

FOR THE **HOMEBREWER & BEER LOVER**

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► The Journal of the American Homebrewers Association ◄

Brewing Dynamics

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A Publication of
the Brewers Association

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In this issue:



**BEERS
YOU
CAN
BREW**

**In Defense
of
Adjuncts**

**WHAT COLOR
IS YOUR
BEER?**

**Brewing
at 14,000
Feet**

PLUS: *National Homebrewers Conference Preview*

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Sensory Analysis of Brewing

Ask any homebrewer what their favorite beer is, and many will inevitably say something along the lines of "The one that's in my glass right now" or "One that I brewed myself."

Part of the joy of crafting your own beer by hand is choosing the style, ingredients, process and equipment unique to your own tastes, budget and needs. But have you ever closely examined how every single aspect of your own brewing process affects the outcome of your beer?

In this issue, we take a look at the intricacies of homebrewing, examining everything from mashing, boiling, fermentation temperatures and pitching rates in John Palmer's overview of the topic on page 20. In addition, Tom Schmidlin examines the dynamics of beer color on page 36, and White Labs' Neva Parker writes about the effects of brewing variables on beer flavor with results from her experiments on page 28.

Sensory analysis is considered to be such an important aspect of brewing that the prestigious Siebel Institute of Technology includes two such courses in its Practical Training program: Sensory Analysis for Flavor Production and Control, and a Sensory Analysis Seminar. Both courses are taught by Lyn Kruger, president and COO of the Siebel Institute.

"Quality control is the largest value that sensory analysis has for craft brewers and homebrewers," said Kruger. Kruger said that especially for craft brewers, making sure that changes in raw materials and formulations don't affect the overall quality of the product and doing new product development are areas where sensory analysis is key.

The same can be applied for homebrewers, said Kruger. "I find homebrewers are

really passionate about what they do," she said. "When they're trying to make certain styles, they like to see how well they've achieved those styles, making sure they don't have any defects or contamination flavors. Basic sensory analysis can tell you if you've been successful at achieving the style you've set out to brew."

Everything from looking for beer contaminants to seeing if a particular hop characteristic has been achieved can be accomplished with sensory analysis techniques, said Kruger. Sanitation, boil times and fermentation rates can be evaluated more closely along with several other aspects of the brewing process.

While many Siebel courses are geared toward professional brewers, the Advanced Homebrewing Program offered off-site in Durango, Colo. includes aspects of sensory analysis, including techniques for sensory evaluation. This year's program is set for July 23-27 at Fort Lewis College. Go to www.siebelinstitute.com for more information.

This issue is also our National Homebrewers Conference preview, and local beer writer Dan Rabin gives you an insider's scoop on the craft brewing and homebrewing scene in Denver to help you prepare for your trip to the Mile High City in June. We also tracked down recipes for the conference brews so you can try your hand at brewing them. In keeping with the Denver theme, our Commercial Calibration panel judged two Denver-brewed craft beers, and the Last Drop offers a glimpse of the unique brewing opportunities that living in Colorado can provide. Hope to see you at the conference June 21-23!

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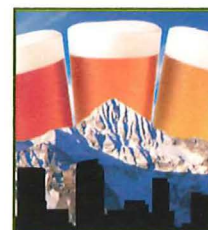
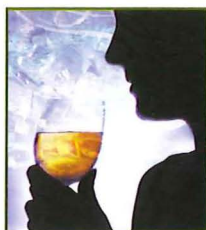
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>> GET THERE!

World Expo of Beer

Join the Frankenmuth Jaycees May 18-19 for Michigan's largest international beer sampling event, the 12th annual World Expo of Beer in Frankenmuth. More than 7,000 people are expected to attend the event at the new Harvey Kern Pavilion in Heritage Park.

With more than 150 different local, national and international beer samples to choose from, two cooking with beer classes to attend, four different entertainment groups scheduled and an expanded food area, the 2007 World Expo of Beer is bound to be the best yet! Admission is \$5 and each 4-ounce sample is \$1.

The event includes a BJCP-sanctioned competition including a Best of Show award. There is also an award for the Volksbier (people's choice).

For more information call 800-386-3378, e-mail info@frankenmuthfestivals.com or go to www.frankenmuthfestivals.com.

May 2-5

New England Real Ale Exhibition Somerville, MA.

Web: <http://nerax.org/>

May 12

The Dunwoody Beer Festival Dunwoody, GA. Contact:

Andra Galtieri, Phone: 770-671-9758, Fax: 770-671-8737, E-mail: andragdr@aol.com

May 12

Oregon Brew Fest Oregon, WI. Phone: 608-835-3697,

E-mail: director@oregonwi.com, Web: www.oregonwi.com.

May 18-19

Brewer's Memorial Ale Fest (Benefiting Humane Societies

of Oregon) Newport, OR. Contact: Robin Winfield,

Phone: 503-241-3800 x115, Fax: 503-241-3780,

E-mail: robin@rogue.com



May 19

6th Annual Virginia Beer Festival Norfolk, VA. Contact:

Domenick Fini, Phone: 757-441-2345, Fax: 757-441-

5198, E-mail: finid@festevents.org, Web:

www.virginiaartsfest.com/fun.html

May 30-June 3

Mondial de la Bière Montreal, Quebec, Canada. Contact:

Marie-Josée Lefebvre, Phone: 514-722-9640, Fax: 514-

722-8467, E-mail: mbiere@globetrotter.net

October 11-13

Great American Beer FestivalSM Denver, CO. Contact:

Bradley Latham, Phone: 303-447-0816 x 145, Fax: 303-

447-2825, Web: www.beertown.org



BREW NEWS: American Craft Beer Week

Celebrate the flavor and diversity of American craft beer by participating in American Craft Beer Week May 14-20. American Craft Beer Week has been designated as a time for all legal-drinking-age Americans to explore and celebrate the flavorful beverages produced by our small, traditional and independent brewers.

During American Craft Beer Week, you can win valuable prizes, including a trip to the Great American Beer Festival this October in Denver, just by visiting your local (or not so local) breweries for the Great American Beer Tour. Visit as many breweries as you like in as many states as you like and collect points by having the brewer or manager endorse your Great American Beer Tour passport during each visit. Points can be accumulated for prizes such as pint glasses, polo shirts and the grand prize of a trip to the GABF.

During the inaugural Great American Beer Tour in 2006, Ohio college instructor Tim Bruening set the bar high by visiting eight different breweries near his Cleveland-area home, stopping by each an average of four times to amass 60 points. Participants can collect points once a day at any brewery. For details go to www.greatamericanbeertour.org.

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www.AmericanCraftBeerWeek.org

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Blichmann Engineering has introduced a new accessory for its Fermentor™ conicals: heavy duty casters for easily moving the fermenter around your brewery. These industrial-grade, full-swivel, all-ball-bearing casters feature non-marking locking wheels with grease fittings, and outriggers for stability. Fits all F2 and F3 Fermentor™ conicals.

Blichmann also has a new addition to its Fermentor™ family. The F3-42 is a revolutionary design utilizing a modular extension in conjunction with the F3-27 Fermentor™ conical. This weld-free extension leverages the patent-pending sealing system and increases the gross volume of the F3-27 to 42 gallons—perfect for a 1-barrel batch size. Since it is a clamp-on attachment, the brewer can brew a 1-barrel batch one session, and a 20-gallon batch the next simply by switching out the lids. The F3-42 is also being sold as an upgrade kit and is compatible with all F3-27 models.

For more information go to www.blichmannengineering.com.



THE LIST

10 Playboy's Best Microbrews

Playboy magazine recently assembled a panel of noted beer experts (including Dogfish Head founder Sam Calagione and Brooklyn Brewery brewmaster Garrett Oliver) to come up with a list of their 10 favorite American microbrews. The results:

1. Sierra Nevada Pale Ale
2. Victory Prima Pils
3. Ommegang Abbey Ale
4. Anderson Valley Boont Amber
5. Sierra Nevada Porter
6. Brooklyn Black Chocolate Stout
7. Troegenator Double Bock
8. Samuel Adams Utopias
9. Alaskan Smoked Porter
10. Deschutes Mirror Pond Pale Ale

BREW NEWS: 2007 Beerdrinker of the Year

Diane Catanzaro, a Norfolk, Va. homebrewer, beer judge and college professor, was crowned the 2007 Beerdrinker of the Year on February 24 in Denver.

Catanzaro, 48, won the title in the hotly contested finals at Wynkoop Brewing Company.

A professor of industrial/organizational psychology at Christopher Newport University in Newport News, Va., Catanzaro is the second woman to win the competition. Cornelia Corey of Clemmons, N.C. won the title in 2001. Catanzaro's home beer bar is The Biergarten in Portsmouth, Va.

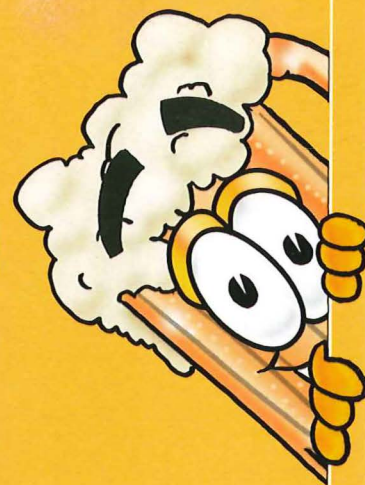
"This is a dream come true for me," Catanzaro said after winning the title. "I can use the title to carry the flag for Beer Nation and spread the news about craft beer. And it gives me an opportunity to promote a better understanding of beer to women in America."

"Beer is not just some fizzy yellow drink," she said. "It has a rich history, an incredible array of styles and flavors, and it's part of a healthy lifestyle. And it's not just for the boys."

Catanzaro, a finalist in last year's Beerdrinker contest, beat out finalists Logan Perkins (Denver) and Phil Farrell (Cumming, Ga.). Her impressive beer drinking experiences, humor and beer ambassadorship helped her land the crown.

"I've never seen three more deserving finalists," said Tom Dalldorf, editor and publisher of *Celebrator Beer News* and one of seven judges for the finals. "But Diane was very engaging, and her personality and very beery background helped her win the title. She speaks well for the beer community."

For more details on the Beerdrinker of the Year search and Wynkoop Brewing Company, visit www.wynkoop.com.



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by Ray Daniels



Paying the Price for Great Beer

Ever try to stop a train? When they are cruising, it takes more than a mile for them to stop after the emergency brake is applied. And that, my friends, is the main reason you don't want to give up the day job to become a beer sommelier.

Oh, did I mention that the train in this case is wine? When it comes to pairing with food, wine cruises down the rails at a hasty clip. Anyone that dares stand a beer in the way can expect a dramatically smashing result.

In fine dining, Western consumers of all stripes know that wine is the "proper" thing to have with their food. The built-in cultural imperative says beer may serve as a cocktail and even accompany burgers or Mexican food, but when you shell out the shekels for a great meal, wine must be consumed. Even brewers and beer writers drink wine with expensive meals!

In my last column, I considered the economics of wine versus beer. I believe beer stands on the verge of being able to support paid beer experts in restaurants when it comes to financial equation. Just last month I visited a place called Bottleworks in Seattle that gave me additional hope in this arena.

Bottleworks is an off-premises specialty beer store, very much like the cozy wine shops that you see in many upscale neighborhoods across the country. Aside from a small selection of chocolate and glassware, all they sell is beer—and most of that is strong, high-end stuff sold by the bottle. The modest space they occupy contains six or seven reach-in coolers and nearly all the inventory is displayed in these cold cases. What an inventory they offer! For a Chicagooan who never sees Alaskan



beers, it was exciting to see this year's smoked porter on display—and even more exciting to see past years' vintages available for sale too! This was true for other "vintage" beers as well. To say the least, the selection was incredible.

What wowed me even more than the selection was the pricing, or rather the range of prices being charged. While the everyday six-packs of drinkin' beers were reasonably priced, the special selections—again reasonably priced for what they are—created a whole population of beers in the rarified world north of \$10 per bottle. While I didn't count, I did notice that every case I looked at had beers over \$10 per bottle and most had at least one bottle priced at or above \$20. I was giddy with excitement.

Before you roll your eyes and toss *Zymurgy* in the spent grain bin in disgust, let me explain. Pricey beer is the first element needed to build the fine beer movement—and the first step in getting paid beer experts on staff at fine dining establishments. From what I understand, wine prices in restaurants are nearly double what you'd pay for the

same bottle in a liquor store. So if we have beer selling for \$10-\$30 a bottle in a store, we have the makings of \$20- to \$60-bottle beers in restaurants. And that is a good thing.

Unfortunately, even when pricing rises to the needed levels, other barriers persist.

Let's start with the fact that we are talking about bottled beer here. When you go to a restaurant and want to order a beer, do you look at the bottled beer list? I rarely do. Most places focus on the draft list and that's what moves. Thus the draft beers stand the best chance of being fresh and drinkable. If you find an interesting bottle of beer someplace with a pedestrian selection of taps, you can't help but worry what condition it will be in. There's nothing like getting an old, abused beer and then struggling to explain to the waiter or waitress that it really *isn't* supposed to taste like that.

So even beer drinkers have a bias against bottled beers generally. And establishments with some beer-serving savvy have gotten the message about freshness: beer needs to move to stay good. Now we come along with strong, bottle-conditioned beers with legs to last two to five years from the date of bottling. Indeed, many of the products we're talking about here will not only last that long, they'll improve during much of that period. The average place will be skeptical—as will the average consumer.

So a new round of education begins. We'll be using wine as the touchstone as we do it. People understand that wine requires special care and beer does too. People know that not all wines are best at the same age and the same can be said for beers. Within five years I hope



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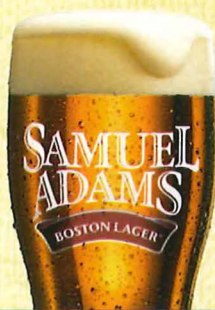
that beverage managers and, yes, sommeliers at restaurants all over the country will understand the difference between present-use beers and those that can be laid down for drinking in the next year or two.

When this starts happening, beer people will be able to stop buying wine when they dine. After all, it isn't that we don't want to have beer with our fancy dinner; we just want something special that befits the occasion. Unfortunately, that means beers that restaurants would never dream of stocking today. If offered a bottle of Port Brewing's Cuvee de Tomme, Russian River's Salvation or Allagash's Curieux rather than just another brown or pale ale, then a lot more folks would be drinking beer with their fancy French food.

Cheers!

Ray Daniels is director of Brewers Publications for the Brewers Association and the author of *Designing Great Beers*. 

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by Professor Surfeit



An Alien-ated Ale?



Dear Professor,

I'm hoping you can shed some light on this very unusual krausen (see above photo). The fermentation started very quickly, and the resulting krausen appeared after about 12 hours. It fell after a few days, as I expected. At first I suspected an infection, but the beer tasted fine.

The beer was a Rye Ale, about 30-percent rye, 60-percent Maris Otter, with crystal, wheat and biscuit malts making up the rest. I used Danstar Nottingham yeast, which I've used since, but I haven't had similar results. Do you have any idea of what caused this demon fermentation, or if it has a name?

Thanks,

John Huck
Strange Brew Homebrew Club
Vancouver, Wash.

Dear Huckster,

What the hell do you have going on here? Here's my guess. For whatever reason, the original krausen that formed became slightly encrusted and hard. And subsequently as the fermentation became more vigorous the foamy "worms" of bubbled wort broke through the encrusted surface in various places and the sticky foam emerged as it squeezed through the broken surface. Thus the worm-like nature of your primary fermentation.

It undoubtedly looks very cool and very alien.

In awe,
The Professor, Hb.D.

Raspberry Mead Gonzo Ferment

Dear Professor,

I have had a strange effect with fruit flavored mead twice now and can't figure it out.

I have made a number of "standard" meads with great success. However raspberry mead has been different. I have maintained the brew with fruit at 180° F for 30 minutes (no boil), added dried champagne yeast and had a terrific, uneventful fermentation. At first racking, about four weeks, the specific gravity went from 1.110 to about 1.040. But after another month the gravity fell to 0.098. The taste is a bit tart and tangy, not sour, and there is a good alcohol effect. It is slightly cloudy rather than bright.

Can this kind of fermentation be possible? The calculations tell me that this would be about 14-plus-percent alcohol. I have suspected some kind of contamination, but the taste doesn't seem to indicate it and I practice good sanitation. This only occurs with fruit—frozen, I might add. I have never been able to achieve this kind of fermentation with any other beer or non-fruit mead using the same yeast. I was hoping for a rather sweet, fruity mead of ordinary gravity.

Pete Precario
Columbus, Ohio

Hi Pete,

No, your fermentation is not unusual. I regularly get my meads to ferment to about 14- to 14.5-percent alcohol using various types of champagne yeast. Every meadmaker's conditions are unique. Water plays a factor as do the origins and other conditions of the honey harvest. As well, there is a great deal of variation between raspberry harvests. It seems that in

your situation the mineral, pH and nutrient balance was better than usual with your honey and frozen raspberries with this batch. Yet it typifies many a mead ferment I have had.

With champagne and wine yeasts I estimate that the fermentation will drop about 100 specific gravity points. That is to say that if I start at 1.110 it will end up around 1.010. If I am shooting for a sweeter mead, I will aim for a starting gravity of about 1.130 to 1.145 and end up at 1.030 to 1.045. Now you've got to realize this is what I get with my experience in my meadery. Other meadmakers might get different results because they are using some kind of "super" yeast that ferments regularly to tolerate even higher degrees of alcohol.

