plastic
- Secondary fermentation: 14 days at 64 degrees F (18 degrees C) in glass

Brewer's Specifics

Mash grains using a single decoction mash schedule.

Judges' Comments

"Pleasant smokiness in aroma and flavor. Needs less caramel sweetness."

Brewers' Comments

"To those who may brew this style, allow beer to age in the bottle for a couple of months for the smokiness to mellow a bit. Very good with a piece of sharp Vermont cheddar!"

Runners-Up

Silver Medal: Peter Johnson, Santa Barbara, CA, "Wee Smokey"
Bronze Medal: Randy Druing and Steve Loyer, Chandler, AZ, "Blustery Day"

Fruit and Vegetable Beer

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by The Purple Foot, Milwaukee, WI

GARRETT LUEDLUFF AND TIM MORAN, FT. SMITH, AR
"APRICOT SUMMER PREMIUM LAGER"
CLASSIC-STYLE FRUIT BEER

Ingredients for 10 U.S. gal (37.9 L)

8 lb dry pale malt extract (3.63 kg)
3 lb two row pale malt (1.36 kg)
1.5 lb wheat malt (.68 kg)
1 lb six row pale malt (.45 kg)
1 lb Pilsener malt (.45 kg)
.5 lb Munich malt (.23 kg)
2.5 oz Fuggle pellet hops, 4.5% alpha acid (71 g) (60 min.)
Morgan's lager yeast
apricot flavoring (at bottling)
.5 cup corn sugar (118 mL) (to prime)

- Original specific gravity: 1.054
- Final specific gravity: 1.012
- Boiling time: 60 minutes
- Primary fermentation: 14 days at 50 degrees F (10 degrees C) in glass
- Secondary fermentation: 25 days at 45 degrees F (7 degrees C) in steel

Brewer's Specifics

Mash grains at 147 degrees F (64 degrees C) for 125 minutes. Boil extract for 60 minutes.

Judges' Comments

"A good fruit beer has harmony between beer and fruit; this has it! So good and so easy to drink, it would be hard to improve."

Runners-Up

Silver Medal: Dan Kasen, Chicago, IL, "Saccharoo-Fruit"
Bronze Medal: Dennis and Paul Waltman, Atlanta, GA, "Old Grizzly Raspberry Ale II"

Herb and Spice Beer

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Marin Brewing Co., Larkspur, CA

DENNIS AND PAUL WALTMAN, ATLANTA, GA
"DRAGON ALE II"
HERB AND SPICE BEER

Ingredients for 5 U.S. gal (19 L)

4 lb pale malt extract (1.81 kg)
2 lb dry wheat malt extract (.91 kg)
1 oz Saaz plug hops, 4.2% alpha acid (28 g) (60 min.)
.5 oz Saaz plug hops, 4.2% alpha acid (14 g) (15 min.)
Wyeast No. 1056 American ale yeast
5 tbsp crushed black pepper (73.9 mL) (in secondary)
.75 cup corn sugar (177 mL) (to prime)

- Original specific gravity: 1.045
- Final specific gravity: 1.013
- Boiling time: 60 minutes
- Primary fermentation: seven days at 68 degrees F (20 degrees C) in glass
- Secondary fermentation: 14 days at 65 degrees F (18 degrees C) in glass
- Tertiary fermentation: 14 days at 65 degrees F (18 degrees C) in glass

Brewer's Specifics

Boil extract for 60 minutes. Add pepper to secondary.

Judges' Comments

"Very light and peppery; delicate."

"Very 'round' flavor. Malt sweetness followed by slight pepper heat. Some corn character. A bready sort of cream ale with a touch of heat from pepper, understated, but well balanced."

Brewers' Comments

"A tablespoon per gallon of black peppercorns, roughly crushed in a mortar and pestle before adding them to the secondary. Measure peppercorns prior to crushing them. The crush was not very fine, just enough to break them into a couple of large pieces each. Transferred the beer off the peppercorns after a little more than a week."

Runners-Up

Silver Medal: Kenneth Clucas, Randy Meharg and Madeline Burns, Overland Park, KS, Coffee Stout
Bronze Medal: Deb and Frank Nelson, Apple Valley, MN, "Silent Night Spice"

California Common Beer

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Anchor Brewing Co., San Francisco, CA

BOB THOMPSON, MURRIETA, CA
"BOB THOMPSON"
CALIFORNIA COMMON BEER

Ingredients for 12 U.S. gal (45.4 L)

16.5 lb pale malt (7.5 kg)
1.5 lb 60 °L crystal malt (.68 kg)
1 lb Vienna malt (.45 kg)
1 lb Cara-Pils malt (.45 kg)
1 oz chocolate malt (28 g)
1.5 oz Northern Brewer pellet hops, 8.6% alpha acid (43 g) (60 min.)
1.25 oz Northern Brewer whole hops (35 g) (30 min.)
1.25 oz Northern Brewer pellet hops (35 g) (10 min.)
White Labs San Francisco Lager Yeast
forced CO_2 to carbonate

- Original specific gravity: 1.050
- Final specific gravity: 1.014
- Boiling time: 90 minutes
- Primary fermentation: 20 days at 60 degrees F (16 degrees C) in steel
- Secondary fermentation: 60 days at 40 degrees F (4 degrees C) in steel

Brewer's Specifics

Mash grains at 151 degrees F (66 degrees C) for 90 minutes.

Judges' Comments

"Medium to high bitterness. Needs more malt flavor."

"Nice beer, especially in the flavor. Good flavor except for low bitterness."

Runners-Up

Silver Medal: Tom Ierardi, Skaneateles, NY, "Carpetbagger Common"
Bronze Medal: Brian Cole, Black Mountain, NC, "California Steamin' "

Traditional Mead and Braggot

GOLD MEDAL

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Bacchus & Barleycorn Ltd., Shawnee, KS

SUSAN RUUD, HARWOOD, ND
"PETE'S HONEY BREW"
SPARKLING TRADITIONAL MEAD

Ingredients for 6 U.S. gal (22.7 L)

20 lb wildflower honey (9 kg)
1.5 tsp yeast energizer (7.4 mL)
5 tsp yeast nutrient (24.6 mL)
6 tsp acid blend (29.6 mL)
3 tsp pectic enzyme (14.8 mL)
1.5 tsp tannin (7.4 mL)
Flor Sherry yeast

- Original specific gravity: 1.140
- Final specific gravity: 1.050
- Boiling time: n/a
- Primary fermentation: 6 months at 70 degrees F (21 degrees C) in glass
- Secondary fermentation: 9 months at 70 degrees F (21 degrees C) in glass

Brewer's Specifics

Heat honey to 185 degrees F (85 degrees C) and hold for 60 minutes.