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Savannah
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Gordon Biersch Brewery Restaurant
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Kailua-Kona
Maui Brewing Co.
Lohaina-Maui

IDAHO

Old Chicago
Boise (2)

ILLINOIS

Brass Restaurant & Brewery
South Barrington
Elmwood Brewing Co.
Elmwood
Flossmoor Station Brewing Co.
Flossmoor
Goose Island Beer Co.
Chicago (2)
Old Chicago
Rockford
Rock Bottom Restaurant & Brewery
Chicago, Warrenville
Windy City Grill & Tap
Orland Park

INDIANA

Buffalo Wild Wings Downtown
Indianapolis
Power House Brewing Co.'s
Columbus Bar
Columbus

Rock Bottom Restaurant & Brewery
Indianapolis (2)
Upland Brewing Co.
Bloomington

IOWA

Court Avenue Brewing Co.
Des Moines
Granite City Food and Brewery
Cedar Rapids, Clive, Davenport
Old Chicago
Bettendorf
Raccoon River Brewing Co.
Des Moines
Rock Bottom Restaurant & Brewery
Des Moines

KANSAS

Granite City Food and Brewery
Kansas City, Olathe, Wichita (East),
Wichita (West)
Old Chicago
Lawrence, Lenexa, Manhattan, Olathe,
Overland Park, Topeka, Wichita (3)

LOUISIANA

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If you want that raspberry mead to be sweeter, try making a batch of mead with 1.145 as a starting gravity. After it ferments down to a sweet 1.045 or so, blend it with your raspberry mead and let it sit in the carboy another few months as a blend to make sure that the fermentation doesn't kick up once again. I've taken this approach several times with a great degree of success, but you need a lot of patience and time to let all these different batches completely ferment out and become clear.

Oh yes, you asked about the haze. If the raspberries were at all subjected to high heat then you might get a pectin haze. Add a bit of pectin enzyme to your fermenter and that should help clarify the mead. Nevertheless, over a long period of time (three to 12 months), all mead should clear. Patience is rewarded, especially with meads.

Grasping for answers,
The Professor, Hb.D.

Betta Bretta Brews

Dear Professor,
I have been brewing for over a year now. Lately I have been interested in trying either an Orval Trappist or Mo' Betta Bretta type brew but have been discouraged. I have been told that Brettanomyces strains as with other wild yeast can infect your brewing equipment.

I live in a small apartment and all of my fermenting is done in a plastic office/storage cabinet (6 feet tall, 4 feet wide and 3 feet deep). This is the same closet that I store all my brewing equipment in.

I know that I will need separate equipment for each type of beer, but can I conduct both "normal" fermentations and "wild" fermentations side by side in the same space? Is it safe to store this equipment side by side or should they be separate? What precautions do I need to take or should I wait for more

brewing space and separate brewing areas?

Scott Constanteles
Queens, N.Y.

Dear Scott,
The most important thing to remember is that you are a homebrewer, making beer in small batches. Therefore you can give undivided attention to sanitation and cleanliness. What this means is that you can be homebrewing several batches of beer and mead and wine with various yeasts and maintain control. You have the ability to corral all of your fermentations and keep things separate. You cannot be sloppy with sanitation. With this attitude in mind you can make great beers consistently, whether you use one yeast or several.

Having said that, I would not recommend that the siphon hoses used for lambic or wild yeast fermentations be reused for lager and ale yeast fermentations. Keep your hoses separate. If you

use a hard plastic racking cane, take extra care to sterilize or be sure to disinfect all the wild yeast from the inside of the cane after use. Use a strong chlorine solution to soak and then rinse both inside and out.

*Taking care of brews,
The Professor, Hb.D.*

Gnarly Lambics Tricks

Dear Professor,
Just a quickie follow-up regarding the Gnarly Roots Lambic Style Barley Wine Ale from Charlie Papazian's *The Homebrewer's Companion* (Dear Professor, March/April *Zymurgy*). I just racked to secondary, and oh my! It's so good! I immediately "canned"

the peaches idea. This needs zero additions!

I am not very proficient with the lambic bugs so they sat in the primary as described: Primary ferment w/Safale US56 packs for a week, add [Brett] bugs, ferment one month. My ferment room dropped from 68 to 63° F within that month. I saw a "slight" looking film of white starting to develop (or so I think, the [kraeusen] blowoff [hose] left quite the mess). My sample tasting is big malt and hops with "sour" ever so slight on the back of the mouth.

The question: The bugs are in the beginning stages of "working," correct? I really saw no top krausening activity or airlock bubbling.

The smell? Slightly putrid, but not overpowering. So at the lower temps I have going right now, what would a reasonable time be to start seeing that white scum form?

*Awaiting your wisdom,
Metal Larzz*

*Yo, my gnarly friend,
Patience mon, patience. Might be a couple or few months to have that sheet of lambic-friendly white scum.*

*You will be rewarded,
The Professor, Hb.D.*

p.s. Charlie recently shared with his wife, Sandra, and me a 15-plus-year-old Gnarly Roots that is fantastic. Trick: right after you bottle and cap, immerse the capped end of the bottle in melted paraffin. This minimizes oxidation and your treasured aged brews last for decades without getting oxidized. It works.

Cruising for a Juicing

Dear Professor,
I was just enjoying my January/February *Zymurgy* and came across the letter from Matt Drott in Lewiston, Maine looking for prickly pears. We (Vita-Pakt Citrus Products) are a citrus processor in Covina, Calif. and happen to process the prickly pear cactus (bright red magenta color) fruit into a frozen puree. As a current AHA member I would greatly appreciate it if you could mention us!

*Sincerely,
Nick Cook
626-332-1101, ext. 105*

*Nick My Man,
Seems like a bit of an advertisement, but I'll take exception to this as what you have to offer is so rare and hard to find. I think American Homebrewers Association members would really appreciate knowing about your whereabouts. Perhaps you will post some kind of regular ad in the back pages of *Zymurgy* in the future.*

*Juiced,
The Professor, Hb.D.*

Hey homebrewers! If you have a brewing-related question for Professor Surfeit, send it to "Dear Professor," PO Box 1679, Boulder CO 80306-1679; fax 303-447-2825; or e-mail professor@brewersassociation.org.

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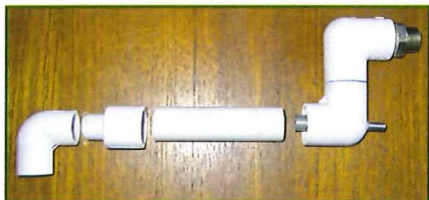
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More DIY Homebrewing Equipment



Dear Zymurgy,
Here's a picture of my homemade wort aerator made from 3/4 inch and 1/2 inch pvc which works great. You can inject oxygen using an aquarium pump or welder's oxygen; no more shaking carboys or worrying about whether you have enough oxygen in your wort for a healthy start of fermentation. Mine generally starts in five hours or less, providing I have pitched plenty of yeast.

Parts needed are 2 3/4-inch elbows glued together (one elbow has to have one end with internal threads for whatever brass adaptor you use to fasten to your boiler drain valve); one two-micron aeration stone (can be purchased from northern-brewer.com or a local homebrew shop. Drill a hole in elbow for stone and glue in place, the tighter the fit the better.); one 4-inch piece of 3/4-inch pvc pipe attached to elbow and adaptor (do not glue in place so it can be disassembled for easy cleaning); one 3/4 to 1/2-inch adaptor (to slow flow for more oxygen absorption); and one 1/2-inch elbow threaded internally on one end.

Happy brewing to you all,
Tom Morrow

thermometer directly to the outflow of the wort chiller. It works great. It gives almost instant feedback on the temp of the wort flowing into the fermenter and allows quick adjustment to correct the temperature. We used some clear packing tape to keep it from getting too wet.

Aaron and Randy Heyden



More Gadgets

Dear Zymurgy,
My dad and I were reading in your magazine about an easier way to fill bottles from the keg (January/February 2007). It involved using a stiff tube. Well, my dad was wondering if you could just stick a bottling wand right inside the cobra head tap. Sure enough it worked. In fact, it worked great! There's practically no foam, and you can lock the tap open and use the bottling wand just as if you were using a bottling bucket (see photo).



We were also reading somewhere about building an inline thermometer for a wort chiller. We thought it was a great idea, but we thought we could make it easier (at least in our personal systems). I realized that you could just attach an aquarium

Planispiral Immersion Chiller

Dear Zymurgy,
With all the various chiller threads lately, it is time to put in a plug for the Planispiral Immersion Chiller. I get quick cooling and automatic piling of the cold break and hops in the middle of the kettle using an alternate design of the immersion chiller, called a planispiral immersion chiller. The planispiral chiller uses flexible copper tube just like the "normal" type of immersion chiller, but the tubing is bent in a flat spiral, sort of like the burner on an electric stove. The spiral is wound as tightly as possible and should be as wide as possible to extend over the whole surface of the wort/kettle.

Cold water goes in at the outer edge of the spiral, and hot water comes out the middle. The cold at the outer edge of the kettle causes the wort to sink, then it wells up through the center of the kettle and is chilled as it flows toward the outer edge.

As soon as the cold water is turned on, you will see the current begin. You can

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cover the kettle, with just the two hoses (or better still, the ends of the copper tubing) sticking out, leaving a crack in the lid to view your thermometer through. You do not need to stir the wort or agitate the chiller at all, due to the thermal current that is naturally created.

It takes less than 30 minutes to chill 10 gallons from boiling to 80° F. Get a copper "+" and four short pieces of stiff copper pipe, and make a cross that just fits inside your kettle. Wind the flexible tubing into a flat spiral, and lash it to the + with bare solid copper wire. Suspend the chiller at the surface of the wort (+ side up) using more solid copper wire. The spiral should be just submerged in the surface of the wort. The planispiral chiller is very simple and very effective.

Mike Maag
Staunton, Va.



Yeast Starters

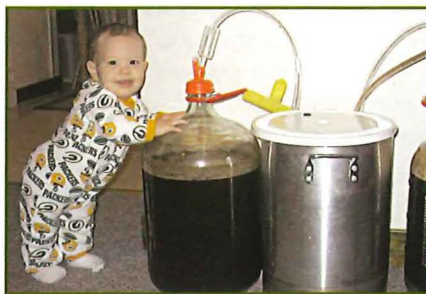
Dear Zymurgy,

I have been brewing for about five years now (all-grain for just over a year) and have just gotten into making yeast starters for just about every batch. I was glad to see Jamil's article about making a starter in the latest issue (March/April 2007). He is a great resource for me and has sparked a lot of great brewing ideas from listening to his show on the Brewing Network. I was thumbing through his article hoping that I might find a little info on making starters with *Brettanomyces* and other bugs/bacteria. I wasn't surprised to see that he didn't mention anything about it seeing that it is probably a whole other bag of tricks.

I have finally worked up the guts, or I should say, I have finally been convinced that I can brew those funky beers without destroying my entire brewing repertoire in my kitchen. I would love to see an article that discusses how to go about making starters with other than *S. Cerevisiae*. Keep up the good work.

Brian Richards
Marquette, Mich.

P.S. I had to include this pic of my son hanging out by the carboys. Yeah, I'm a proud father. Looks like I'm gonna have a future homebrewer on my hands.



Beer Sommelier

Dear Zymurgy,

I liked Ray Daniels' "The Coming of the Beer Sommelier" (March/April 2007). The study to become a beer sommelier is for a long time a part of the studies at Doemens Institute in Munich, Germany. Dr. Wolfgang Stempf, managing chair, developed the course several years ago. It would be great if Dr. Stempf would offer the course as online study so it would be available for BJCP judges and others to deepen their knowledge of beer.

Some beer sommeliers in Germany are also owners of Gasthaus Brauereien (brew-pubs), and I have eaten at a lot of them. I can say that both studies at Doemens (to become a Master Brewer/Maltster and beer sommelier) have paid off.

Fred M. Scheer
Nashville, Tenn.

Send your letters to Dear Zymurgy, PO Box 1679, Boulder, CO 80306 or e-mail jill@brewersassociation.org. Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to Kelli Gomez, Magazine Art Director, at the above address or e-mail it to kelli@brewersassociation.org.



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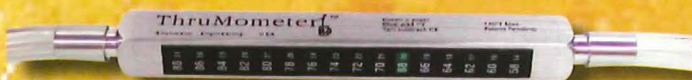
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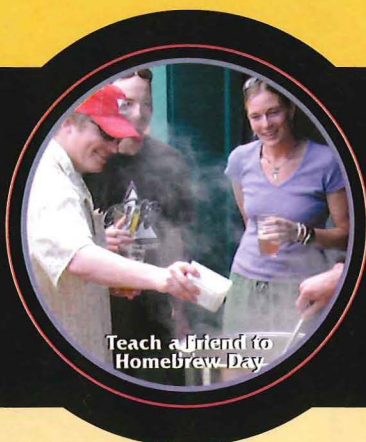
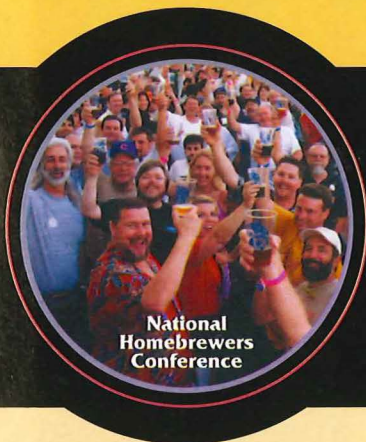
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by Amahl Turczyn Scheppach

Brewing Great Extract Beers

Using malt extract rather than a grain mash has both advantages and disadvantages, but ultimately you are sacrificing control over the brewing process—and a little extra cash—for the convenience extract offers. For those of us with busy schedules and short weekends, this is often well worth it, and with today's sophisticated methods for producing extracts, there are no sacrifices in quality. Just about any beer you can make with grain, you can make with extract. Here are the highlights.

Malt Extract Pros

- Requires less brewing equipment
- Less time needed per brew
- Easier to brew high-strength beers
- Convenient medium for making yeast starters
- Comes in a variety of grades (e.g. amber, light, dark, etc.)
- Widely available
- Unhopped extract quite versatile for recipe formulation
- Hopped extract can make brewing process extremely easy
- Can be used to supplement all-grain beers or kit beers
- Great yeast nutrient for meads

Malt Extract Cons

- Expensive relative to all-grain
- Limited shelf life—will darken over time
- Both syrup and powdered forms can be messy
- Water composition, dissolved salts and barley quality out of brewer's control
- No control over fermentability of diluted wort
- Even extra-light extracts can produce darker beers than all-grain process
- Can scorch if added directly to a boiling kettle

Suggestions for Maximizing your Malt Extract Experience

- Use the freshest extract you can find.
- Dilute with softest water possible.
- Use light or extra light extract and color with specialty grains if desired.
- Use plain, unhopped extract and add hops separately.
- Store away from heat, light and oxygen.

- Remove kettle from heat before adding.
- Dry extract added to boiling wort = potential boilover.
- Liquid malt extract (syrup) contains about 20-percent water.
- Heat extract syrup just before adding to lower viscosity.
- For kit brewing, substitute dry malt extract whenever sugar is called for.

Jaromir Jagr Honey Lager

Ingredients

for 5 U.S. gallons (19 liters)

3.5 lb	(2.27 kg) Cooper's light dry malt extract
1.0 lb	(0.45 kg) honey
0.5 lb	(227 g) 10L crystal malt
1.0 oz	(28 g) US Hallertau hops (pellets), 4% alpha acid (60 min)
0.5 oz	(14 g) US Hallertau hops pellets, 4% alpha acid (30 min)
	Pilsner lager yeast

Original Specific Gravity: 1.042

Boil Time: 60 minutes



Directions

This is a light, dry, easy-drinking, easy-to-brew Pilsner beer with a touch of honey. It goes well with hockey games, but you don't have to be a Rangers fan to enjoy it. Pilsner lager strains are attenuative enough to make this a balanced, refreshing lager, but remember that a hefty pitching rate and a lengthy lagering time are necessities for this beer. Steep crushed crystal malt in 155° F (68° C) soft brewing water for 30 minutes, then remove grains, add honey and extract, and bring to a boil. The larger a volume of wort you can manage to boil, the lighter a beer you'll end up with. Skim off any foam that collects on the surface of the wort, then carefully add your first charge of hops. Boil for 30 minutes, add the last hop charge, and boil another 30 minutes. Chill to at least 60° F (16° C), oxygenate or aerate, and pitch lager yeast starter. Ferment at 50 to 53° F (10 to 12° C) until fermentation is complete, then rack into secondary and lager 10-12 weeks at 35° F (2° C) or so. Prime with Coopers Carbonation Drops at bottling. Some brewers prefer to add the honey at steep, but depending upon the honey quality, your lager may suffer from haze issues without a complete boil.

Estimating Original Gravity

If you are making a purely extract-based beer, you can use the following method to estimate your original gravity. Brewing software packages will help you determine your O.G. with a greater degree of accuracy, since you can include a greater variety of parameters, but for the beginning brewer, this method will get you in the ballpark. As a benchmark, 1 pound of the following fermentable sugars dissolved in 1 gallon of water will yield the following original gravities:

Granulated sugar 1.042

Corn sugar (dextrose) 1.040

Dry malt extract 1.040

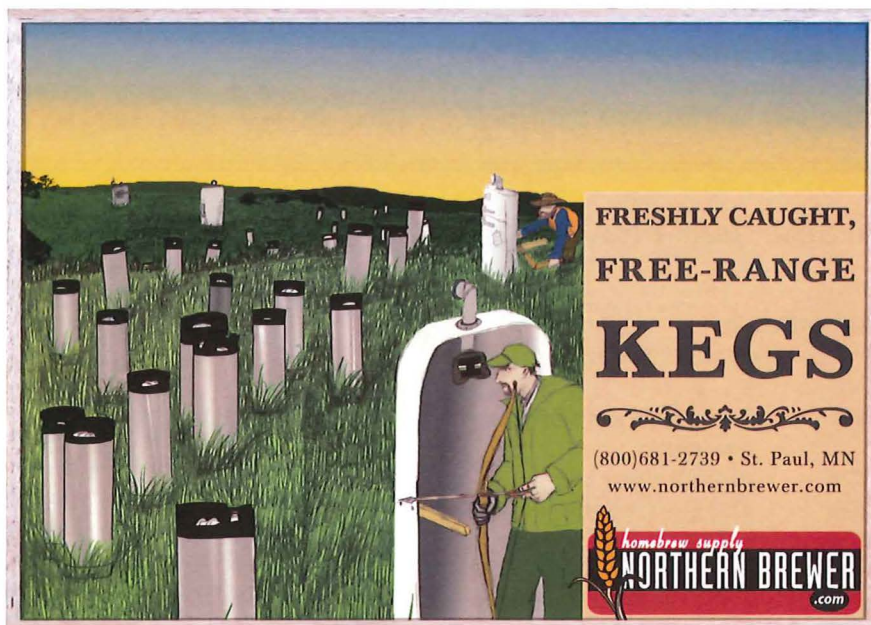
Liquid malt extract 1.034

Honey 1.030

Pale malt (mashed) 1.025-1.028

Crystal malt (steeped) 1.016

Multiply the number of pounds of each ingredient by last two numbers of the original gravity listed above. Then, since these are for 1 gallon only, divide by the number of gallons you will be brewing. Let's say you are making a 5-gallon batch of honey lager. You are using 5 pounds of light malt extract syrup, 1 pound of honey, and are steeping a half a pound of crushed, 10L crystal malt.



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So for the extract, 5 times $(1.0)34 = 170$; for the honey, 1 times $30 = 30$; and for the crystal malt, 0.5 times $16 = 8$. Total extract is $170 + 30 + 8 = 208$, divided by 5 gallons = 41.6, so you can expect an original gravity of 1.0416, or about 1.042.

Converting Extract Recipes to All-Grain

The same principle can be used to estimate how much grain you'd need to do the same recipe without extract. To find the number of pounds of milled barley malt you'd need to achieve your extract recipe original gravity, look at the average extracts above, and calculate the estimated starting gravity for the extract recipe. Again, drop the first two constant numbers before calculating (example: 1.042 becomes 42). Say you want to try the honey lager recipe again, but you want to substitute 2 pounds of the malt extract syrup with two-row barley and do a mini mash. You know the 5 pounds of malt extract in this recipe yields 170 points of extract, so 3 pounds would be 170 times $3/5$ (or 0.6) = 102. You need to make up 68 points with grain, so 68 divided by the average extract per pound for mashed pale malt (28) equals about 2.4 pounds of grain.

Malt extract is a great thing to have on hand, even if you are an all-grain brewer; and if you don't have time for all-grain brewing, it's an even more important commodity. Stock up and have fun.

Amahl Turczyn Scheppach is a former craft brewer and associate editor for Zymurgy, and now brews at home in Lafayette, Colo.



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How Do I Brew Thee? (With apologies to Elizabeth Barrett Browning)

*How do I brew thee? Let me count the ways.
I brew thee to the depth and breadth and height
My spoon can reach, when stirring out of sight
For the ends of the pickup tube that's been displaced.
I brew thee to the level of everyday's
Most fervent need, by sun and shoplight.
I brew thee freely, as men strive for Right.
I brew thee purely, in return for Praise.
I brew thee with the passion put to use
Standing in my T-shirt and briefs, and my childhood's faith.
I brew thee from a recipe I seemed to lose
With my patron saint, I shall brew thee without dread,
With smiles, tears, and occasionally my wife! or, if I choose,
I shall but brew thee later before bed.*

Sensory Analysis: A Beer is What You Make of It



A beer can be compared to the performance of a symphony orchestra. We are the conductor, the recipe is the sheet music, and the instruments are the ingredients with which we work. A beer can be brewed rigorously to a recipe just like music can be played mechanically to the score. The difference is in the performance.

Everything we do in the brewing process affects the beer we make: the mash, the boil, the equipment we use, the decisions we make to cope with the brewing environment; all is manifest in the flavor of our beer. As brewers we can shape this performance and pull nuances from the ingredients that make a beer truly memorable.

First let's look at the sources of beer's flavor—the ingredients. Most of the flavors come from the malt and other fermentables. The hops add bitterness and a variety of herbal/floral/spicy flavors and aromas, but they usually play a supporting role, an accompaniment. The yeast can have a profound effect on the expression of the flavors, but serve the brewer much like the tempo and musical dynamics. The yeast build flavors from what they are given to ferment, and the brewer directs the fermentation. The barley is malted and kilned to produce a variety of flavors that we broadly describe as malty. These

by John Palmer
Illustration by Rick Hudson

flavors are usually described as warm and toasty, like freshly baked bread, and are the result of Maillard reactions, chemical browning reactions between amino acids and the naturally occurring sugars in the malt. Indeed, Maillard reactions are the source of all malt flavors, including chocolate and roast flavors.

The Mash


The sugars, proteins and flavors of malt are enzymatically extracted during the mash. The extraction is primarily dependent on temperature and pH. At low mash temperatures (113-131° F, 45-55° C), the proteases cleave large insoluble proteins

into smaller soluble proteins that greatly enhance the mouthfeel of the beer. For instance, if you rest the mash at 120° F (48° C) for 15 minutes, you will add more soluble protein to the wort that will help build up the body of a beer that uses a high percentage (30 percent) of low protein adjuncts like rice, corn or refined sugar. More soluble protein also seems to aid head retention, although recent research indicates that the real cause may be more complex than that. As the mash temperature passes 150° F (65° C), any remaining beta glucan in the malt (a type of cellulose from the plant cell walls) will become soluble and increase the viscosity

of the wort and the apparent body of the beer. Beta glucans add to the mouthfeel of the beer, but can also cause lautering problems in the mash; unmalted wheat and barley are prime examples. Resting the mash at 95-113° F (35-45° C) will break up these beta glucans, reducing viscosity and aiding extraction.

Conversion of the malt starches to sugars occurs most readily at the upper end of the saccharification range at 150-158° F (65-70° C), but the fermentability of the wort can be increased by resting at the lower end of the saccharification range at 140-150° F (60-65° C). Resting the mash in this lower temperature range for 20 minutes will lower the final gravity of the beer, making it drier and less filling. The effect of temperature to enzymes is like voltage to light bulbs; the warmer they are, the faster they will work, but they will also burn out more quickly than they will at a lower temperature. This is especially true of beta amylase, which is very heat- and pH-sensitive, but creates the highly fermentable sugar *maltose*. If the mash temperature is rested at the higher end of the range, beta amylase will be mostly denatured in about 20 minutes, the resultant sugars will be larger and less fermentable, and the beer will be maltier with more residual sweetness. Resting the mash for 20 to 30 minutes in both temperature ranges will yield a more fermentable wort and a slightly higher yield than a single rest mash at 150° F (60° C).

The pH of the mash affects both the enzyme activity and the expression of melanoidin flavors from the malt. The concept of residual alkalinity is the key to understanding the interaction of natural malt acidity and brewing water chemistry that determines the mash pH. There are books such as *How To Brew* that explain the concept more fully than I will attempt to do here. To summarize the concept, the mash pH for all beer styles should always be in the range of 5.4 to 5.8, when measured at room temperature, for highest yield without tannin extraction from the husks. Darker malts, and thereby darker beer worts, are more acidic than lighter malts, and require more alkaline brewing water to balance and achieve the



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proper mash pH range. The majority of brewing water across the country (including bottled water) is moderately alkaline, and thus will properly balance with moderately dark beer worts, i.e. amber to brown colored beers. Lighter beer styles need less alkaline brewing water, and darker beer styles need more alkaline brewing water.

If a dark beer is brewed with less alkaline water, the mash pH will be below the recommended range, the beta amylase enzyme will be inhibited, yield will be reduced, and the beer flavor will be acrid. If a light beer is brewed with more alkaline water, the malt and hop flavors will be dull, tannins can be extracted from the grain husks, and the beer can taste astringent and chalky.

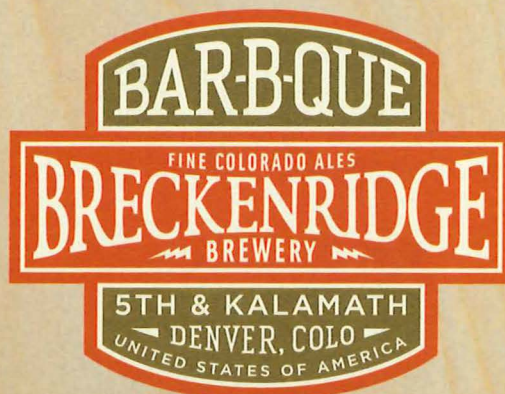
*The hops are added to the boil for
bitterness, flavor and aroma. The
melding of the hop character to the
malt in a beer can be conducted in
a myriad of ways.*

The lautering or sparging method can also affect the flavor and body of the beer. The traditional sparging method continuously rinses the grainbed to extract as much of the sugar and soluble extract from the grain as possible. The result is a dilution of the soluble protein and other rich tasting compounds in the wort, and if sparged too long, can lead to higher extraction of silicates and polyphenols from the husks that dull the taste of the beer. No-sparge brewing does not rinse the grain, and the wort comes entirely from the first runnings. The result is a richer, maltier tasting beer that can match the most ardent decoction-mashed effort. Batch sparging is halfway between these two methods. It is less sensitive to the problems of over-rinsing, in effect only rinsing the grainbed once. To batch sparge, drain the wort completely from the mash (this is the first runnings), and then add an equal amount of water back

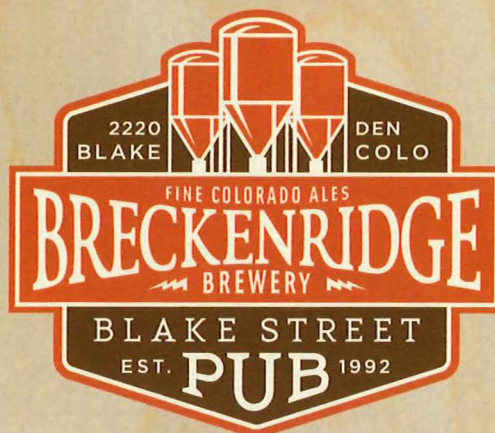
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to the mash, stir, recirculate for clarity, and drain again (the second runnings).

The Boil

Now for an interlude: the boiling of the hops. The hops are added to the boil for bitterness, flavor and aroma. The waxes and oils in the lupulin glands boil off at different rates, and we use this fact to impart different flavors and aromas from different varieties of hops at different times during the boil. Long boiling times result in more of the hop alpha acids being isomerized (and soluble) while the lighter oils and waxes boil away. Shorter boil times preserve more of these aromatic oils in the beer. Hop additions used to be rigorously added at 60, 30 and 15 minutes specifically for bitterness, flavor and aroma, but nowadays brewers achieve a greater spectrum of flavor and aroma with smoother bitterness by adding more of the hops later in the boil, and/or by continuously hopping throughout the boil a few grams at a time. The melding of the hop character to the malt in a beer can be conducted in a myriad of ways.

*♪ Fermentation temperature, like
the tempo set by the conductor,
♪ is one of the most important
controls a brewer can exercise in
crafting a beer. ♪*

Hops also contribute polyphenols to the boil, and these along with malt husk polyphenols will link up with proteins in the boil and precipitate in the hot break. Irish moss helps to link large polyphenols and proteins together to help them settle out and clarify the beer. Studies have shown that less hazy beer is more stable and has less chance of staling. The most common manifestation of protein-polyphenol haze is the "chill haze" formed by small polyphenols cross-linking with protein. These complexes are insoluble when the beer is chilled, but don't have enough mass to settle out effectively and

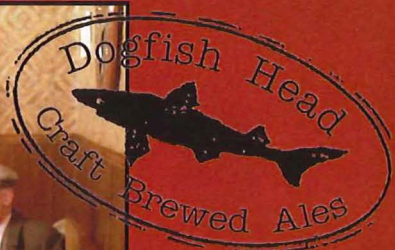
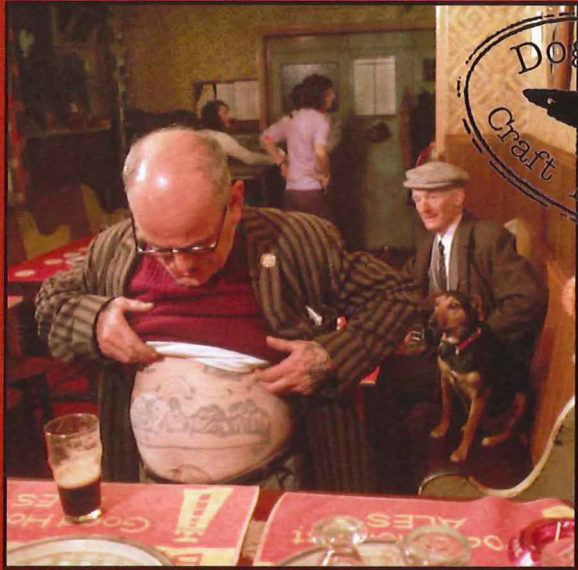
will dissolve back into solution when the beer is warmed to room temperature. Lagering or cold conditioning the beer will help this haze to settle out. If a beer with chill haze is poorly handled during bottling or kegging, oxygen exposure can cause the small polyphenols to grow into larger polyphenols (and tannins) by polymerization, and the chill haze can become permanent haze.

Maillard reactions come back into play during the boil. The flavor changes are often attributed to caramelization, but this is a misnomer. Caramelization does not actually occur during the boil, even at gravities of 1.100, because the minimum temperature for caramelization of fructose is 230° F (110° C), and most other malt sugars require 320° F (160° C). Maillard reactions occur at a variety of temperatures and produce a bouquet of different flavors from the various amino acids and sugars created in the mash. These flavors can be fruity, nutty, raisiny or caramel-like. Maillard reactions also produce the brown melanoidin compounds that darken the beer and generate spectacular orange and red highlights.

Finally, a vigorous boil helps to drive off the chemical precursors of dimethyl sulfide, an off-flavor similar to cooked corn or vegetables that is most prevalent in beers made from low-kilned malts like pilsner lager malt and pale ale malt. A minimum boil time of 60 minutes is recommended to prevent dimethyl sulfide from being a problem in pale ales and lagers. Malt extract-based beers have fewer problems with DMS than all-grain beers due to the amount of volatilization experienced during dehydration.

Pitching Rate

The yeast pitching rate also affects the aroma/flavor character of the beer. The yeast reproduce rapidly early in the fermentation cycle, producing more fermentation byproducts than at any other time. A low pitching rate causes more total cell growth, more amino acid synthesis, and generally more esters (fruity flavors and aromas), diacetyl precursors (acetoxy acids) and fusel alcohols (solvent-like). Lower pitching rates tend to produce more aromatics and esters than

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higher pitching rates. High pitching rates mean less total cell growth and generally fewer esters.

However, high pitching rates tend to promote acetaldehyde in the beer. Acetaldehyde is a green-apple-like flavor that is produced early in the fermentation cycle as part of the ethanol production process and is reduced later. It is typically caused by rapid fermentation due to warm temperatures (10° F over nominal), or by over-pitching and under-aeration. It is reduced by conditions that favor the conditioning processes such as warmer lagering temperatures (40-45° F), keeping the beer on the yeast longer, and keeping the yeast suspended. In addition, a less-flocculant yeast strain will allow more time for acetaldehyde reduction.

The fusel alcohols are not reduced by the yeast and will affect the final flavor of the beer, making it seem hot, harsh or solvent-like. While a few fusel alcohols can be esterified, it is a minor path and not a viable means of fusel reduction. Fruity esters are formed by the yeast by combining alcohol and a fatty acid. Fusel alcohol levels are increased by warmer temperatures, excessive aeration and excessive amino acids, or by under-aeration and a lack of amino acids.

Fermentation Temperature

Fermentation temperature, like the tempo set by the conductor, is one of the most important controls a brewer can exercise in crafting a beer. The fermentation temperature can have a big impact on the beer's flavor. Yeast activity and character are highly dependent on temperature. Yeast produce more esters, acetaldehyde and fusel alcohols when stressed. That same temperature/yeast activity level will determine how well the yeast condition the beer and clean up the acetaldehyde and diacetyl byproducts.