Judges' Comments

"Exceptional strength and sweetness are well balanced by crisp acidity. Honey character very clean with just a touch of sulphur. Well attenuated for style."

"This is a beguiling, attractive, sweet mead whose balance keeps me coming back for more. Good wildflower character."

Runners-Up

Silver Medal: Robert Ring, Caldwell, ID, "Traditional Mead"
Bronze Medal: Ken Schramm and Dan McConnell, Troy, MI, "Builds Strong Bodies 12 Ways "

Specialty and Experimental Beer

GOLD MEDAL

AHA 1998 Homebrewer of the Year

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Great Western Malting Co., Vancouver, WA

ICHIRI FUJIURA, TOKYO, JAPAN
"TOASTED COCONUT PORTER"
CLASSIC-STYLE SPECIALTY BEER

Ingredients for 2.6 U.S. gal (9.5 L)

4.4 lb pale malt (2 kg)
.8 lb chocolate malt (.37 kg)
.3 lb 80 °L crystal malt (.15 kg)
.64 oz Northern Brewer whole hops, 8% alpha acid (18 g) (60 min.)
.32 oz E. Kent Golding whole hops, 5.4% alpha acid (9 g) (10 min.)
Wyeast No. 1318 London III ale yeast
7.2 oz shredded coconut, toasted (200 g) (in secondary)
2.18 oz dry malt extract (62 g) (to prime)

- Original specific gravity: 1.058
- Final specific gravity: 1.021
- Boiling time: 60 minutes
- Primary fermentation: 20 days at 65 degrees F (18 degrees C) in glass
- Secondary fermentation: 14 days at 65 degrees F (18 degrees C) in glass

Brewer's Specifics

Mash grains at 153 degrees F (67 degrees C) for 90 minutes. Add toasted coconut to secondary.

Judges' Comments

"Good chocolate malt flavor followed by a different kind of coconut taste. A little roasty. Wow! You pulled this one off! Great balance. I could drink a couple."

Runners-Up

Silver Medal: Tom Morrow, Hamilton Branch, CA, "Branch Water Pumpkin Pie Ale"
Bronze Medal: Tom Stelman, Utica, MI, "Hava Java Stout"

Bock

GOLD MEDAL

AHA 1998 Ninkasi Award Winner

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Washington Hop Commission, Yakima, WA

ART BEALL, HUDSON, OH
"DOPPLE YOUR PLEASURE"
DOPPLEBOCK

Ingredients for 13.5 U.S. gal (51.1 L)

- 40 lb Munich malt (18.16 kg)
- 2 lb light crystal malt (.91 kg)
- 2 lb dark crystal malt (.91 kg)
- .5 lb chocolate malt (.23 kg)
- 5.25 oz Tettnanger whole hops, 4.6% alpha acid (149 g) (60 min.)
- 1.25 oz Tettnanger whole hops, 4.6% alpha acid (35 g) (30 min.)
- Wyeast No. 2206 Bavarian lager yeast
- forced CO_2 to carbonate

- Original specific gravity: 1.090
- Final specific gravity: 1.022
- Boiling time: 2 hours, 10 minutes
- Primary fermentation: 21 days at 50 degrees F (10 degrees C) in glass
- Secondary fermentation: 70 days at 35 degrees F (2 degrees C) in glass

Brewer's Specifics

Mash grains using a triple decoction mash schedule.

Judges' Comments

"Rich, sweet malt with hop bitterness beneath, smooth, sweet finish, right in style. An excellent dopplebock! Much to enjoy. A killer beer."

"Malt is dominant, hops and alcohol, ferment clean, balance is marvelous. Hard to critique."

Runners-Up

Silver Medal: Pat Bannon, Jeffersonville, PA, "Eis-O-The-Dog Bock"
Bronze Medal: George Dietrich, Shelby Twp, MI,"Third Bock from the Sun"

Fruit and Vegetable Mead

GOLD MEDAL

AHA 1998 Meadmaker of the Year

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by U-Brew Corp., Millburn, NJ

RON BADLEY, RENO, NV
"KISS ME BABY MEAD"
STILL MELOMEL

Ingredients for 5 U.S. gal (19 L)

- 18 lb fireweed honey (8.2 kg)
- 1 lb key lime peel (.45 kg)
- 3-4 red peppers
- Lalvin No. 1122 and 1118 yeast

- Original specific gravity: 1.128
- Final specific gravity: 1.040
- Boiling time: n/a
- Primary fermentation: 21 days at 80 degrees F (27 degrees C) in glass
- Secondary fermentation: 30 days at 70 degrees F (21 degrees C) in glass

Judges' Comments

"Key lime! Clean, crisp, fantastic. Slight pepper. Lime is great."

"Key lime, honey with a touch of pepper in the aftertaste. A bit more honey in the flavor would balance the lime better. This is truly wonderful."

Runners-Up

Silver Medal: Thomas J. O'Connor III, M.D., Rockport, ME, "James Duck's Melomel"
Bronze Medal: Robert Wikstrom, Derby, KS, (Untitled)

Cider

GOLD MEDAL

AHA 1998 Cidermaker of the Year

AHA 1998 NATIONAL HOMEBREW COMPETITION

Category award sponsored by Widmer Brothers Brewing Co., Portland, OR

GLORIA FRANCONI, RED HOOK, NY
"SPICED CIDER"
SPECIALTY CIDER

Ingredients for 5 U.S. gal (19 L)

- 5 gal Northern Spy apple juice (19 L)
- 5 Campden tablets
- 2.5 tsp yeast nutrient (12.3 mL)
- 2 tbsp mulling spices (9.9 mL)
- (tea, in tertiary)
- Premier Cuvee wine yeast
- forced CO_2 to carbonate

- Original specific gravity: 1.062
- Final specific gravity: 0.99
- Boiling time: n/a
- Primary fermentation: 5 months at 65 degrees F (18 degrees C) in glass

Brewer's Specifics

Steep mulling spices in one cup (237 mL) of boiling water, then add to taste.

Judges' Comments

"A very full and rich cider laden with spice! The sweetness of the finish mellows the spicyness somewhat. Is there too much spicyness in this cider? For some, maybe, but not for me... "

Brewer's Comments

Franconi stresses patience when making cider. Letting the must sit after its initial fermentation until it undergoes a malolactic fermentation improves the quality of the finished cider, she says.