Diacetyl is not actually produced by the yeast. The yeast excrete diacetyl precursors throughout fermentation, and these break down chemically into diacetyl, independent of the yeast. Warm temperatures and the presence of oxygen promote this reaction. The yeast absorb and remove the diacetyl as part of the fermenta-

Mybock

Partial Mash Recipe

Ingredients

for 5 U.S. gallons (19 liters)

1.0 lb	(0.45 kg) Munich malt
1.0 lb	(0.45 kg) Pilsner malt
1.0 lb	(0.45 kg) Aromatic malt
3.3 lb	(1.49 kg) liquid wheat malt extract
4.0 lb	(1.81 kg) light dry malt extract
1.0 oz	(28 g) Magnum Hops (12% alpha acid) 30 min.
2-3	Activator packs Wyeast 2633 Octoberfest Lager Blend BG for 3.3 gallons

Original Target Gravity: 1.060

IBUs: 29

Directions

Conduct a mini-mash in a 3-gallon (11.35 L) stock pot using a 5-gallon (18.92 L) nylon mesh paint strainer bag from the hardware/paint store. Crush the grain and put it in the mesh bag. Heat 6 qt (5.68 L) water to 165°F (74°C) (ratio of 2.0 qt/lb or 4.18 L/kg), and immerse the grain bag. Make sure all the grain is thoroughly wetted quickly and check the temperature. The mash temperature of the grain and water should now be about 150-155°F (66-68°C). Let mash sit for a half hour. Add heat from the stove while stirring to get the temperature up to 155°F (68°C). Let mash sit for another half hour. Place 2 gallons (7.57 L) of water in a 5-gallon (18.92 L) boiling pot and heat to 165° F (74° C). Lift bag out of the first pot and let it drain for a minute before transferring to the other pot. Swirl the bag in the pot to rewet the grain and let it sit for 5 minutes. Lift the grain bag, drain and discard. Add the wort from the first pot and the 3.3 lb (1.49 kg) of liquid wheat malt extract to the second pot, and begin your boil. Wait for the hot break to occur, then add the hops. Boil for 30 minutes. Add the remaining 4 lb (1.81 kg) of dry malt extract during the last 10 minutes of the boil. Stir to prevent scorching. Chill the wort and dilute in the fermenter to 5 gallons (19 L). Pitch 2-3 Wyeast 2633 Activator packs for a good pitching rate, and aerate well.

tation cycle. The ability of the yeast to remove diacetyl is about 10 times the creation rate, but in the case of lagers, the yeast activity decreases as the temperature is lowered toward the end of fermentation, and cleanup can be a problem. The result is the classic diacetyl artificial butter off-flavor. To remove any diacetyl that may be present after primary fermentation, a diacetyl rest is recommended. This rest at the end of a lager primary fermentation consists of raising the temperature of the beer to 55–60° F (12–16° C) for 24 to 48 hours before cooling it down for the lagering period. This makes the yeast more active and allows them to eat up the diacetyl before downshifting into lagering mode. Be careful to minimize oxygen contact during racking because this will generate still more diacetyl. Some yeast strains produce fewer diacetyl precursors than others; a diacetyl rest is needed only if the pitching or fermentation conditions warrant it.

By brewing a beer with attention to the details of the brewing process, we can craft and shape a beer to an ideal we hold in our minds. We can choose different specialty malts to emphasize particular kinds of malt flavor, or color. We can choose a mash schedule to give the beer more body, or more fermentability, and we can choose a yeast strain and fermentation environment that shapes the flavors and balance. Beer is music for the mouth.

How do I brew thee?

I brew thee for color, for the play of light, to capture the sun

I brew thee for aroma, the smell of home's hearth, and woodland heather

I brew thee for flavor, the warmth of the malt, the bitter kiss of the hop.

I brew thee for the delight of everyday, and for the delight of one.

John Palmer is author of *How to Brew*. As an engineer, he is drawn to the processes of brewing and tries to shape them into the best practices that allow new brewers to obtain consistent, high quality results. His favorite beers are American Amber Ale, American Wheat, Robust Porter, Flanders Red, Flanders Brown, Gueuze and Vienna.



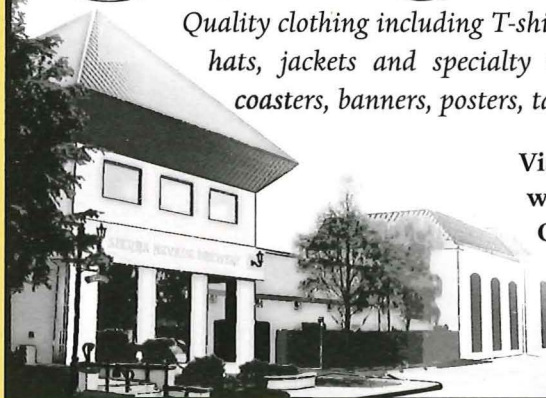
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Cherry Dubbel 🎵

Partial Mash Recipe

Ingredients

for 5 U.S. gallons (19 L)

1.0 lb	(0.45 kg) Munich malt
1.0 lb	(0.45 kg) Pilsner malt
1.0 lb	(0.45 kg) Aromatic malt
3.3 lb	(1.49 kg) liquid Light malt extract
3.3 lb	(1.49 kg) liquid Amber malt extract
12 fl oz	(0.35 L) Belgian Dark Candi Syrup
12 fl oz	(0.35 L) Traverse City Cherry Juice Concentrate
1.0 oz	(28 g) Fuggle Hops (5% alpha acid) 60 min.
2-3 tubes	Whitelabs WLP500 Trappist Ale Yeast

Original Target Gravity: 1.078

IBUs: 16

Directions

Conduct a mini-mash in a 3-gallon (11.35 L) stock pot using a 5-gallon (18.92 L) nylon mesh paint strainer bag from the hardware/paint store. Crush the grain and put it in the mesh bag. Heat 6 qt (5.68 L) water to 165° F (74° C) (ratio of 2.0 qt/lb or 4.18 L/kg), and immerse the grain bag. Make sure all the grain is thoroughly wetted quickly and check the temperature. The mash temperature of the grain and water should now be about 150–155° F (66–68° C). Let mash sit for a half hour. Add heat while stirring to get the temperature up to 155° F (68° C). Let mash sit for another half hour. Place 2 gallons (7.57 L) water in a 5-gallon (18.92 L) boiling pot and heat to 165°F (74°C). Lift bag out of the first pot and let it drain for a minute before transferring to the other pot. Swirl the bag in the pot to rewet the grain and let it sit for 5 minutes. Lift the grain bag, drain and discard. Add the wort from the first pot and the 3.3 lbs (1.49 kg) of liquid Light malt extract to the second pot, and begin your boil. Wait for the hot break to occur; then add the hops. Boil for 60 minutes. Add the remaining 3.3 lbs (1.49 kg) of liquid Amber malt extract and the dark candi syrup during the last 10 minutes of the boil. Stir to prevent scorching. Chill the wort and dilute in the fermenter to 5 gallons. Pitch 2-3 Whitelabs WLP500 tubes for a good pitching rate, and aerate well. Add the cherry juice concentrate after the third or fourth day of fermentation when activity has slowed.

SAME YEAST, DIFFERENT *flavor*

HOW CHANGING BREWING
CONDITIONS CAN IMPACT
YOUR YEAST



ops. malt, water and yeast. All contribute to the overall quality and flavor of a finished beer, but here we address the most easily influenced ingredient—yeast.

It is fairly common knowledge that different yeast strains will produce varying flavor profiles with the same wort, but the same can also be true for the same yeast. The brewing conditions to which we subject our yeast can greatly alter the way that yeast performs, giving us very distinct flavor contributions from the same strain.

Temperature and original wort gravity are factors that are easily under the brewer's control. Taking this into consideration, I decided to perform a series of fermentation trials to validate the idea that varying these two components can change yeast performance and flavor production.

YEAST METABOLISM AND FLAVOR CONTRIBUTION

Saccharomyces cerevisiae, aka brewer's yeast, is a unique microorganism in that it can be metabolically active in both the aerobic and anaerobic state. During beer fermentation, the yeast cell undergoes many biological processes that can affect the outcome of a beer. Let's begin with a quick recap of the yeast metabolic pathway.

The yeast begins in the lag phase, where each cell can assess its environment and acclimate itself to wort conditions. The cell senses the amounts of sugars and nutrients present in the wort and signals the activation of several enzymes that will later help to break down saccharides and proteins into smaller, usable components. This is followed by the log phase where lipid and protein production are encouraged for cell growth. The cell then enters glycolysis (a series of reactions), where glucose, maltose and maltotriose are used to produce ethanol and CO₂ in the absence of oxygen. The stationary phase begins when there are little fermentable sugars left. Yeast populations remain constant, alcohol levels begin to inhibit yeast performance, and cells begin to flocculate.





BY NEVA PARKER

During the formation of ethanol and carbon dioxide, the yeast cell also produces many byproducts that make a major contribution to flavor and aroma. The primary compounds of interest are acetaldehyde, n-propanol (alcoholic, harsh), iso-amyl alcohol (alcoholic, vinous), ethyl acetate (solvent, nail polish remover), iso-

amyl acetate (fruity, banana) and diacetyl (buttery). Acetaldehyde is an intermediate in ethanol formation, but this compound usually disappears during maturation because it reacts with sulfur compounds in the beer to produce something flavorless. When found in beer, it has a characteristic green apple or grassy aroma in

young beer and can be a desirable flavor in some lagers.

The biosynthesis of amino acids from nitrogen (free amino nitrogen) in the wort is one of the largest contributors to the formation of these flavor-active compounds. The amino acids leucine, isoleucine, and phenylalanine can be converted to higher alcohols, predominantly iso-amyl alcohol and n-propanol in beer. These alcohols contribute to the harsh alcoholic, vinous character and can be typical in many high-gravity beers such as barleywines. Reaction of these higher, or fusel, alcohols with other metabolic intermediates (acids) results in the production of iso-amyl acetate, ethyl acetate and other trace ester compounds.

GENERALLY, A VARIABLE THAT CAUSES AN INCREASE IN CELL GROWTH TRIGGERS AN INCREASE IN METABOLIC ACTIVITY. IN THESE TRIALS, I FOUND THAT A RISE IN BOTH TEMPERATURE AND ORIGINAL GRAVITY RESULTED IN MORE CELL MASS AND, CONSEQUENTLY, MORE FUSEL ALCOHOLS AND ESTERS IN THE FINISHED BEER.

Ethyl acetate is the most common found in beer, producing a solvent or nail polish remover quality in large amounts. Iso-amyl acetate, when present and detectable, is the larger flavor contributor, giving beer pronounced fruitiness even in small quantities. Most frequently, this compound is associated with banana, a characteristic in German wheat beers and some Belgian ales.

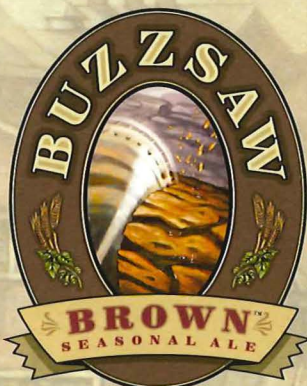
Another common product is diacetyl (or vicinal diketone—VDK), which is produced as an intermediate in amino acid synthesis. The compound's precursors

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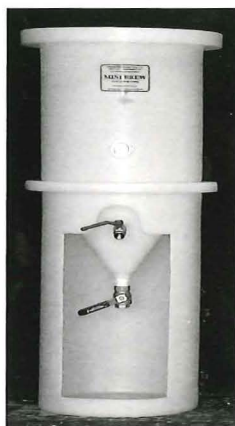
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leave the yeast cell, form diacetyl and are taken up again by the cell and reduced to a flavorless compound. Most beer consumers are quite sensitive to diacetyl so you have probably easily recognized the distinct buttered popcorn flavor and aroma in these beers.

EXPERIMENTAL DESIGN

This experiment was designed to demonstrate that factors such as starting gravity and fermentation temperature can affect the finished beer. I focused on the flavor-active compounds, propanol, iso-amyl alcohol, ethyl acetate, iso-amyl acetate, and diacetyl because of their common presence and low threshold levels in beer.

Three different White Labs yeast strains were used for each trial: California Ale Yeast WLP001, Trappist Ale Yeast WLP500, and

German Lager Yeast WLP830. The wort was made from an all-grain batch and beer was fermented in temperature-controlled 7.1-gallon conical fermenters. In each fermentation trial, pitching rate, nutrition additions and aeration were kept constant.

In the trials where the fermentation temperature was the variable, the two ale strains were fermented at 68° F and 75° F. The lager was fermented at 55° F and 68° F, where the lower temperature remains within the normal fermentation range for this strain. All three strains fermented at a starting gravity of 1.044. With the different gravity trials, each yeast strain underwent fermentation in wort with starting gravity of 1.030 (low gravity), 1.044 (normal gravity) and 1.070 (high gravity). The temperatures remained constant for these fermentations, at 68° F for the ales and 55° F for the lager.

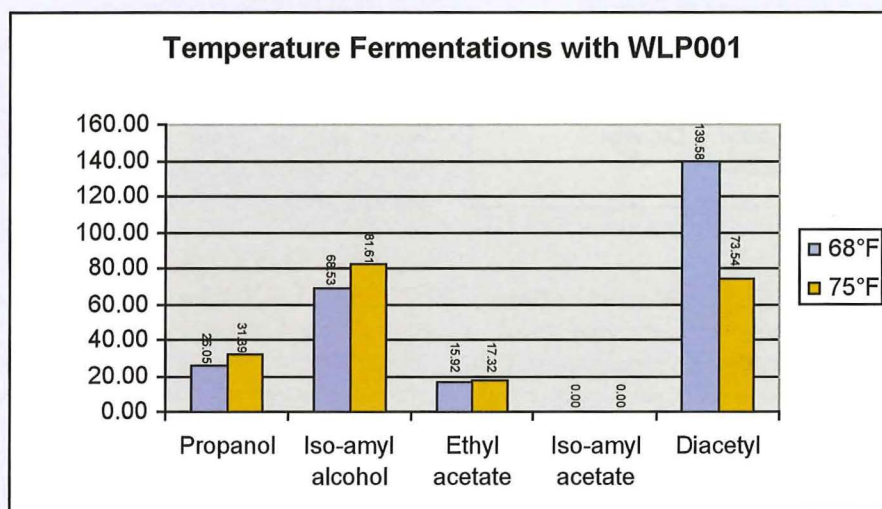


FIGURE 2-A

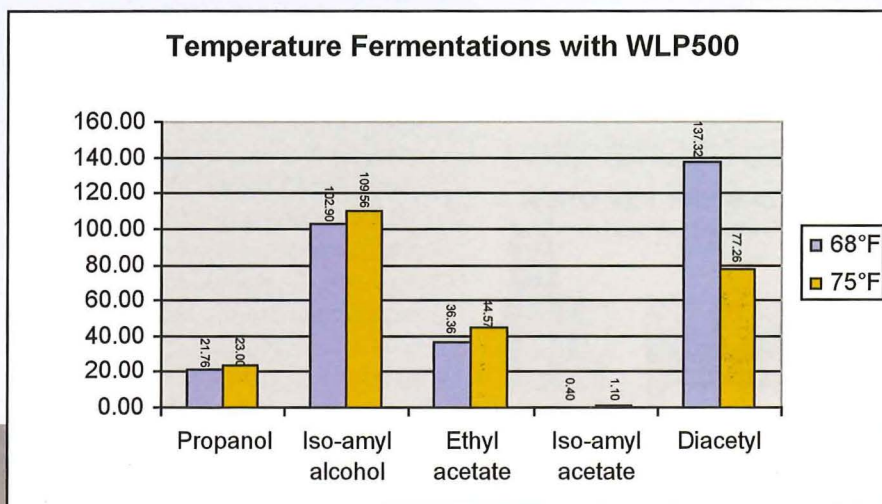
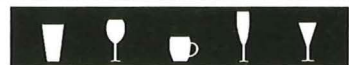


FIGURE 2-B



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FIGURE 1: GAS CHROMATOGRAPH DETECTION LIMITS, LEVELS FOUND IN BEER AND FLAVOR THRESHOLD LEVELS

Flavor Compound	GC Detection Limit (mg/L)	Typical Level in Beer (mg/L)	Flavor Threshold (mg/L)
n-Propanol	1-1000	3-16	600-800
Iso-amyl Alcohol	10-100	50	70
Ethyl Acetate	10-100	10-50	30-50
Iso-amyl Acetate	1-10	0.5-3	1-2
Diacetyl	0.05-0.8	0.01-0.6	0.08

Temperature Fermentations with WLP830

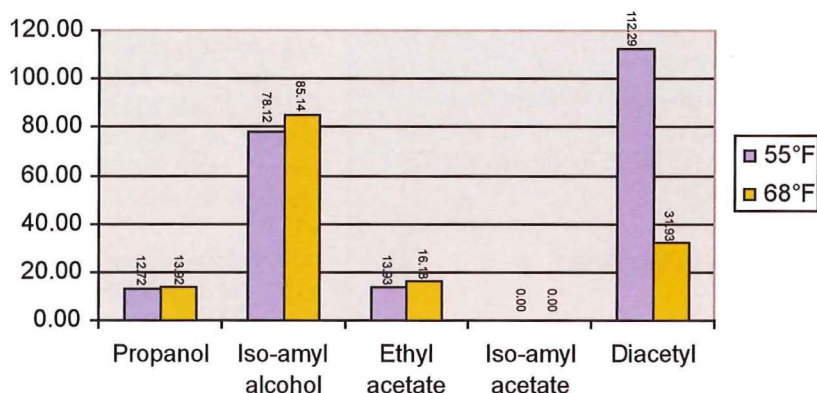


FIGURE 2-C

Samples were obtained every 12 hours after the beginning of active fermentation to monitor attenuation and cell growth. At the completion of fermentation, all beers were tested to insure microbiological sta-

bility (absence of wild yeast or bacterial contaminants) and analyzed using a Perkin Elmer Gas Chromatograph (GC) to measure the levels of volatile flavor compounds produced by the yeast during fer-

mentation. A panel of tasters, with varying degrees of sensory experience, was also asked to sample each of the beers and describe the flavor profile in an attempt to match the detection of the compounds using GC with the perception of beer taste.

Some of these flavor compounds are detectable by most beer drinkers at very low levels in the beer, while some must be present in larger amounts to affect the palate. Figure 1 presents the typical GC detection limits, levels typically found in beers, and the flavor threshold levels (level of compound needed for human perception) in beer.

KNOWN EFFECTS OF TEMPERATURE & ORIGINAL GRAVITY CHANGES

The metabolic flavor-active compounds produced by brewers yeast can be affected by many things: wort composition, aeration, wort gravity and various fermentation conditions. Among these are fermentation temperature and original gravity of the wort.

First let's address the issue of fermentation temperature. A single yeast cell is microscopic, so even a slight change in brewing conditions, such as temperature, can greatly impact the cell. Temperature control can be one of the brewer's most difficult challenges, and yet one of the most important to produce good quality beer. Higher temperatures enhance the metabolic activity of yeast and cause a rapid increase in cell growth. As a result, more flavor-active byproducts are released, increasing the levels of fusel alcohols and esters in the beer. Warmer temperatures toward the end of fermentation also work to promote yeast uptake of diacetyl.

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Traditionally, lagers undergo a diacetyl rest where the temperature of the fermenter is raised a few degrees to reduce these levels.

The change in original wort gravity also affects yeast cell metabolism. Higher concentrations of sugar in the wort subject cells to more osmotic stress. This causes the cell to shrink as it attempts to adjust to the pressure exerted on its cell wall, resulting in a delay in the start of fermentation. High-gravity beers also exhibit higher alcohol levels, which eventually become toxic to yeast, inhibiting activity. With relation to production of flavor compounds, high-gravity worts also contain increased amounts of utilizable nitrogen. These free nitrogen groups are then used by the cell to form amino acids, the building blocks for such cell components as lipids for cell wall, proteins and nucleic acids (genetic structures). In high amounts, these amino acids are degraded to form fusel alcohols, which in turn can be converted to ester compounds.

MY FINDINGS

Generally, a variable that causes an increase in cell growth triggers an increase in metabolic activity. In these trials, I found that a rise in both temperature and original gravity resulted in more cell mass and, consequently, more fusel alcohols and esters in the finished beer. Although starting gravity did not seem to have an impact on the diacetyl levels (data not shown), temperature did play a major role.

The data I collected from the temperature trials follow this trend. Figures 2A-C summarize the levels of the flavor compounds found in each beer with altered temperatures. Since both WLP001 and WLP830 are low ester-producing strains, the iso-amyl acetate levels in these fermentations were lower than the detectable limit for this compound. WLP500, a Trappist strain with high ester character, showed significant levels of both esters. In each case, the increase in fermentation temperature caused an increase in the fusels and ester compounds. In all of the beers fermented at the higher temperature, tasters described noticeable fruitiness and solvent notes, as well as an alcoholic aftertaste (Figure 4). The taste perceptions are most

likely due to the higher levels of both esters and fusel alcohols in these beers.

With WLP001 and WLP830 (low ester producers), the beers fermented at the

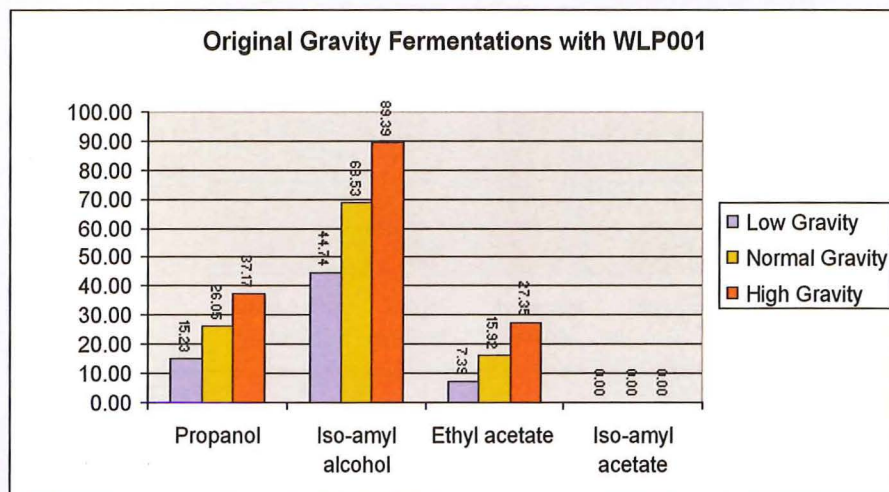


FIGURE 3-A

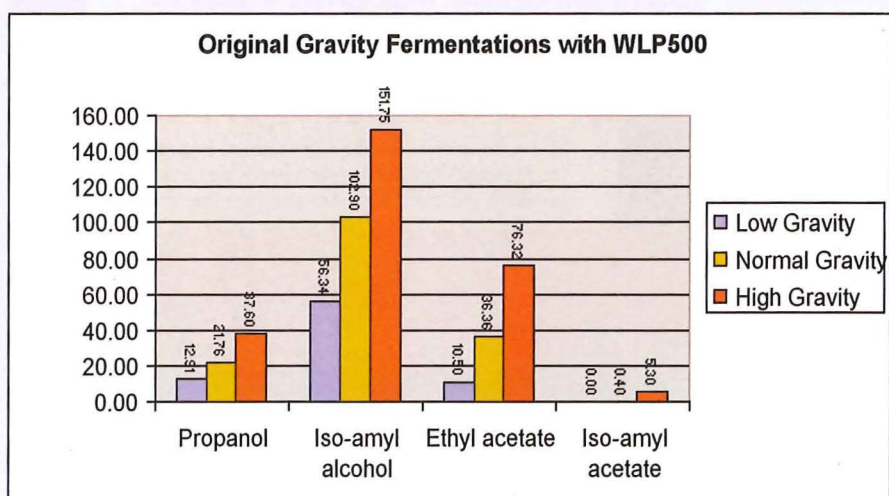


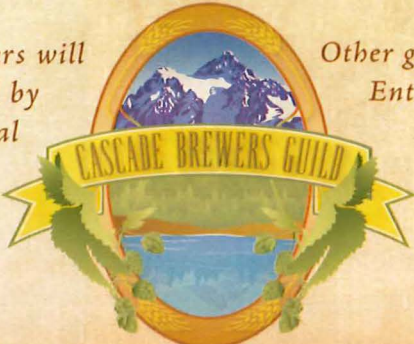
FIGURE 3-B

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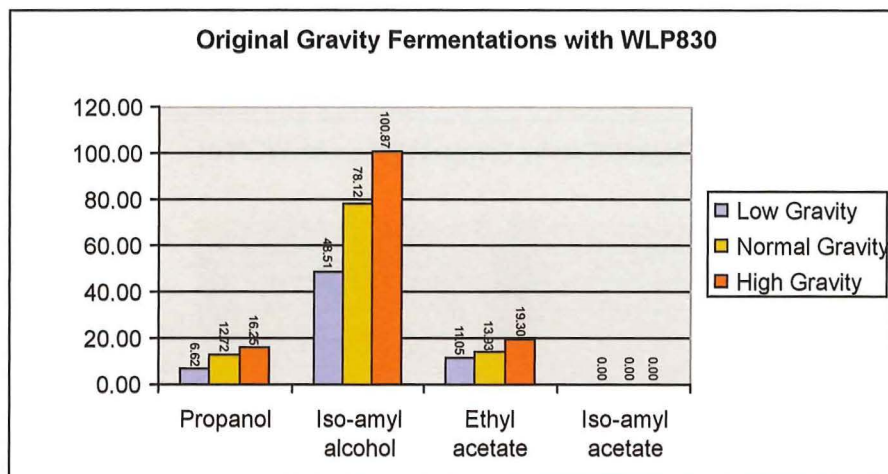


FIGURE 3-C

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lower temperature produced clean tasting, malty beers with no fruit. WLP500 displayed significant fruitiness, common for this strain, but at a more noticeable level in the higher temperature fermentation. With all three strains, an increase in temperature worked to decrease the levels of diacetyl in the finished beers. WLP830 at 55° F had a slightly buttery taste, most likely due to low fermentation temperature and no diacetyl rest. Neither of the ale yeasts had noticeable buttery flavors, even though GC levels were quite high. This is probably best explained by the presence of other flavor compounds produced by the two ale strains, making the diacetyl less noticeable.

In the gravity trial, again, WLP001 and WLP830 showed no detectable levels of iso-amyl acetate, while WLP500 showed significant levels. However, ethyl acetate (more common in beer) and both fusel alcohols showed an increase with increasing gravity. With elevated wort sugar concentrations, more substrates are available for the yeast cell. It can then use the substrate intermediates and convert them to secondary products that contribute to the sensory palate of the beer. Specifically, the intermediates in this process result in higher levels of both fusel alcohols and esters, as displayed in Figures 3A-C. Again, the lager had a slight buttery character with all gravity trials because of the cool fermentation temperatures, while both ales did not display this characteristic (Figure 4). Confirming the assumption that original gravity affects flavor outcome, the higher gravity trials produced noticeably fruitier beers than the lower gravity trials. According to the descriptions by the tasting panel, both WLP001 and WLP830 had slightly fruity characteristics, while the normal and low gravity trials were clean with no fruitiness. WLP500 had a very strong banana and other fruit character in the high gravity trials, with decreasing intensity in the normal and low gravity beers. Both ales also had slight alcohol or solvent flavors in high gravity fermentations, and WLP500 also had some solvent in the normal gravity fermentation.

CONTROL OF FLAVOR COMPOUNDS

These results demonstrate that changes in these two brewing conditions can truly influence the flavor profile of your beer. This change is not only in terms of scientific measurements, but it is also supported by a panel of tasters. I was rather surprised to find that, according to the GC results, varying the starting gravity has a more significant bearing on flavor production than changing the fermentation temperatures. However, results from the tastings showed that alterations in both are equally perceptible.

This information can be extremely valuable to any brewer. It gives us the opportunity to decide what characteristics are important and fine-tune the fermentation to give desired flavor profiles. With these ideas, there is a great deal of room for experimentation. Here we see that WLP001 is still predominantly neutral in flavor characteristics while a Trappist strain, WLP500, is predominantly fruity. Even a clean lager strain like WLP830 can produce some fruity flavors when conditions are altered. This can be advantageous in a biere de garde, for example, a French farmhouse ale that is traditionally lagered. The possibilities in this sphere can be limitless if you are as eager as I am to invest the time and resources to embark on more of these fermentations.

Fermentation temperature and original gravity play a major role in yeast flavor production, although many other variables can affect this—nutrients, aeration, amount of glucose versus maltose and other sugars, pitching rate, yeast strain. However, these are two factors that a brewer can easily manipulate to fit their tastes or particular beer styles. Above all, it is important to remember that these cells are microscopic and small changes in fermentation conditions can effect large changes in the final product.

Neva Parker is the laboratory manager for White Labs in San Diego, Calif. She has a degree in Microbiology from Gonzaga University and enjoys beer, brewing and cooking.

FIGURE 4: SENSORY DESCRIPTIONS BY TASTING PANEL

Beer	Sensory Descriptors
WLP001 – High Gravity (68° F)	Slightly fruity, slight alcohol, malty, clean
WLP001 – Normal Gravity (68° F)	Clean and malty
WLP001 – Low Gravity (68° F)	Yeasty, grainy, clean
WLP001 – (Normal Gravity) 68° F	Clean and malty
WLP001 – (Normal Gravity) 75° F	Slight banana & fruit, some alcohol & solvent
Beer	Sensory Descriptors
WLP500 – High Gravity (68° F)	Strong banana & other fruit, noticeable solvent
WLP500 – Normal Gravity (68° F)	Noticeable banana & other fruit, slight solvent
WLP500 – Low Gravity (68° F)	Banana, slightly solvent
WLP500 – (Normal Gravity) 68° F	Noticeable banana & other fruit, slight solvent
WLP500 – (Normal Gravity) 75° F	Strong banana & fruit, some alcohol & solvent
Beer	Sensory Descriptors
WLP830 – High Gravity (55° F)	Slightly fruity, buttery
WLP830 – Normal Gravity (55° F)	No fruitiness, clean, slightly buttery
WLP830 – Low Gravity (55° F)	No fruitiness, slightly buttery
WLP830 – (Normal Gravity) 55° F	No fruitiness, clean, slightly buttery
WLP830 – (Normal Gravity) 68° F	Slightly fruity, some alcohol & solvent



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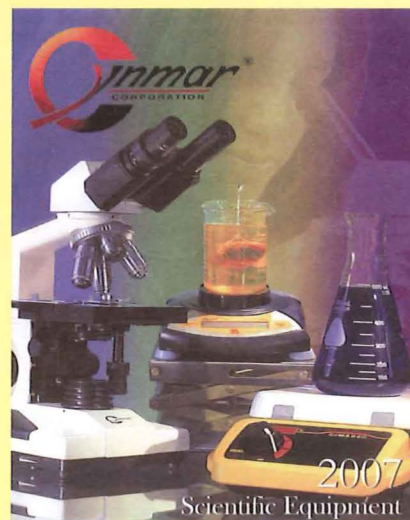
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What Color Is Your Beer?

By Tom Schmidlin





When someone asks you to describe a stout, the first thing you mention will probably not be the aroma of roasted grains, the taste of the bittering hops, or the fullness of the body. No, the first thing you are likely to mention is its color—it's a dark beer. You might talk about the different levels of color that are acceptable, maybe mention that some can be a dark brown while others are jet black and everything in between. But what it really comes down to is that this style of beer is defined, at least partially, by its color. All beers are, whether they are a light American lager or a Russian Imperial stout.

The color of the beer we drink comes from a wide variety of sources. These include everything from mash conditions to wort boiling times, from the yeast strain used to care in packaging. Mostly, however, the color comes from the grains and adjuncts used. Grain color is specified as degrees Lovibond, or °L. Many attempts have been made to allow brewers to equate the color of the finished beer to the ingredients used, whether by percentage of the grist, percentage of the extract or some other method, but these formulas are not very accurate in practice.

The American Society of Brewing Chemists (ASBC) has defined a method for determining the color of beer involving a spectrophotometer, a fairly expensive piece of equipment that is not available to everyone. You could also send a sample of your beer to a variety of testing facilities and they'll determine the color in their lab, for a fee. But there has to be an easier way, right? There is.

George and Laurie Fix outlined just such a method in Appendix B of their book *Vienna, Märzen, Oktoberfest*. The method involves diluting a known reference sample, Michelob Classic Dark, with water until it matches your unknown sample. Then you simply look up the value on the chart in the book, and voilà, you know what color your beer is.

There are two problems with this method. First, the reference beer is no longer available. The second and bigger problem is that the chart is wrong.

You may have heard it before: "Beer does not obey Beer's Law." Except it does. I first noticed this when doing some spectrophotometer tests on some beers. The results indicated that one beer was lighter than another, when it was blatantly obvious to me that the opposite was true. What was the source of the error?

Beer Color and SRM

First, the basics. Beer color is reported in SRM, which stands for the Standard

Reference Method. The sample of beer is placed in a 0.5-inch square container called a cuvette, and the absorbance of the beer is measured with a light beam at 430 nm wavelength, which is in the violet region of the spectrum. The absorbance is then multiplied by 10 to get the SRM. The equation is simply:

$$SRM = A_{430} * 10$$

(SRM using a 0.5 inch cuvette)

I was using a 1 cm cuvette, which is more standard today than when the method was developed, so the new equation corrects for the new path length by multiplying by 1.27 because $1.27 * 1 \text{ cm} = 0.5 \text{ inches}$.

$$SRM = A_{430} * 10 * 1.27$$

(SRM using a 1 cm cuvette)

Using this calculation, I noticed that there was no problem with lighter beers, but when the spec reading got up around 3 or more then things got screwy. Interestingly, the manufacturer of this machine says the absorbance is accurate up to 3 . . . and dilutions of the samples below that level showed a linear increase in the absorbance up until that range. When I switched to using a 5mm cuvette instead of a 1cm cuvette, the problems cleared right up.

I turned to the Web and quickly realized that I was not the first to make this discovery, but it has not yet percolated into common knowledge among brewers. I can only surmise that the problems with the Fixes' data arose strictly from the limitations of their equipment, and I was able to recreate their chart quite easily with that knowledge in hand.

How do we correct the problems? Well, the first thing is to change the reference beer. I chose Guinness Draught cans as they are widely available and should be consistent in color. The second step is to redo the chart, or better yet, provide an equation that governs the color of your unknown beer in reference to the known color of Guinness. Finally, the method had to be tested to see if it was easy enough for most people to do, if the instructions were clear, and if the results were precise and accurate.

The Experiment


My first step was to test some beers myself. I acquired a selection of beers and followed my preliminary procedure, using a pipette to accurately measure the samples and dilutions in glass test tubes, and mixing well in between water additions with a vortexer. After visually determining the SRM this way, I measured samples on a spec. Many thanks to Bill Jenkins at Big Time Brewery and Alehouse for the donated samples of Prime Time Pale Ale (PTPA), Coal Creek Porter (CCP), and Fool's Progress Belgian Dubbel (FPBD). The results can be seen in Table 1.