Runners-Up

Silver Medal: Frank Salt, Staten Island, NY, "Sparkling Raspberry Specialty Cider"
Bronze Medal: Fred Sterner and Mary Anne McQuillan, E. Freetown, MA, (Untitled)

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World of Worts *(from page 29)*

this essay—a long time coming—but a 10-gallon batch of Pilsener. Saflager, I'm told, is a successfully dried and packaged real lager yeast, perhaps the first of its kind. When the Swiss Hürlimann Brewery was bought by Feldschlösschen, they discontinued supplying wet yeast cultures of their lager yeast to customers around the world. The demand was still there. This is when DCL Yeast Ltd. decided to invest a lot of resources (including money) into developing a means to dry lager yeast and maintain viability and performance. They claim success. Their process is ultrasecret. The 23-gram package, when available, should retail for a little more than you're used to paying for dried yeast.

I wondered if it was worth it. I brewed a 10-gallon batch of a German-style Pilsener and split the wort into two separate five-gallon batches. I pitched a healthy slurry of a cultured up (sediment from freshly sedimented 20 ounces of wort) Wyeast 2206 Bavarian lager yeast in one fermenter. To the other I added two 23-gram packages of Saflager S-23. I rehydrated the yeast in 8 ounces of 75-degree-F (24-degree-C) water for 20 minutes prior to pitching. Both yeasts were pitched into a 64-degree-F (18-degree-C) 1.046 specific-gravity (11.5-°B) wort and then cooled to 52 degrees F (11 degree C) within 24 hours.

Both yeasts took off, with the dried yeast exhibiting more activity. Within seven days the Saflager fermentation had dropped to 1.011 (2.5 °B) and showed signs of clearing. The Wyeast took 14 days to reach the same degree of attenuation. This could be expected, as my pitching rate for 2206 Bavarian lager yeast was technically underpitched and not ideal. If I had a good 8 ounces of thick yeast slurry from a just-completed fermentation, that would have been ideal. But I'm a practical homebrewer, doing the best with what I have.

Both beers were chilled to 40 degrees F (4.5 degree C) upon reaching 1.009 (2 °B) and lagered for an additional four weeks.

The beers were both clean and delicious at bottling. Clear and slightly carbonated due to the cold lagering. My 15th generation Wyeast Bavarian Lager 2206 lived up to its standards, providing a clean full-flavored lager beer with no flavors associated with sulfur, acetaldehyde, esters, higher alcohols or diacetyl.

Saflager succeeded as a dried yeast, fully fermenting at cold temperatures (even at 40 degrees F or 4.5 degrees C) and with four weeks lagering both beers had minor visible activity). The Saflager had the advantage of being able to provide adequate pitching rates and yeast viability. Quick fermentation also was a bonus. The only perceived difference in the beers was that the Saflager clearly expressed an amount of diacetyl (a slight butterscotch, butterlike character) at bottling time. With two weeks bottle conditioning, this character totally disappeared.

Personally, a low amount of diacetyl adds a soft, caramellike character that is not offensive. Beers with bitterness can welcome a bit of diacetyl, unlike the very low-hopped American-style lagers that are not in balance if there is any perceived diacetyl evident. That's my opinion.

It seems likely that with a bit of fermentation control that includes a "diacetyl rest,"

HOMEBREW BITTERING UNITS (HBUs) are a measure of the total amount of bitterness in a given volume of beer. Homebrew Bittering Units can easily be calculated by multiplying the percent of alpha acid in the hops by the number of ounces. For example, if 2 ounces of Northern Brewer hops (9 percent alpha acid) and 3 ounces of Cascade hops (5 percent alpha acid) were used in a 10-gallon batch, the total amount of bittering units would be 33: (2 x 9) + (3 x 5) = 18 + 15. Bittering units per gallon would be 3.3 in a 10-gallon batch or 6.6 in a five-gallon batch, so it is important to note volumes whenever expressing bittering units.

INTERNATIONAL BITTERNESS UNITS (IBUs) are a measure of the bitterness of a beer in parts per million (ppm), or milligrams per liter (mg/L) of alpha acids. You can estimate the IBUs in your beer by using the following formula:

$$IBU = \frac{(\text{ounces of hops} \times \% \text{ alpha acid of hop} \times \% \text{ utilization})}{\text{gallons of wort} \times 1.34}$$

Percent utilization varies because of wort gravity, boiling time, wort volume and other factors. Homebrewers get about 25 percent utilization for a full one-hour boil, about 15 percent for a 30-minute boil and about 5 percent for a 15-minute boil. As an example, 1 ounce of 6 percent alpha acid hops in five gallons of wort boiled for one hour would produce a beer with 22 IBUs:

$$IBU = \frac{1 \times 6 \times 25}{5 \times 1.34} = 22 \text{ IBUs.}$$

METRIC BITTERNESS UNITS (MBUs) are equal to the number of grams of hops multiplied by the percent alpha acid.

diacetyl levels can be reduced to take advantage of this convenient form of true dried lager yeast. Diacetyl rests are covered in advanced homebrewing and brewing books. It utilizes the process of raising the temperature of the fermentation at a certain stage in order to put yeast back in suspension, thus allowing the yeast to reduce the presence of diacetyl.

What about the other characters of this beer? The smoked malt is barely suggestive, only adding complexity. Wheat adds some toasted malt character with extra head retention, as does the CaraPils. At a calculated BU of 38 one would expect an assertive, but not overwhelming, bitterness. My perception would lead me to guess a bitterness level of 33-35. Very appetizing and perfect for this style.

So let's cut the shuck and jive and get on with this advanced brewing partial mash and malt extract recipe.

Cold Creek Pilsener

Ingredients and recipe for 5 U.S. gallons (19 L)

- 3.3 lb two-row pale malt (grain) (1.5 kg)
- .5 lb Bamberg 10 °L smoked malt (225 g)
- .5 lb CaraPils malt (225 g)
- .5 lb wheat malt (225 g)
- 3 lb extra light dried malt extract (1.4 kg)
- 1 oz German Northern Brewers whole hops (9.5 HBU/266 MBU) (28 g) (60 min. boiling)
- 1 oz German Hersbrucker-Hallertauer whole hops (4 HBU/112 MBU) (28 g) (25 min. boiling)
- 1.1 oz German Hersbrucker—Hallertauer whole hops (4.4 HBU/123 MBU) (32 g) (10 min. boiling)
- .6 oz New Zealand Hallertauer Triploid pellet hops (4.2 HBU/119 MBU) (17 g) (3 min. boiling)
- 1 oz French Strisselbract whole hops (28 g) (1 min.)