From the table you can see that a comparison of undiluted Prime Time Pale Ale to a

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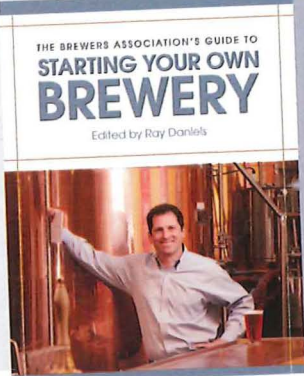
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Table 1.

Sample	Sample:Water	Guinness:Water
PTPA	4:0	1:3
FPBD	4:0	1:1
CCP	1:5.25	1:3

mixture of 1 part Guinness and 3 parts water gave a color match, however 1 part Coal Creek Porter was mixed with 5.25 parts water to match the 1:3 mixture of Guinness and water. So what is the SRM?

$$SRM_{unknown} = [(V_{unknown} + V_{water1}) / V_{unknown}] * [V_{Guinness} / (V_{Guinness} + V_{water2})] * SRM_{Guinness}$$

Since I had previously measured the Guinness SRM to be 52.0 (± 1.0), plugging in our numbers we get:

$$SRM_{PTPA} = [(4+0)/4] * [1/(1+3)] * 52.0 = 13.0 \text{ SRM}$$

$$SRM_{FPBD} = [(4+0)/4] * [1/(1+1)] * 52.0 = 26.0 \text{ SRM}$$

$$SRM_{CCP} = [(1+5.25)/1] * [1/(1+3)] * 52.0 = 81.25 \text{ SRM}$$

Now we can compare these numbers to what I got when I ran the samples on the spectrophotometer. The results are in Table 2. As you can see, this method provides accurate results in these cases when great care is taken in measuring. Note that in the case of the Coal Creek Porter (CCP), the sample had to be diluted 1:1 with water to bring it into a low enough range for the spectrophotometer to accurately measure.

Table 2.

Sample	SRM _{spec}	SRM _{dilution}
PTPA	13.1	13.0
FPBD	27.0	26.0
CCP 1:1	82.6	81.3

Now that the preliminary test was complete, it was time to test out the method on some people and see how well they were able to determine the color of sample beers. I recruited a few friends to help with the test (many thanks to Jim Lanning, Jeff Rea, Jerome Seipp and Matt Waldman) which required they purchase bottles of each of the beers we were testing and some



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Guinness Draught cans. They then followed my same preliminary procedure and provided me with their results (Table 3).

Note that Rogue's HazelNut Brown Nectar was measured on the spectrophotometer at nearly 53 SRM, while the dilution method yielded a result that is only 28 SRM. This is likely due to the hazelnut extract either absorbing or scattering light in the testing range, since a visual inspection shows that this beer is nowhere near as dark as Guinness.

Unfortunately, while the volunteers' measurements were accurate to a point they did not do as well as I'd hoped. This caused me to rewrite the procedure to hopefully improve the results. The biggest effect likely came from the measuring techniques used. While using a shot glass may be fine for mixing a gin and tonic, it is probably not accurate enough to get you dead on. That is not to say that you need to use something accurate to a microliter, but a graduated cylinder would be nice. Measuring larger volumes helps as well—a container that is accurate to 0.5 milliliters would introduce less error if you were measuring 100 milliliters at a time instead of 10. Finally, determine the color of all of your samples, *then* drink what is left of the beer.

The Method

This method is essentially the same as outlined in *Vienna, Märzen, Oktoberfest*. It requires good clean water (preferably distilled water), a blender to de-gas the beer before beginning, clean glasses of identical shape and size, and a measuring container of some sort. The more accurate the measurements you make, the more accurate your results will be. When comparing the two samples of beer, it is important to do so in front of a white background with a good light source, and to ignore the exact hue of the beer. Focus on the relative lightness/darkness of the samples instead.

For lighter unknown beers: Mix one part of your reference beer with one part of water. If the mixture is still darker than your unknown, repeat the previous step until they are close. At any time you may reduce the size of the water additions you are using, but it is critical that you care-

fully track how much water has been added to the known sample. When the two samples are as closely matched as you can make them, calculate the percentage of known sample that is in your dilution. For example, if you used 1 part Guinness and 4.5 parts water, your dilution would be $1 / (1 + 4.5) = 22\%$ Guinness. Since the SRM measurement of Guinness is 52 you simply multiply $52 * 0.22 = 11.6$ SRM, which is the color of your unknown beer.

For darker unknown beers: This is where it can get more complicated. It is difficult to compare two very dark beers and get an accurate reading, so begin by diluting the Guinness with four parts water. This should give you a reference sample of $(1 / (1 + 4)) * 52 = 13$ SRM. From there dilute your unknown beer as above, keeping careful track of how much water you have added. When your unknown dilution reaches the same apparent color as the diluted control sample, simply use the following equation to determine the color:

$$SRM_i = (V_i * SRM_i) / V_1$$

where V_i is the total volume of your unknown sample plus water, SRM_i is the color of the same sample (13 SRM in the example above) and V_1 is the volume of the unknown you diluted. So if you added one part of your unknown and nine parts water, the SRM of your unknown beer would be $10 * 13 / 1 = 130$ SRM.

Does it matter if you measure your beer to be 10 SRM and it's actually 12? Not usually. Like in all things homebrewing, use the equipment you have at hand. As long as you are consistent in your methods, this technique can help you fine-tune your recipes to get the color you want in your beer.

Tom Schmidlin is a biochemistry PhD student at the University of Washington. His interest in brewing and yeast has shaped his current career and will likely be a major part of any future endeavors. He is a member of the Cascade Brewers' Guild homebrew club and is currently fermenting a 100 percent rauchbier and a spruce-tip wit in his garage.

Table 3.

Sample	SRM _{dilution}	SRM _{spec}
Hale's Pale Ale	9.4.....	15.5
Elysian Immortal IPA	9.8.....	12.1
Maritime Flagship Red	17.0.....	23.2
Rogue HazelNut Brown Nectar.....	28.0.....	52.7*
Pike XXXXX Stout.....	164.3.....	191.7

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HOW TO BREW

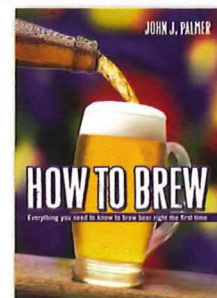
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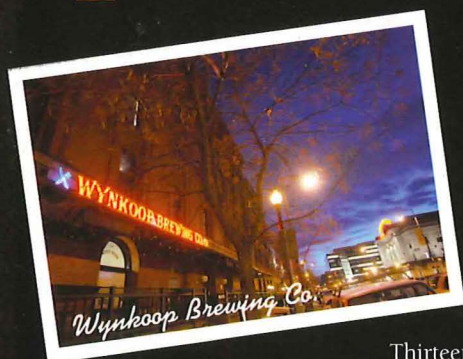
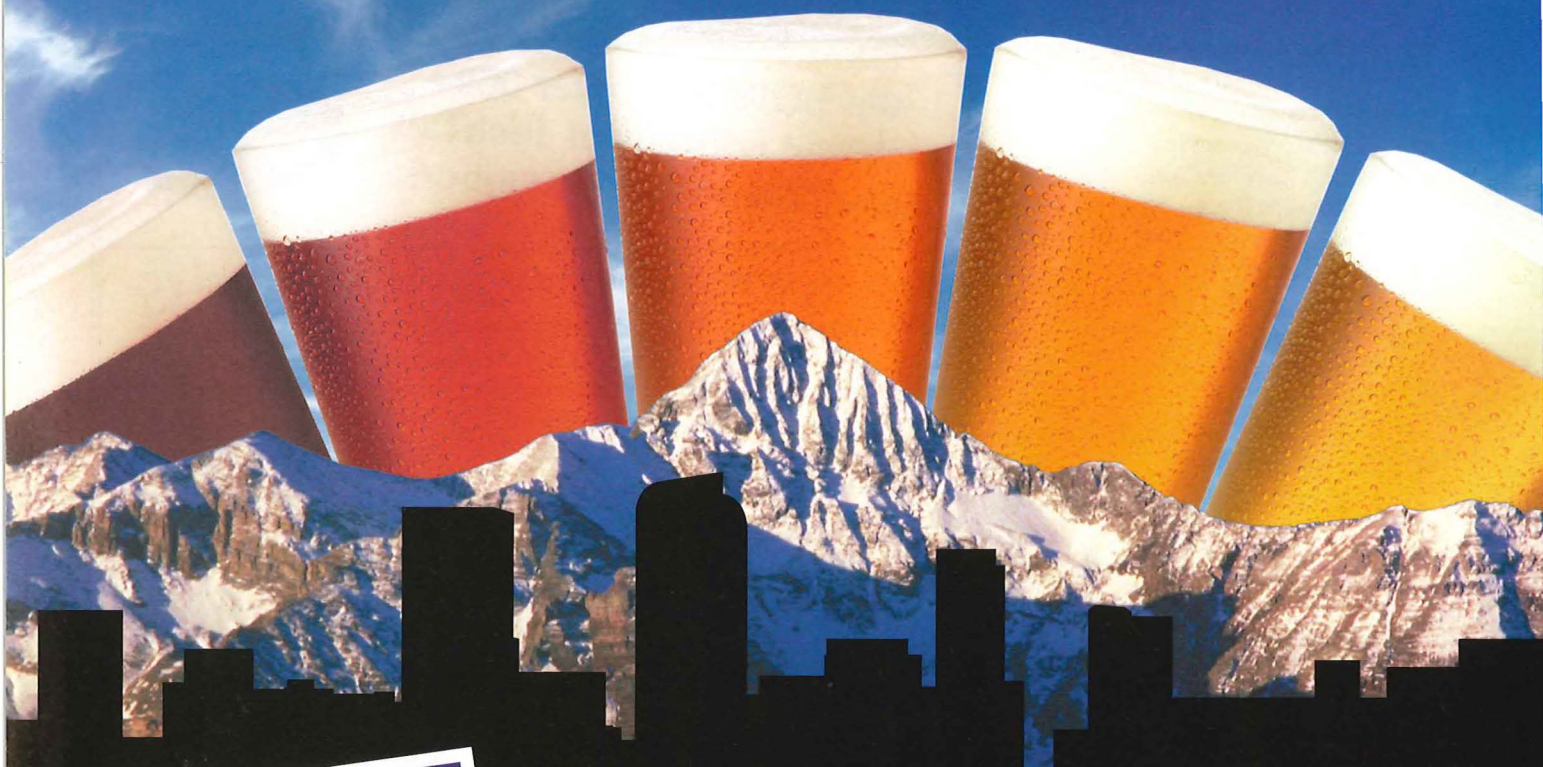
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ALES *with an* ALTITUDE: *Mile High City* Hosts Homebrewers

BY DAN RABIN



Thirteen years ago, when Denver last hosted the National Homebrewers Conference, the city had gained a reputation as one of the country's top beer towns. Though much has changed in Denver since that spirited gathering of '94, the city remains a mecca of American beer culture.

Come June 21-23, when hundreds of homebrewers descend on the Mile High City for the 2007 conference, they'll discover an energetic, fun-loving metropolis

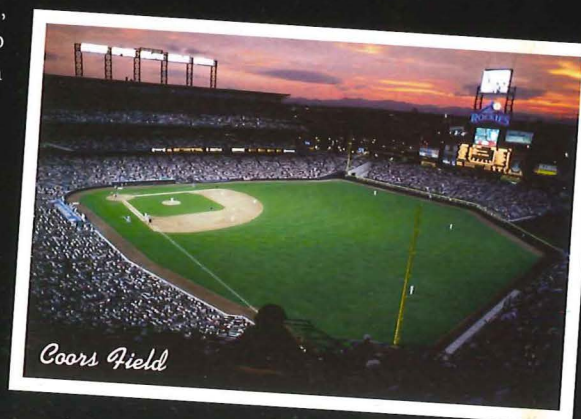
sporting an impressive collection of brewpubs, craft breweries and beer bars.

The evolution of Denver's infatuation with great beer dates back to 1988, when an entrepreneur and beer enthusiast named John Hickenlooper converted an historic building in the city's dodgy Lower Downtown quarter into Denver's first brewpub. Locals took to the pub's flavorful English-style ales, and other beer venues sprang up in LoDo like wildflowers in an alpine meadow.

The opening of the Wynkoop helped spark a neighborhood renewal that transformed the former warehouse area into a thriving nightlife district and epicenter of the city's burgeoning beer scene.

If you're coming to Denver for the conference, a trip to LoDo should have high priority on your Mile High itinerary. You can sign up for the Denver pre-conference pub crawl, or visit at your leisure on a self-guided tour.

Coors Field, located a few blocks from Wynkoop, includes the Sandlot brewpub, the country's first brewery-in-a-ballpark.





Former homebrewer Tom Hail, who brewed the commemorative beer for the 1994 conference, holds the reins as head brewer in the oft-decorated brewhouse. Hail has concocted a special brew to be unveiled at the conference.

Across the street, Breckenridge Brewery's Blake Street Pub is a popular stop for pre- and post- game libations. A block away, the Falling Rock Tap House is owned by former homebrewer Chris Black and his brother Steve. Boasting 69 draughts, an extensive international collection of bottled beers and a mantra of "no crap on tap," it's no wonder the popular watering hole has a reputation as one of the country's top beer bars. Falling Rock will host a brew-themed lunch as part of the pre-conference Denver pub tour.

Other beer-intensive businesses have become neighborhood fixtures including the Denver Chop House, the Great Divide Brewing Company and the Flying Dog Brewery. Flying Dog's president, Eric Warner, will be a featured speaker at the conference.

The People

Homebrewers have always been an integral part of the local beer culture. Concurrent with the proliferation of Colorado craft beer, a passionate homebrew community formed almost literally in the backyard of homebrew guru Charlie Papazian.

Homebrewers have provided local pubs not only with a loyal customer base, but in many cases with knowledgeable brewers eager to learn the ropes in busy

brewhouses. A number of these hobbyists-turned pros—including Hail and Warner—have become major players in the local beer scene.

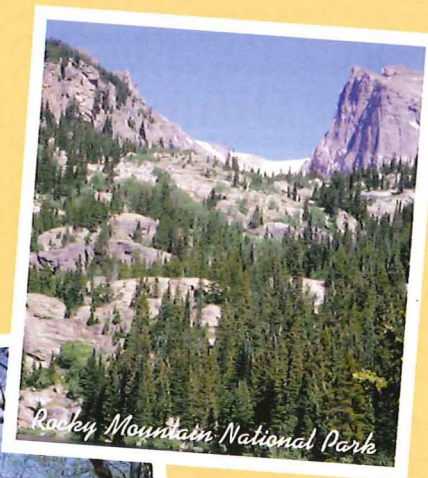
As in past years, local homebrewers have taken on the task of organizing the annual conference. Planning for the '07 version has been underway for many months by host clubs including Denver's Foam on the Range, Broomfield's Keg Ran Out Club, and Boulder's Hop Barley & the Alers. Also pitching in are members of Denver's Mile High Monks, Fort Collins' Liquid Poets and the High Plains Drafters from Cheyenne, Wyo.

Co-chairs of the organizing committee are Bob Kauffman and Jim Homer, both long-standing members of Hop Barley & the Alers. The dedicated duo has amassed an amazing record of National Homebrewers Conference attendance. While Kauffman has missed the annual event only once since 1994, Homer is the only person on the planet—aside from American Homebrewers Association founder Papazian—to have attended every National Homebrewers Conference since they began in 1979!

Diversions

There are several good reasons why you should arrive in Colorado well in advance of the conference's official Thursday kickoff. One is the fact that June is an excellent time to take in the state's many sights and flavors.

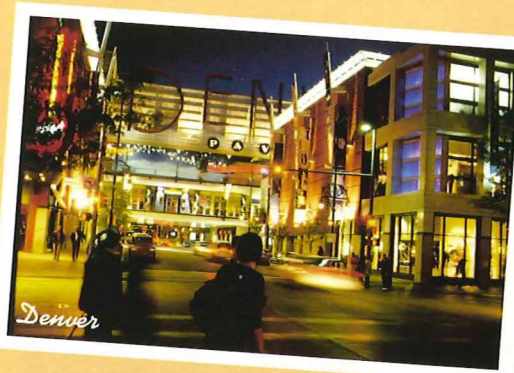
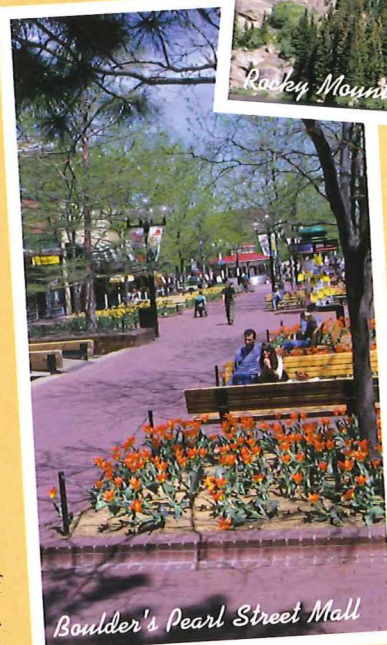
You can take a day trip to Rocky Mountain National Park and have a snowball fight at 12,000 feet, then be back in Denver in time for happy hour. Or you can head to Boulder, stroll the Pearl Street Mall, take a hike in the foothills, then have a meal at a



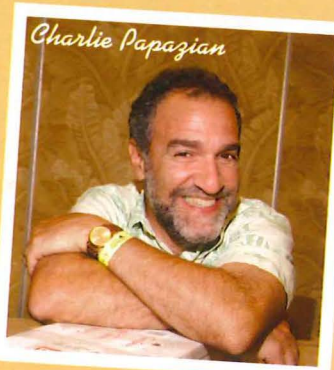
local brewpub or one of the city's nationally acclaimed eateries.