.25 tsp powdered Irish moss
.75 cup corn sugar/glucose (180 mL) (to prime)
Try Saflager S-23 dried lager yeast or Wyeast Bavarian lager 2206

- Original specific gravity: 1.044 to 1.048 (11 to 12 °B)
- Final specific gravity: 1.008 to 1.012 (2 to 3 °B)
- IBUs: about 38
- Approximate color: 5 SRM (10 EBC)
- Alcohol: 5 percent by volume
- Apparent yeast attenuation: about 80 percent

A step infusion mash is used to mash the grains. Add five quarts (4.8 L) of 142-degree-F (56-degree-C) water to the crushed grain, stir, stabilize and hold the temperature at 132 degrees F (53 degrees C) for 30 minutes. Add 2.5 quarts (2.4 L) of boiling water and add heat to bring temperature up to 154 degrees F (67.5 degrees C) and hold for about 30 minutes.

Raise temperature to 167 degrees F (75 degrees C), lauter and sparge with 2.5 gallons (9.5 L) of 170-degree-F (77-degree-C) water. Collect about three gallons (11.4 L) of runoff and add the malt extract and first charge of Northern Brewer hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 25 minutes remain add 1 ounce (28 g) German Hersbrucker-Hallertauer (4 HBU/112 MBU) whole hops. When 10 minutes remain add 1.1 ounces (32 g) German Hersbrucker-Hallertauer (4 HBU/123 MBU) whole hops and Irish moss. When three minutes remain add New Zealand pellet hops. After a total wort boil of 60 minutes turn off the heat. Add the French Strisselbract and let steep for one minute before straining and sparging into a sanitized fermenter to which you've added 1.5 gallons (5.7 L) of water. It helps to prechill (33 degrees F or 1 degree C) the water added to the fermenter rather than simply adding warmer tap water.

Pitch a good dose of healthy active lager yeast or rehydrate one or two packages (23 grams each) of Saflager S-23 yeast in 8 ounces (250 mL) of 75-degree-F (24-degree- C) water and primary ferment at temperatures between 50 and 55 degrees F (10 and 12.5 degrees C). Lager between 35 and 40 degrees F (2 and 4.5 degrees C) for one month.

Prime with sugar and bottle when fermentation is complete.

This is a great recipe for any good lager yeast. I'm relaxing and having a homebrew right this very moment!

World traveler Charlie Papazian is the founding president of the Association of Brewers and the author of numerous best-selling books on homebrewing. His most recent books are *Home Brewers Gold* (Avon 1997), a collection of prize-winning recipes from the 1996 World Beer Cup Competition, and *The Best of Zymurgy* (Avon, 1998) a collection of the best articles and advice from 20 years of *Zymurgy*.

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Dear *Zymurgy* *(from page 8)*

A Six-Pack Man

Dear ***Zymurgy***;

Re: Six issues a year...YES...YES...YES! I'm glad you're doing it. It is the only thing (except for the food articles) that I didn't like about the membership!

Thanks,
Michael A. Domin
domes@lancnews.infi.net

What, all you do is drink beer? You never cook? What do you do with those batches of beer that come out...wrong? Pawn them off on your poor friends? Cook something, Michael! And we're glad you like the extra issue!

Beyond French Fries

Dear ***Zymurgy***;

In the Cult Classics/Guinness article (Spring 1998, Vol. 21 No. 1), Greg Kitsock refers to the country folk preferring an illicit whiskey called "poteen." Actually, it is called "potcheen" and is no longer illegal in Ireland. It's closer to a vodka than a whiskey (it's clear and made from potatoes). I have a bottle made by Bunratty Mead & Liqueur Company in Bunratty, County Clare. It's a very interesting taste—presumably an acquired taste!

Jim Elwell
Salt Lake City, Utah

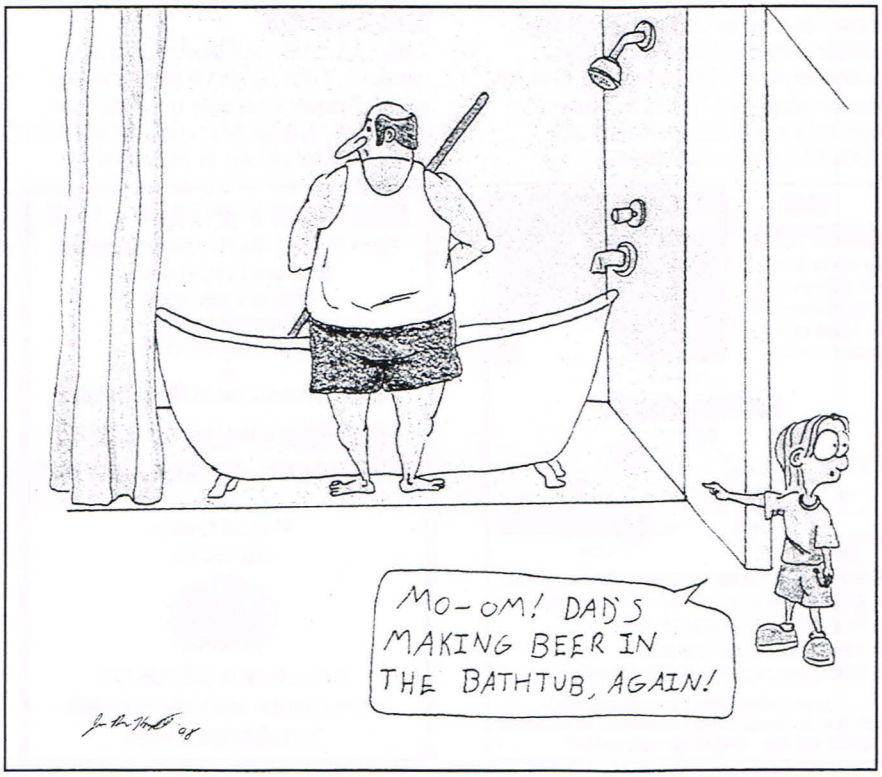
We had an uncle in Mississippi who used to make something that sounds similar. He called it whiskey, but most of the people who took a sip called it lighter fluid. At the time, he was known as progressive because he eschewed using old auto radiators as the final stage of brewing.

In the Jailhouse Now

Dear ***Zymurgy*** & Professor Surfeit;

Last month were you or your illustrator, Brendan Danielsson, perhaps at the Alameda County Fair in California by any chance?

We work at the University Students' Cooperative Association, which houses 1,250 students in 19 houses at the University of California. One of our houses is



CARTOON COURTESY OF J.R. HONEYCUTT

Boy, do you guys ever like Guinness! We got our most responses ever—112—and virtually everyone loved our Cult Beer feature on good old Guinness Stout. We were already planning on expanding our Cult Beer stories, and now we're definitely on that track. Fullers ESB and McEwan's Scottish Ale come to mind as candidates. One person took us to task for not choosing an American beer as our first Cult Classic, but Guinness was such an obvious choice (especially since two AHA/AOB people ride creaky, clanky, leaky British Norton motorcycles...its' an Brit-O-Phile thing).

We had one member regretfully announce he'd be leaving us because we didn't have enough all-grain articles, and another member thinking about not re-upping because we had too many all-grain articles and not enough extract articles. We consider that (with our fingers crossed) a wash.

Several members mentioned that the overall tone of *Zymurgy* was lighter. We're glad you noticed! Homebrewing is, after all, supposed to be fun, and a magazine about homebrewing should also be fun. Why else would one of our esteemed members spend months and months trying to exactly duplicate Budweiser?
—Ed.

How long have you been an AHA Member?

Less than one year	14%
1-2 years	14%
2-3 years	21%
3-4 years	14%
4+ years	37%

Please rate *Zymurgy*'s features on a scale of 1 (not useful) to 10 (very useful):

"The Best in Burners"	8
"The Incredible Staying Power of Guinness"	8
"Won't You Be Maibock"	7
"Tips and Gadgets"	6.5
"For the Beginner"	6
"World of Worts"	6
"Zym Warp"	5.5
"Homebrew Cooking"	5.5
"Best from Kits"	5

Do you brew beer professionally?
Yes - 5% No - 95%

Any article suggestions?
An article on walking into a Home Depot (for example) and all the items that can be found or adapted for homebrew use—3/16" spark plug sockets for pin lock kegs, wallpaper trays for sanitizing racking canes and bottle fillers, etc.. or walking into a supermarket...wheat flour, corn syrup, molasses...
Watch for more and more tips from Paul Zocco, who knows more about hardware stores than any living human should. Paul could build the Space Shuttle with a couple of visits to Home Depot.

Zymurgy Feedback

Your responses to the following questions will help make ***Zymurgy*** and the AHA even better. Please take the time to write your answers, remove the page, fold and mail it, or fax your response to (303) 447-2825. You can also fill out the survey in the AHA members-only area on the web http://beertown.org. Thank you!

Cheers,

Michael Bane
Editor

Are you an AHA member?
○ Yes ○ No
Membership number _____(optional)

How long have you been an AHA member?
○ Less than 1 year ○ 1-2 years
○ 3-4 years ○ More than 4 years

FOLD HERE

PLEASE RATE THE FEATURES IN THIS ISSUE.

"Yeast is Yeast" Road Test
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"12 Steps to Happier Yeast"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"Magic of the Ancients"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"The Biology of Yeast"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"Capture Your Favorites"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"Successful Plating"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"Secrets of Storing Yeast"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"Tips and Gadgets"
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

"For the Beginner" (Intro into Liquid Yeast)
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 5 10
Not useful Very Useful

Continued on back.

Feature homebrewers who have excellent or efficient mini/micro breweries in their homes with pictures and detailed parts and technical info on how they brew and where and how they set up their breweries. Interviews with pro brewers.

We're still sifting around with this idea. Watch for it in 1999.

Would like to see some good articles on mashing, sparging etc. that are not a bunch of technical mumbo-jumbo. Get down to the mechanics and the different ways of doing it, i.e. infusion, decoction, etc. I do all grain and also extract/specialty grains. hnilsen@digitalis.net

The suggestion for a column on "How They do it" is something I would read first every time. The extract conversion of all grain recipes is a good idea. I brew all grain when time is not a problem, but I brew extract most of the time. I can convert most recipes myself but would like to follow an expert's version. Charles W.

Watch for a pull-out article on how to convert from grain to extract.

I have been brewing beer for seven years and am proud to say that I am strictly an extract brewer who can brew great beer. I would like an article that will focus on my experience and brewing technique to make it the best it can be. Jim Brewer

The article on outdoor cookers was great. I've been holding off on which one to buy and your story really helped. I made my first batch with the cooker I purchased with your great story today. Thanks for the help!

Thanks! Glad you were able to find the cooker of your dreams.

1. Weird places to brew. 2. Creative solutions to problems. 3. Speed brewing—shortest turnaround time with acceptable results. 4. Why we brew? 5. How to convert friends to homebrewing friends?

Weird places to brew, huh? A friend of ours brewed at base camp on a big mountain climb in Nepal. His theory was that, no matter how bad the beer was, he really, really would need it when he came down. And watch for the ubiquitous Charlie's World of Worts in our Jan/Feb issue for some serious "speed brewing!"

1. More like "Dear Professor" but use a rotation of experts. 2. Photo features of "regular" homebrewers and their brewing, techniques and favorite recipes. Skip the semi-pros—total amateurs only!

Okay, okay...We'll get the picture features up and running!

Survey Results.... Now it's your turn!

TAPE TOP WITH THIS SIDE FACING OUT. PLEASE DO NOT STAPLE CLOSE.

"World of Worts"

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 5 10

Not useful Very Useful

"Homebrew Cooking (The other use for Yeast)"

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 5 10

Not useful Very Useful

"Did you share this issue of *Zymurgy* with a friend?"

○ Yes ○ No

Any article suggestions?

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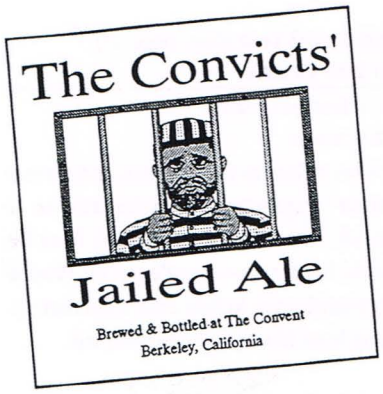


a converted convent and the residents refer to themselves as The Convicts. Recently we gave them a homebrewing workshop while brewing a pale ale. We decided to enter the finished product in the local county fair, and we designed an appropriate label.

While the beer failed to earn a ribbon, we were surprised to see that our label won a blue ribbon for best humorous label.

Imagine our surprise when we saw the featured illustration accompanying your Dear Professor column September/October 1998 column in ***Zymurgy*** (Vol. 21, No. 3)!?

Enclosed please find our award winning label.

Sincerely,
Marjorie J. Green, Illustrator
George O. Proper, Brewer
Berkeley, CA

Corrections

In Alt Specifications chart on page 33 of the Sept./Oct. issue of ***Zymurgy*** (Vol. 21, No. 3), the amount of flavor hops should be .5 ounces (14 g).

In World of Worts on page 50 of the Sept./Oct. issue of ***Zymurgy*** (Vol. 21, No. 3), the amount of powdered Irish moss in the recipe should be .25 teaspoon.