Within Denver, a plethora of shops, museums, theaters, restaurants, bike paths, parks, pubs and people-watching spots can fill many leisurely hours. But perhaps the most compelling reason to arrive early on your Colorado pil-

grimage is the extraordinary lineup of pre-conference festivities organizers have amassed for your entertainment.



On Tuesday, The Cheshire Cat, an atmospheric brewpub in nearby Arvada, will serve up a beer dinner as a conference appetizer. The meal will be hosted by Charlie Sturdavant, a pro brewer, homebrewer, meadmaker and wine-maker whose interests in several local pubs and breweries (he owns Golden's second-largest brewery, the Golden City Brewery) has hardly diminished his involvement in the local homebrew scene.



Homebrewing at Altitude COMMEMORATIVE BEERS

The AHA Big Brew celebration of National Homebrew Day includes some very special recipes this year: the 2007 AHA National Homebrewers Conference commemorative beers! Take this opportunity to see what you'll be sampling at the AHA Conference in Denver June 21-23—and, even better, bring some of your own to Denver to compare with the originals. See www.beertown.org for more on these recipes.

The first recipe is Griffin Spit IPA developed by Tony McCrimmon of Aurora, Colo. The name is a tribute to Tony's longtime brewing assistant, Griffin, a golden retriever. As Tony tells it, "A little more than a year ago my dog Griffin helped me with a recipe. For some reason, he decided to eat my freshly cracked grain from my grain bucket, and, of course, the grain on top was all the specialty grain and not the base grain."

McCrimmon continued, "Soon after, Griffin fell ill. (Not from the grain.) His final treat was what ended up being a large consumption of the IPA. He adjusted the recipe and he obviously approved. Because of this I decided to make this a perpetual beer. So a quart has always been added to batches just to make sure I am following his direction."

The second recipe is a Strong Belgian ale: Striking Gold, developed by Bob Kauffman, co-chair of the organizing committee for the National Homebrewers Conference. Bob's recipe involves a little guidance and a lot of leeway with the adjuncts and yeast. Bob encourages everyone who tries this recipe to be creative and make this recipe his or her own. It was brewed at the Cheshire Cat brewery in Arvada, Colo.

The third recipe is a Hailbrau Doppelbock provided by Tom Hail. This is a particularly special recipe tying in the last AHA Conference held in Denver, 1994's BrewStorm, for which Tom provided the commemorative beer recipe, a hefeweizen. Tom is now the brewmaster for the Sandlot Brewing Co., the microbrewery located at Coors Field, home of the Colorado Rockies baseball team.



On Wednesday, a stellar selection of engaging pub tours will let you savor some of the state's finest breweries and beer-centric communities. In addition to the aforementioned Denver tour, other planned

GRIFFIN SPIT IPA *by Tony McCrimmon*

All-Grain Recipe

Ingredients

for 5 U.S. gallons (19 liters)

9.0 lb	(4 kg) Pale Malt (two-row)
3.0 lb	(1.4 kg) Munich Malt
1.0 lb	(0.45 kg) Crystal 40L
0.5 lb	(0.22 kg) Cara-Pils Dextrine Malt
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (20 min.)
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (10 min.)
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (5 min.)
1.0 oz	(28 g) Summit Pellet Hops, 19.0% alpha acid (Dry Hop)
1 tsp.	Irish moss (15 min.)
	White Labs WLP002 English Ale Yeast or Wyeast 1968 London ESB Yeast

Anticipated Original Gravity: 1.073

Anticipated SRM: 10

Color Formula Used: Morey

Anticipated IBUs: 190.3

Hop IBU Formula Used: Daniels

Brewhouse Efficiency: 75%

Wort Boil Time: 90 minutes

Directions

Mash grains at 154° F (68° C) for one hour. Bring to 170° F (77° C) and sparge with 170° F (77° C) water. Collect enough wort (a little over 6 gallons or 22.7 liters) to end up with 5 gallons (19 liters) after a 90-minute boil. Add hops and Irish moss according to the recipe (note all bittering in this beer comes from late addition hops). After a 90-minute boil, chill to 66° F (19° C), rack to fermenter, pitch yeast and aerate well. Pitch two packages of yeast or a half-gallon starter. Ferment at 66-68° F (19-20° C) for two weeks, then rack to secondary with dry hops added. Age on hops three weeks before bottling or kegging.

Extract Recipe

Ingredients

for 5 U.S. gallons (19 liters)

8.5 lb	(3.7 kg) Light Liquid Malt Extract
2.0 lb	(0.9 kg) Amber Liquid Malt Extract
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (20 min.)
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (10 min.)
2.0 oz	(57 g) Summit Pellet Hops, 19.0% alpha acid (5 min.)
1.0 oz	(28 g) Summit Pellet Hops, 19.0% alpha acid (Dry Hop)
1 tsp.	Irish moss (15 min.)
	White Labs WLP002 English Ale Yeast or Wyeast 1968 London ESB Yeast

Directions

Stir extract into 2 gallons (7.6 liters) of warm water. Bring to a boil. Total boil time will be 35 minutes. Add hops and Irish moss according to the recipe (note all bittering in this beer comes from late addition hops). After completing the boil, rack to a fermenter with enough cold water to make 5 gallons. When temperature drops to 66° F (19° C), pitch two packages of yeast or a half-gallon starter and aerate well. Ferment at 66-68° F (19-20° C) for two weeks, then rack to secondary with dry hops added. Age on hops three weeks before bottling or kegging.

outings to choose from include bus trips to Golden, Boulder, Fort Collins and the mountain towns of Summit County.

The Golden tour will take you just west of Denver where you'll visit the town's two largest breweries (hint: one is Coors).

The Boulder tour features a stop at Colorado's first microbrewery, Boulder

Beer, in operation since 1979. You'll also experience the "can-do" attitude of Lyons' Oskar Blues, the bayou-themed brewpub that made it respectable to put craft beer in a can. Also on tap is a visit to Avery Brewing Company to sample their extensive lineup of over-the-top fermentations.

Among the stops on the tour of Fort Collins, the town *Money* magazine named

STRIKING GOLD BELGIAN STRONG ALE *By Bob Kauffman*

All-Grain Recipe

Ingredients

for 5 U.S. gallons (19 liters)

9.50 lb	(4.3 kg) Pilsner Malt
14.0 oz	(0.87 kg) Wheat Malt
7.0 oz	(0.19 kg) Cara-Pils Dextrine Malt
3.0 oz	(85 g) Aromatic Malt
1.33 lb	(0.3 kg) Cane Sugar (10 min.)
0.67 lb	(0.3 kg) Jaggery Sugar (30 min.)
1.75 oz	(50 g) Kent Goldings pellet hops, 4.75% alpha acid (60 min.)
1.0 oz	(28 g) Czech Saaz pellet hops, 3.50% alpha acid (5 min.)
	Blend of Wyeast 3787 Trappist High Gravity and Wyeast 1214 Belgian Ale Yeast or White Labs WLP570 Belgian Golden Ale and White Labs WLP500 Trappist Ale Yeast

Anticipated Original Gravity: 1.077

Anticipated SRM: 4.4

Color Formula Used: Morey

Anticipated IBUs: 31.0

Hop IBU Formula Used: Daniels

Brewhouse Efficiency: 70%

Wort Boil Time: 60 Minutes

Directions

Use a step mash with 30-minute steps at 142° F (61° C), 152° F (67° C), and 160° F (71° C). Mash out at 172° F (78° C) and sparge with 170° F (77° C) water. Collect enough wort (a little under 6 gallons or 22.7 liters) to end up with 5 gallons (19 liters) after a 60-minute boil. Bring to a boil and add hops and sugar according to the recipe. After a 60-minute boil, chill to 68° F (20° C), rack to fermenter, pitch yeast and aerate well. Pitch two vials of yeast, one of each kind, or a half-gallon starter of the blended yeast. Ferment at 73-75° F (23-24° C) for two weeks, then rack to secondary and ferment another two to four weeks before bottling or kegging.

Extract with Specialty Grains Recipe

Ingredients

for 5 U.S. gallons (19 liters)

6.0 lb	(2.7 kg) Extra light dry malt extract
0.5 lb	(0.23 kg) Liquid wheat malt extract
3.0 oz	(85 g) Aromatic malt
1.33 lb	(0.3 kg) Cane sugar (10 min.)
0.67 lb	(0.3 kg) Jaggery sugar (30 min.)
2.25 oz	(64 g) Kent Goldings pellet hops, 4.75% alpha acid (60 min.)
1.0 oz	(28 g) Czech Saaz pellet hops, 3.50% alpha acid (5 min.)
	Blend of Wyeast 3787 Trappist High Gravity and Wyeast 1214 Belgian Ale Yeast or White Labs WLP570 Belgian Golden Ale and White Labs WLP500 Trappist Ale Yeast

Directions

Steep grains in 1 quart (0.9 liter) of water at 150° F (66° C) for 30 minutes, raise temperature to 170° F (77° C) then strain and sparge with 1 quart (0.9 liter) of hot water. Add an additional 1.5 gallons (5.7 liters) of water then stir in extract and sugar and bring to a boil. Add hops and sugar according to the recipe. After a 60-minute boil, strain into a fermenter with enough cold water to make 5 gallons (19 liters). Pitch yeast when temperature drops to 68° F (13° C). Ferment at 73-75° F (23-24° C) for two weeks, then rack to secondary and ferment another two to four weeks before bottling or kegging.

Note: This recipe is wide open to experimentation. Try using different sugars, different yeasts or blends of yeasts, or different fermentation temperatures.

On the Summit County tour, you'll learn what "Brewing with Altitude" is really all about. Stops at Keystone, Breckenridge and other locations will combine a day of great beer with a taste of the spectacular high country. Chances are you'll come back convinced that beer is better when consumed in the shadows of majestic snow-capped peaks.

The Main Event

The three-day conference formally kicks off on June 21 at the Four Points by Sheraton Denver Southeast. Located in the Denver Tech Center, the host hotel sits within walking distance to the Southmoor light rail station, providing easy, car-free access to downtown Denver and other urban attractions.

A stellar lineup of speakers will be on hand to educate, entertain and quench your thirst for knowledge, no matter what your particular beer-themed passion.

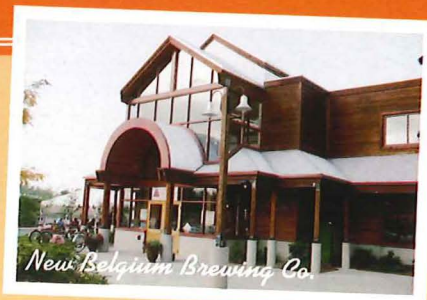
Among the authors who will share their expertise are John Palmer (*How to Brew*), Lucy Saunders (*Cooking with Beer, Grilling with Beer*) and Flying Dog's Warner (*German Wheat Beer and Kölsch*).

Brewmasters and brewery owners will be well-represented with presentations from Vinnie Cilurzo (Russian River Brewing Co.), Matt Brynildson (Firestone Walker Brewing Co.), Tony Simmons (Pagosa Brewing Co.), David Myers (Redstone Meadery) and Keith Villa (Coors Brewing Co.).

While most of us view homebrewing as a hobby, to some it's a business. Get the perspective from the supply side of homebrewing at presentations by Charlie Talley (Five Star Chemicals), Chris Graham (*Beer, Beer and More Beer*) and Byron Burch (*The Beverage People*).

Words of wisdom will also emanate from 2006 Beer Drinker of the Year and certified yeast freak Tom Schmidlin.

The conference's keynote speaker is Peter Bouckaert, brewmaster at New Belgium Brewing Co. and formerly of Belgium's Rodenbach brewery. An engaging orator with a unique perspective on beer and brewing, Bouckaert will



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surely inspire you—whether you're a seasoned brewer or just discovering the joys of making your own. (When asked

for a sneak preview of his talk, the cryptic Bouckaert disclosed only that it would involve "blue houses." Hmm...)

"Mining for Beer" is the theme of Pro Brewers Night. This mini beer festival will give you a chance to dig into beers from dozens of breweries, and pick the brains of their creators.

Club Night will be the time to roll out your party clothes, let down your hair and do what homebrewers do best: share quaffables and camaraderie with scores of other fun-loving beer fanatics.


Throughout the conference, you'll have access to the Hospitality Suite, an informal setting to relax, make new acquaintances or renew old ones, and sample a rotating selection of homebrews brought in by clubs from across the country.

The 2007 conference officially concludes with Saturday's Grand Banquet. Following the feast, the much-anticipated awards ceremony will recognize the country's top amateur brewers in the world's largest beer competition: The AHA National Homebrew Competition.

If you haven't been to Denver in a while, the city may surprise you with its new sophistication. But don't let outward appearances deceive you. Beer culture still surrounds the city like Belgian lace on a stemmed chalice.

Actually, Denver has seen one significant change that speaks volumes about the local vibe. That Hickenlooper fellow who opened the doors to great beer in Denver nearly two decades ago now holds a new title. Mayor Hickenlooper will address attendees at the welcoming toast of the 2007 National Homebrewers Conference.

It's sure to be a hopping good time.

Beer and travel writer Dan Rabin has been a member of Boulder's Hop Barley & the Alers homebrew club since 1991, won a gold medal in the 1994 AHA national homebrew competition and is organizing the Summit County Pub Crawl for the 2007 conference. For more information on the 2007 National Homebrewers Conference, visit www.beertown.org/events/hbc. 

HAILBRAU DOPPELBOCK *By Tom Hail*

All-Grain Recipe

Ingredients

for 5.5 U.S. gallons (21 liters)

11.5 lb	(5.2 kg) Munich Malt
3.5 lb	(1.6 kg) Pilsner
1.0 lb	(0.45 kg) Carahell® Malt
1.0 oz	(28 g) Carafa®
0.25 oz	(7 g) Hallertauer Mittelfruh pellet hops, 4.0% alpha acid (120 min.)
1.0 oz	(28 g) Hallertauer Mittelfruh pellet hops, 4.0% alpha acid (90 min.)
1.0 oz	(28 g) Hallertauer Mittelfruh pellet hops, 4.0% alpha acid (40 min.)
	White Labs WLP 820 or 830 Yeast or Wyeast 2112, 2178 or 2308 Yeast (Note: This recipe requires a large dose of yeast. Use a 1-gallon starter or pitch slurry from a previous batch.)

Anticipated Original Gravity: 1.076

Anticipated SRM: 13.4

Color Formula Used: Morey

Anticipated IBUs: 27.5

Hop IBU Formula Used: Daniels

Brewhouse Efficiency: 70%

Directions

Mash schedule: Step infusion, rests at 104° F (40° C), 144° F (62° C) and 158° F (70° C). Mash out at 170° F (77° C).

For more adventurous brewers, Tom Hail recommends a double decoction mash, pulling first decoction at 104° F (40° C) with rests at 144° F (62° C) and 158° F (70° C), then boil for 30-45 minutes. Second decoction should start at 144° F (62° C), rest at 158° F (70° C) and boil for 30-45 minutes.

Boil wort for 120 minutes adding hops as directed in the recipe. Chill to 50° F (10° C) and pitch yeast. Ferment at 50° F (10° C) for two weeks, raise temperature to 60° F (16° C) for two days, then rack to secondary and lager at 35° F (2° C) for 4-6 weeks.

Extract With Specialty Grains Recipe

Ingredients

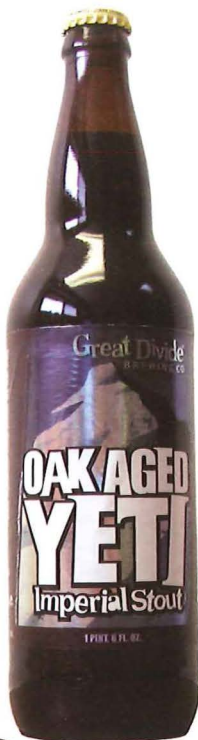
for 5.5 U.S. gallons (21 liters)

8.33 lb	(3.8 kg) light Munich liquid malt extract
2.0 lb	(0.9 kg) extra light dry malt extract
1.0 lb	(0.45 kg) Carahell® malt
1.0 oz	(28 g) Carafa® malt
2.0 oz	Hallertauer Mittelfruh pellet hops, 4.0% alpha acid (60 min.)
1.0 oz	(28 g) Hallertauer Mittelfruh pellet hops, 4.0% alpha acid (40 min.)
	White Labs WLP 820 or 830 Yeast or Wyeast 2112, 2178 or 2308 Yeast (Note: This recipe requires a large dose of yeast. Use a 1-gallon (3.8 L) starter or pitch slurry from a previous batch.)