In the Classic Style Fruit & Vegetable Beer bronze medal winning recipe by Thomas J. O'Connor III, MD on page 46 of the Sept./Oct. issue of ***Zymurgy*** (Vol. 21, No. 3), the missing ingredient is 10 pounds of homegrown pureed peaches added to the secondary after eight days in the primary. Bottle after it finishes out, as long as 30 days.

Dear Professor *(from page 20)*

aromatic, Biscuit or Victory malt to your infusion mashes. These will lend some toast malt character getting you part of the way there.

Boiling some of the mash after the starch conversion? Well I think you'll get yourself a sticky mess or a stuck mash. Better to boil some before and add it back for starch conversion. Hmmmmm. Sounds like decoction mashing—tried and true procedure for centuries. Who are we to think that we can improve on it?

Disco? Hot Stuff and dirty dancing. Sounds like a theme for your next batch. I'm sure the fermentation would get a little boost.

Disco technically,
The Professor, Hb.D.

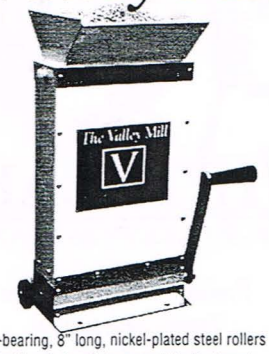
Deluxe Bitterometer

Dear Professor,

I've brewed about six batches of beer but have never had success in getting the bittering level I want. It's always too high or too low. I've been using IBUs because it takes the specific gravity of the boil into consideration. While designing a very malty pale ale, I decided on a five gallon batch with a hop bitterness of 35. Before adding the hops to the boil, I scooped out a sample into a pyrex measuring cup. I quickly cooled the wort to 65 degrees F (18 degrees C) by stirring it with a plastic bottle filled with frozen water and took a gravity reading. The gravity was 1090. Here is my first question: How do I calculate the hop utilization percentage (alpha acid extraction efficiency) based on the length of the boil?

Without this information I relied on the graph on the back of my trusty Doctor Bob's Hop-Go-Round. This gave me a utilization of 23 percent or thereabouts (the graph isn't very detailed). I used the Hop-Go-Round to determine the amount of Bullion hops, which has an alpha acid percentage of 8.5, needed to give my beer an IBU of 35. The contraption told me to use 1.2 ounces (34 g) of hops. I double-checked this by using the formula given in ***Zymurgy***, as follows:

(ounces of hops) x (alpha acid % of hops)
x (utilization %)
(number of gallons) x 1.34



Here is the equation using my figures:

1.2 x 8.5 x 23
5 x 1.34

Or further simplified:

234.6
6.70

Virtually the same answer I got from the Hop-Go-Round! However, since I'm only using one type of hop in the boil, the equation is backward. I want the equation to tell me the amount of hops to use based on the IBU I want to achieve. With the Hop-Go-Round I was able line up the desired IBU to the utilization percentage and determine the amount of hops, but I don't want to rely exclusively on this contraption. I would like to rewrite the equation, but I'm too dumb with numbers. Help please!

I saved the dumbest question for last. After the beer is brewed, how do I know if the IBU was achieved? My taste buds aren't expert enough to determine the exact IBU of a beer. Is there any way to gauge this? Has anyone invented a Bitterometer?

David Yeater
Santa Cruz, California

Dear David,
That's easy:

Ounces of hops =
(IBU desired) x (number of gallons of brew) x (1.34 % alpha acid) x (% utilization)

There are no dumb questions in beer making, only dumb beer as a result of not asking dumb questions. How can you find out how many IBUs in your beer? Simple, pay about $100 and send your beer off to a beer services laboratory for testing. That's easy isn't it. Me, I prefer to fine tune my own bitterometer—my palate. Practice makes perfect. Taste commercial beers of known bitterness and start gauging your tongue.

Dumb dee dumb dumb,
The Professor, Hb.D.

Send your homebrewing questions to "Dear Professor," PO Box 1679, Boulder, CO 80306-1679; FAX (303) 447-2825 or professor@aob.org via e-mail.

Yeast Road Test *(from page 37)*

Yeast Labs Canadian

Time to ferment: 5 days

FG 2.5 °Plato

Some sulfur in both aroma and flavor. Became increasingly unpleasant as it warmed. Dry, chalky mouthfeel. May be suitable for cream-ale style beers. Would likely benefit from further cold conditioning. Among least liked of yeasts sampled.

Yeast Labs Strathcona

Time to ferment: 6 days

FG 2.0 °Plato

Some fruitiness in aroma. Neutral flavor finishes dry with some chalkiness. Clean and pleasant. Unlike the Australian, it displayed more complexity as it warms. May be appropriate for a Scotch ale or other sweet beer that would diminish the dryness. Generally well-liked. Best of the Yeast Labs.

This exercise produced some interesting results beyond the findings already discussed. As was hoped, there was a broad consensus among the tasting panel concerning the qualities of the 12 beers that were sampled. That's not to say that everyone's comments were identical. For example, someone described one beer's fruity aroma as being raisinlike, while others described it as being currantlike, or plumlike. But as far as describing the overall character of the different beers, there was general agreement.

We also found, to no one's surprise, that the liquid yeasts produced better beer than the dry yeasts. This reaffirms what thousands of homebrewers have discovered on their own. Though dry yeasts are inexpensive and easy to use, they generally produce beers of lesser quality than those made with more expensive liquid yeasts. If you're going to use a dry yeast, take care to use enough.

Finally, it was evident that the wort used in this exercise favored the yeasts with a more neutral character. The distinctiveness of the three Belgian yeast strains would undoubtedly have been better expressed in a wort brewed specifically to the style for which they were intended.

So be selective in the yeast you use. For a homebrewer, it's never been easier.

Dan Rabin is a regular contributor to *Zymurgy*.

Storing Yeast *(from page 39)*

to become active. As a result, it can be more easily harmed by higher temperatures.

Refrigeration is also the key for proper storage of harvested yeast. Because we're not getting into how to harvest yeast (see the ***Zymurgy*** article on beginning plating in this issue) and only how to store it once its done—we'll start with your harvested yeast in some sort of container.

John Sims, a brewer for Copper Tank Brewing Co. in Dallas, TX, who specializes in yeast propagation, recommends pouring the yeast solution into a sterilized mason-type jar, topping it off with beer and placing in the refrigerator. [Lid should be loose enough to allow air to escape–Ed.]

The top layer of beer merely ads another layer of protection between the yeast and the outside world. Anybody who brews knows how dangerous the outside world is to beer. Between the CO_2 being released by the yeast solution and the beer layer, the yeast should be fairly safe from infection.

Yeast Bombs

Palmer adds that the jar in which the yeast is stored should be made out of plastic as a safety measure. Although many brewing guides suggest the use of glass beer bottles, Palmer cautions against it.

"Pressure builds up inside it and you've got yourself a little bomb...I had a friend who got a whole bunch of glass shards in his leg that way (using a beer bottle)," he said. "Just taking it out of the refrigerator was enough to cause it to blow."

The yeast should be stored just above freezing, which will cause it to go dormant. Otherwise, the yeast remains active and begins to autolyze—essentially eating itself—which damages the yeast culture and can create off-flavors when used in a beer. Another danger of heat to a yeast culture is mutation. Although much more likely in ale yeasts than in lagers, yeasts subjected to heat can mutate, decreasing the strain's viability.

Although you want to keep the yeast cold, you don't want to freeze it. Doing so will cause ice crystals to form, which will puncture the yeast cell walls—another undesirable effect.

Aging Yeast

Yeast stored in this manner should ideally be kept only about two weeks while it is freshest. Palmer said he has used much older yeast (up to six months), but he doesn't recommend it.

Whether you harvest yeast or buy it from the store, you can achieve much better results with a little care and a few square inches in your refrigerator. You'll get a more active yeast, a cleaner-tasting beer and less time wasted with fermentation problems.

You say your wife doesn't want your stinky yeast in the fridge, and there's no spare fridge lying around to use?

No problem. You can always buy a cold-storage tank like the breweries use for a few thousand dollars. Announce those plans and I'm sure you'll find the eggs moved over to make a little room.

Louisiana-based homebrewer James Slaton writes about business in addition to his regular contributions to *Zymurgy*.

Capturing Favorites *(from page 45)*

of the bottle for just a second or two with the lighter and decant the sterile medium off its sediment and into your sanitized culturing container. Don't leave the culturing container open and exposed any longer than necessary. Remember you need to aerate or oxygenate the wort prior to or immediately after inoculating it with the yeast sample. This can be done by means of a stone, or simply by shaking it.

Now you're ready to inoculate.

Adding the Yeast

Have your sample bottle or bottles (the more yeast sediment, the better) cool, not cold. Remember that yeast is subject to thermal shock and any sudden temperature change in excess of 18 degrees F (10 degrees C) is to be avoided. That said, you probably want to enjoy the beer sitting over your sample, and who wants to drink 70-degree beer?

Again, use a nearby heat source, if available, to get the surrounding air moving upwards, and have a butane lighter at the ready. Gargling with mouthwash or whiskey just before the procedure may seem silly, but it can't hurt. Sanitize a bottle opener and your yeast source bottle carefully as described above, without disturbing the sediment. Have your glass ready.

Working quickly, pry off the cap and flame the mouth of the bottle. Decant the beer carefully into your glass until you see yeast begin to emerge. There should be an ounce or two of liquid in with the sediment. Swirl this around to get all the sediment into suspension. Depending on how compact it is, you may want to recap the bottle while you swirl, then flame it again before pouring the dregs into your culturing containers. Set the container in a warm place, 70 to 75 degrees F (21 to 23 degrees C). If there were live cells in the sample, you should see signs of activity within 48 hours.

When a layer of foam has risen on top of the culture, smell the fermenting wort. Do this in a manner which will not jeopardize the sanitation of the wort, i.e., don't pop off the stopper and stick your nose in the jug! Sniffing the airlock should give you some idea of the culture's quality. If it smells good, repeat the opening procedure and add enough additional sterile wort to double the volume of the starter culture. That should reach high kraeusen (with a good layer of foam on top) again in just a few hours. Repeat the process until the desired volume of starter is reached. Once that has fermented out, you just need to pour the fermented beer out of the culturing container, leaving just enough to get the yeast slurry into suspension, and you are ready to pitch.

As a final precaution, though, you may want to taste the fermented wort. It probably won't be the best in terms of beer quality, but you should be able to tell if it is clean and uninfected. That way you can be sure you won't be pitching something funky into five gallons of homebrew.

For an exhaustive list of culturable commercial beers, check out Anders Lundquists' Web page at www.nada.kth.se/~alun/beer/.

Amahl Turczyn descended into the Yeast Underworld for this issue of *Zymurgy*. He also organized this issue's Yeast Road Test.

It's the Beer Talking *(from page5)*

I also have recommendations on handling yeast. Make a starter when using liquid yeast. Yeast is much happier when it hits the main batch if it has gone through its reproductive cycle in a smaller volume. Make it easy on your yeast to reproduce by giving it a low-gravity starter of 1.020 to 1.040. For big beers, step it up twice, increasing the gravity in the second starter. Yeast respirates before it reproduces, so oxygenate your starter (preferably with a sanitary source of oxygen). Remember that your healthy brewing yeast is racing wild yeasts and bacteria in your fermenter. The race does not have to be fair; give your yeast the head start. The beer will tell you if you have treated your yeast properly.

Homebrewer and homebrew shop owner Paul Gatza is the Director of the AHA.

Happier Yeast *(from page 57)*

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Al Korzonas has been homebrewing for more than 10 years, is a BJCP Master judge and the author of *Homebrewing - Volume I*, Sheaf & Vine, 1997. Retail and mail order information: http://www.brewinfo.com/brewinfo/.

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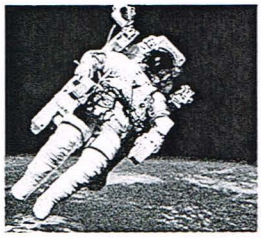

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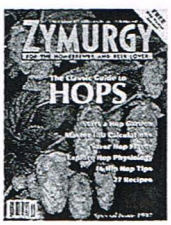

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LASTDROP

Dan Rabin

Trouble Brewing In Paradise

Last winter I ventured to the Caribbean island of St. Croix, under the guise of conducting "professional research" at the St. Croix Chop House and Brewpub. The Chop House sits at harbor's edge in the picturesque town of Christiansted, one of two towns on the largest of the U.S. Virgin Islands.

During my all-too-brief stay I spent several wonderfully relaxed afternoons seated at a waterside table in the outdoor bar, enjoying both the mild breeze off the turquoise water and brewer Tim Mason's flavorful ales.

Before moving to St. Croix to set up and operate the Chop House's tiny brewhouse, Tim was a brewer at the Oasis brewpub in Boulder, CO. In fact, that's where I first met Tim, as I would frequently stop by the Oasis to get fresh yeast for homebrewing. As we talked amidst tables of sunburned tourists and laid-back locals, Tim explained to me that operating an open-air brew house on a tropical island presents a number of unusual challenges that his apprenticeship in a more traditional brewpub setting did not prepare him for.

Open-air Pitching

One example, Tim explained, is the concern over pitching yeast in the open-air environment. The steady trade winds carry pristine air over the island, and the risk of infecting a batch of beer from airborne contaminants is minimal. That is, of course, as long as there are no seaplanes near the brewpub. The seaplanes make frequent trips between St. Croix and St. Thomas and regularly taxi past the Chop House to and from their nearby loading area. Before opening a fermenter, Tim must always be sure there are no seaplanes in the vicinity, lest a gust of exhaust-filled air enter the tank.

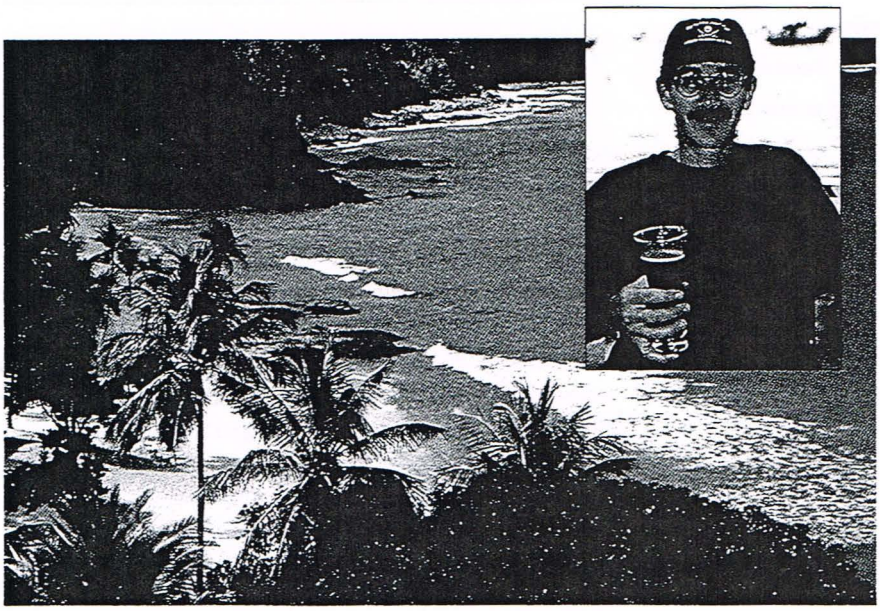
Another painful paradise story Tim shared with me concerned his attempt to procure yeast for his first batch of beer. In Tim's words, this is what happened.

Ready, Set, Brew

"When I was set to brew I ordered yeast for next-day delivery. They tell you that packages usually arrive second-day on the island, even if you have them shipped next-day. So, on the second day, when the yeast hadn't arrived, I called the shipping company and they said they would try to track it. After the third day, they said they had tracked it to San Juan, Puerto Rico, and it would be in the next day. On the fourth day, it still hadn't made it. On the fifth day, still no yeast. Finally, on the sixth day, I got a call. They said 'we've got a package down here for you, but it's oozing and dripping some really smelly, weird stuff.' Needless to say, I ordered new yeast and started over again."

Hey, Tim, I'd be happy to deliver supplies to you in person.

Dan Rabin is a regular contributor to *Zymurgy*.



Tim Mason (inset) suffers mightily while brewing in St. Croix.

PHOTOS BY DAN RABIN

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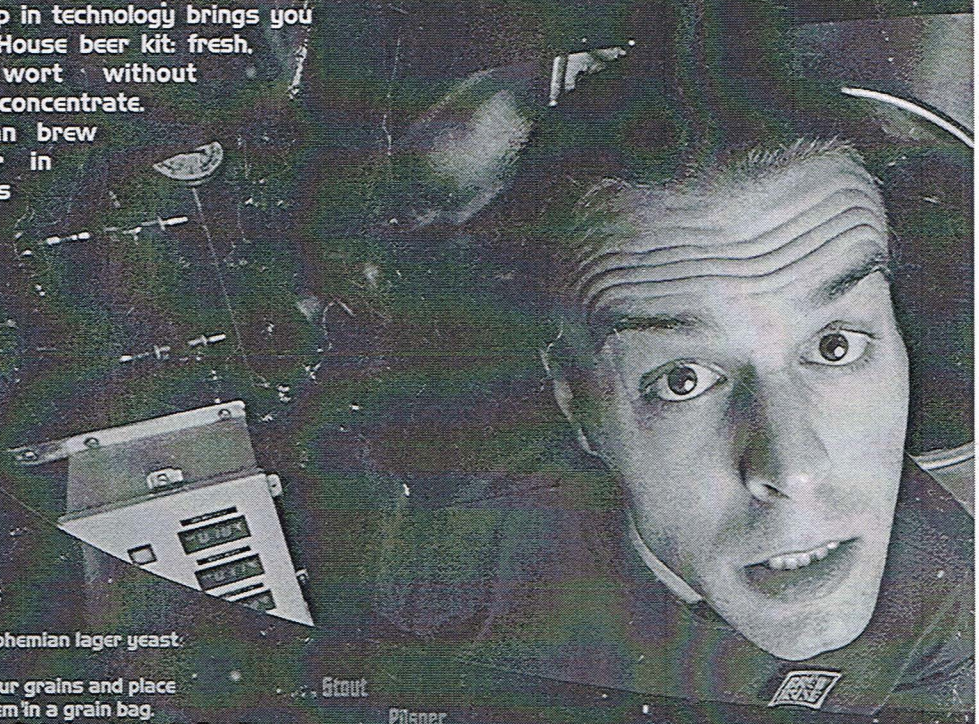

RIF Vienna Lager
(Recipe for 5 US gallons*)

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

1. Crack your grains and place them in a grain bag.
2. Add grain bag to 2 gallons of cold water in a 3 gallon (or larger) pot. Place over medium heat. Bring temperature to 170°F and hold for 20 minutes.
3. Remove and discard grains and boil for 20 minutes. At the end of the boil, add Saaz hops, remove pot from heat and steep hops for 5 minutes.
4. Cool the liquid and use it to make up the volume of the kit. Top up with water if necessary. Do not forget to add the pH adjustment package.
5. Pitch your yeast culture and ferment at 46-54°F.

Stout
Pilsner
Pale Ale
Wheat Beer
Munich Dark Lager
Extra Special Bitter
American Premium Lager

Your RIF should be ready for bottling in 6 to 8 weeks. With long lagering comes smoothness, rich complexity, and assimilation.

*This recipe is for the 5 US gallon (19 litre) kit. Get in touch and we'll send you the Canadian version. We have other recipes too—just ask.

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