Directions

Steep grains in 1 gallon (3.8 L) of water at 150° F (66° C) for 30 minutes, raise temperature to 170° F (77° C) then strain and sparge with 0.5 gallon (1.9 liter) of hot water. Add an additional gallon (3.8 liter) of water then stir in extract and bring to a boil. Total boil time is 60 minutes. Add hops according to the recipe. After 60 minute boil, strain into a fermenter with enough cold water to make 5.5 gallons (21 liters). Pitch yeast when temperature drops below 55° F (13° C). Ferment at 50° F (10° C) for two weeks, raise temperature to 60° F (16° C) for two days, then rack to secondary and lager at 35° F (2° C) for 4-6 weeks.

One way beer judges check their palates is by using commercial "calibration beers"—classic versions of the style they represent. Zymurgy has assembled a panel of four judges who have attained at least the rank of Master in the Beer Judge Certification Program. Each issue they will score two widely available commercial beers (or meads or ciders) using the BJCP scoresheet. We invite you to download your own scoresheets at www.bjcp.org, pick up a bottle of each of the beverages and judge along with them in our Commercial Calibration.



This issue we turn our attention to Denver, Colo., site of the American Homebrewers Association's National Homebrewers Conference June 21-23.

Colorado has been called "the Napa Valley of beer" and if you have a chance to come to the conference and explore the area for yourself, you'll soon see why. Award-winning craft breweries are scattered throughout Denver and nearby Boulder and Fort Collins, and dot the rest of the state from Colorado Springs to Idaho Springs to Pagosa Springs.

As our conference preview article mentions (see page 42), the Wynkoop Brewing Company helped revitalize the lower downtown area of Denver (LoDo), where many conference-goers will undoubtedly be spending some of their time. Several other craft breweries now make their home in LoDo, including Great Divide Brewing Co. and Breckenridge Brewery (the pub in LoDo is one of three locations for Breckenridge).

Two bold beers from Great Divide and Breckenridge were sent to our Calibration judges for a taste of Denver. First up was Great Divide's Oak Aged Yeti Imperial Stout, a "sophisticated sibling" of the Yeti Imperial Stout. The oak-aged version is aged on a blend of French and toasted oak chips, infusing a subtle oak and vanilla character into Yeti's already intense chocolate, roasted coffee malt flavor and hugely assertive hop profile.

Oak Aged Yeti has 75 IBUs and is 9.5-percent alcohol by volume. Great Divide suggests pairing with cow's milk blue cheese (specifically Blue de Auvergne), New York strip and all-natural vanilla ice cream. It is available in 22-ounce dinner bottles and on draft year-round. Our judges gave high marks to the Yeti for its elegantly oaked flavor.

Next up was Breckenridge 471 IPA, part of the brewery's new lineup of "471" small batch brews (including an ESB). 471 IPA is available in 22-ounce bottles and is also available in six-packs. The limited edition ale is a double IPA that combines pale, Munich, Caramel 30, Carapils and wheat malts with Chinook, Centennial, Simcoe and Fuggles hops. The brewery describes the flavor as "a big, sweet mouthfeel balanced by aggressive hoppiness" with 70 IBUs and an abv of 9.2 percent. Our judges liked the 471 for being boldly hopped yet with a nice malt balance.

Stop by the breweries if you're in Denver this June and try these forward-thinking beers for yourself, fresh from the source.

Our expert panel includes David Houseman, a Grand Master III judge and competition director for the BJCP from Chester Springs, Pa.; Beth Zangari, a Master level judge from Placerville, Calif. and founding member of Hangtown Association of Zymurgy Enthusiasts (H.A.Z.E.); Scott Bickham, a Grand Master II judge from Corning, N.Y., who has been exam director or associate exam director for the BJCP since 1995; and Gordon Strong, a Grand Master III judge and principal author of the new BJCP Style Guidelines who lives in Beavercreek, Ohio.



ON THE WEB

Breckenridge Brewery

www.breckenridgebrewery.com

Great Divide Brewing

www.greatdivide.com

BJCP Style Guidelines

www.bjcp.org



Oak Aged Yeti Imperial Stout—Great Divide Brewing Co., Denver, Colo.
BJCP Category: 22C Wood-Aged Beer (Classic Russian Imperial Stout)

THE JUDGES' SCORES FOR OAK AGED YETI



Aroma: Grassy hop aroma dominated initially fading to citrus notes as the beer breathed and warmed. A bit of roasted barley/malts in the background of noticeable alcohol. Vanilla, oaky notes arise as the beer warms, as does the alcohol. No diacetyl. No DMS. Very nice complexity. Serve this beer on the warm side of cold to enjoy the fragrance. (10/12)

Appearance: Black. Opaque. Rich, creamy, long-lasting tan head. Certainly appropriate to the style. (3/3)

Flavor: Chewy malt exhibiting a smooth blend of caramel, roast and barley malts. High hop bitterness is balanced with malt sweetness. Hop flavor is low to medium amid high alcohol and dark prune and plum fruity esters. Exceedingly well balanced for as big and complex as this Russian Imperial Stout is. The oak character is somewhat subtle in the background with recognizable oak character and a hint of vanilla and very low tannin astringency. Finishes sweet with slight citrus hop flavor. Low diacetyl. No DMS. (17/20)

Mouthfeel: Full bodied. Smooth, creamy mouthfeel with significant alcohol warming. Not hot at all. Very low astringency from either hops or grains. Very smooth. (5/5)

Overall Impression: Excellent Russian Imperial Stout. The subtlety of the oak character is one of its attractions, along with its balance and complexity. It's great to have the oak support the RIS rather than dominate, but I would expect more oakiness from a beer labeled "oak aged." Finishes sweet; a somewhat drier finish would make the beer snappier. (8/10)

Total Score: (43/50)



Aroma: Roasty malt and vanilla; robust citrus hop, dried prune undertones. As the beer warms, alcohol becomes more evident, carrying definite toasted oak, reminiscent of a freshly cut used oak barrel left in the sun, or oak lumber when the saw gets stuck and the blade scorches. (9/12)

Appearance: Brown-black and opaque; bubbles seem suspended, swirl and rise slowly to form a tight, rocky, persistent brown head that peaks like meringue. (3/3)

Flavor: Roasty and bittersweet chocolate malt, with firm hop bitterness, though not much hop flavor. Chocolate malty sweetness emerges mid-palate. Toasted oak comes forward toward the end with a pronounced woody character. Lingering hop bitterness is balanced with rich dark chocolate and vanilla sweetness. Alcohol is evident, but carries and blends with the oak; vanilla, chocolate, dried prune and lingering roast malt and hop bitterness. Final fadeout is of smoky toasty oak. (17/20)

Mouthfeel: Full bodied with creamy carbonation, thick and chewy, but not cloying. Alcohol is both numbing to the lips and tongue, warming to the throat and chest, almost as whiskey. Lingering, but gentle woody astringency finishes. (4/5)

Overall Impression: Rich chocolatey beer with a surprising balance of malty sweetness, assertive hop character and elegant oak. Both hop flavor and bitterness carry, without overpowering the malt or toasty oak. An excellent dessert beer and wonderful accompaniment to a rich chocolatey dessert or bit of chocolate bar. (9/10)

Total Score: (42/50)



Aroma: Rich combination of roasted and chocolate malt, with citrus notes and alcohol providing an American signature. Some sherry notes from oxidation, but smells fairly young. Higher alcohols come through as it warms, but not unpleasant and similar to British versions. I get very little oak but there is some earthiness in the background. (9/12)

Appearance: Deep black, opaque but clarity is good through the sliver of beer at the top of the tilted glass. Creamy beige head with unusually good retention for a strong beer. (3/3)

Flavor: Has a rich, creamy maltiness with caramel, bread, earthy and roasty flavors. Hop flavor is low, which is fine for this style, allowing ester and alcohol flavors to share the limelight. The finish has a long bitterness from both hops and roasted malts. The alcohol is a little more assertive than I would like, so this beer may benefit from further aging. No discernable oak flavor except for perhaps some tannins in the finish. (15/20)

Mouthfeel: Alcoholic warmth is prevalent, but is partially balanced by creaminess and a pleasant level of astringency from the roasted malts. (4/5)

Overall Impression: Very enjoyable beer in spite of an alcohol edge, perfect for sipping on a cold winter night. I was impressed by the creamy, complex malt character and would be interested in finding out the malt bill. The fermentation character is more British than American with more emphasis on esters, almost a cross between an Old Ale and a classic Imperial Stout. (7/10)

Total Score: (38/50)



Aroma: Rich chocolate and roasted malt aroma—medium-high intensity, mixed in with a sweet, vanilla, oak and bourbon aroma. The alcohol is noticeable and accentuates the bourbon impression. Moderate hops follow later. Multi-layered malt with caramel and toast supporting the dark roast. Low fruity notes. Complex but clean—nothing off. Great Imperial Stout qualities with complementary barrel character. (11/12)

Appearance: Tall mocha brown head; moussy with frothy, tiny bubbles—retained well. Opaque. Deep brownish-black color. (3/3)

Flavor: Significant roast/dark malt with firm alcohol flavor. The malt also has complex layers of flavor—caramel and toast—and moderate residual sweetness. Moderately fruity, including plum and raisin esters. Medium-high bitterness with an earthy, citrusy hop flavor. Tannins and oak/vanilla flavor add complexity and help give a long bitter and tannic finish. The sweetness helps soften the finish a bit, giving a bittersweet chocolate impression. The hopping definitely says "American." The oak/tannin adds to bitterness while the vanilla enhances sweetness. (15/20)

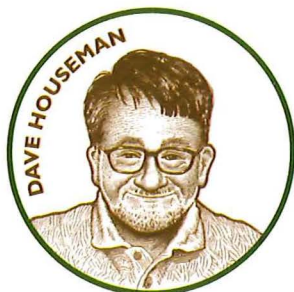
Mouthfeel: High carbonation. Quite warming from alcohol. Noticeable tanning—could be from wood, dark grain and/or hops. Moderate astringency. Seems young. Medium-full body, but seems thinner from carbonation. (3/5)

Overall Impression: Should improve significantly with age. Alcohol is a bit too forward in flavor and the tannins still have a sharp edge. It's a bit too sweet but should dry out with time. The hops also could use some mellowing. A great Imperial Stout. (7/10)

Total Score: (39/50)



THE JUDGES' SCORES FOR 471 DOUBLE HOPPED IPA



Aroma: Complex hop aromas consisting of citrus, floral, minty and woody notes. Very nice blend of hop aromas. A bit of caramel and toasted graininess, and fruity apricot and peach esters contributed to the balance and complex aroma. No diacetyl. No DMS. Alcohol doesn't stand out in aroma; that's good. (11/12)

Appearance: Orange-like amber hue. Clear but not brilliant. Dense, long-lasting head. Very pretty beer. (3/3)

Flavor: Malt sweetness up front with slight toasted, caramel notes, mostly just a clean, rich maltiness. High hop bitterness is remarkably smooth in the finish for the level of bitterness. High floral, citrus, minty hop flavors. Alcohol is quite assertive, contributing to sweetness as well. Complex fruity apricot and peach esters, likely from both hops and yeast by-products. No diacetyl. No DMS. Finish is a tad sweet, but can be easily forgiven with the fine balance that this beer has achieved. (17/20)

Mouthfeel: Medium-full body. Quite smooth, given the high hopping level. Noticeable alcohol warming. Moderate carbonation lightened the mouthfeel a bit. (5/5)

Overall Impression: Intensely hopped strong pale ale that can best be described as complex and balanced. While many Imperial IPAs do showcase hops, this does so elegantly without much hop astringency and not forgetting the proper place for balancing malt backbone and yeast characteristics. Hop bitterness, flavor and aroma equally share the stage. While this went well with a bit of extra sharp cheddar cheese, it can also be just sipped and enjoyed. (9/10)

Total Score: (45/50)



Aroma: Pink grapefruit and orange citrus aromas dominate. Low clean, sweet malty notes detected. Some woodsy piney hop aromas emerge as the beer warms. (9/12)

Appearance: Orangey burnished gold with brilliant clarity. Firm off-white head dissipates to thin, fine film. (3/3)

Flavor: Fruity citrus hop with evident, but not hot, alcohol. Sweet Valencia orange and pink grapefruit citrus fruity flavors are supported by biscuity, toasty malt character mid-palate; fruity with non-cloying sweetness. Finishes with a long, lingering hop bitterness that is assertive, but not harsh. (16/20)

Mouthfeel: Medium body with moderate carbonation. Some hop-derived astringency as might be expected for the style. Alcoholic warmth is numbing to the lips and warming. (4/5)

Overall Impression: Aside from the carbonation, I could imagine I am drinking freshly squeezed pink grapefruit juice with some hops added. Malty, toasty sweetness provides an excellent support for strong citrus, orange and grapefruit with a touch of pine hop character. Has a pleasant balanced astringency combined with a lingering bitterness for a long lasting finish. Between the toasty malt and citrus hop character, this beer lives up to the adage: "It's not just for breakfast anymore." (8/10)

Total Score: (40/50)



Aroma: Perfumey hop aroma, with earthy, woody and mushroom notes. Citrus and alcohol components lend a touch of new mown hay. Malt is subdued except for some background caramel wafting through the hops. (9/12)

Appearance: Surprisingly light in color, similar to polished copper. Excellent clarity. Head forms readily but dissipated rather quickly, perhaps due to hop oils and alcohol. (3/3)

Flavor: Soft malt backbone, with some caramel and toasted notes, fulfills the objective of providing some balancing sweetness. There is a slight graininess in the finish. Hop character is pronounced, with spruce and earthy flavors as well as a pleasantly long bitterness in the finish. Some esters are present, but focus is clearly on the hops rather than the yeast character. There is a slight acidity in the finish that accents the citrus notes from the hops, lending lemony notes. (17/20)

Mouthfeel: Creamy with some lingering sweetness on the lips. Some alcoholic warmth without straying into barleywine territory. There is surprisingly little astringency in view of the high hop rate. (5/5)

Overall Impression: Very enjoyable beer with an interesting blend of flavor hops that lend both American and British qualities. The focus is on the hops, as one might guess from the name. A little less graininess from the malt would soften the finish and probably reduce the grassy notes in the aroma, but that would really be a minor tweak to an excellent beer. (8/10)

Total Score: (42/50)



Aroma: Fresh piney, citrusy, woody hops—clearly dry-hopped. "Rough." Big pungent hop aroma dominates—like smelling a Christmas tree. Mild alcohol and esters way underneath. Slight malty sweetness in background. All about hops! Clean. (10/12)

Appearance: Deep amber-bronze color. Crystal clear. Tall ivory-colored head, creamy bubbles settled slowly. (3/3)

Flavor: Moderately high hop flavor and bitterness but with substantial malt. Bitterness most evident in aftertaste but malt masks some of the hop character (as it can in alt-biers). Same hop character as in nose—pine, wood, citrus, earth. Malt has a full, clean richness; more malty than sweet. Full but dry finish. Clean fermentation profile. Light esters. (15/20)

Mouthfeel: Medium to medium-full body with moderate carbonation. Mouthfeel is somewhat thick—almost an American barleywine. Very mild astringency; well done for a beer with all those hops. Deceptive alcohol. Warming in the throat more than the mouth. Smooth. (4/5)

Overall Impression: I'm torn on this one. It has a great hop profile but the malt balance, body and finish is more like a barleywine. The malt masks the hops except in the late finish. Easy to drink, even with all these hops. I'd prefer it to be drier to showcase the hops more in the palate. A very clean and well-crafted beer. Hops suggestive of the Pacific Northwest. Less body would help; it has a big mouthfeel, more than many others. The hop bitterness is very clean, though; that's quite an accomplishment. (7/10)

Total Score: (39/50)

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In Defense of Adjuncts

Mary, Mary,
Quite contrary
How does your garden grow?

I don't know what caused Mary to become contrary but I can relate. I've been homebrewing for over three decades and I've heard it all about "cheap adjuncts." Much maligned corn and rice have really gotten a bum rap (for all you international readers, that means falsely accused).

Why do we revere the use of sugar in fine Belgian-style strong ales? Why do we celebrate the complexities of wheat beer? Why do we speak of the splendor of oats and unmalted barley in our stouts? When many beer enthusiasts hear that corn and rice are in their beer they get apoplectic. OK, I'll admit I don't exactly cherish light lager beers using corn and rice that have had the entire flavor refined out of them. But why blame corn and rice?

So over the past two years, just like Mary, I've become contrary. And now I can prove to anyone who has any doubt that corn and rice can be used in many styles of beer to actually enhance their character. Don't you all-malt enthusiasts go ballistic yet. I love all-malt beer. Let me repeat myself: I love all-malt beer! I brew mostly all-malt beer.

Read my words carefully. Like Humpty Dumpty said while on the wall before his fall, "When I use a word it means just what I choose it to mean—neither more nor less."

"Corn and rice *can* be used...to...*enhance*." While you may choose to or you may choose not to enhance certain malt or hop character, you *can* do it if you desire.

I've brewed Pilsener type lagers using 10- to 20-percent rice, accenting the flavor and aromatic nuances of unusual and

Nick of Time IPA

All-Grain Recipe

Ingredients

for 5 U.S. gallons (19 liters)

7.0 lb	(3.2 kg) Two-row Maris Otter malt
1.0 lb	(454 g) English crystal malt, 15 lovibond
1.0 lb	(454 g) rice flakes
6.0 oz	(168 g) Weyermann Melanoidan malt
9.0 oz	(252 g) dark rapadura (Brazilian sugar)
0.66 oz	(18 g) Simcoe hop pellets 12% alpha (8 HBU/222 MBU)—60 min
1.5 oz	(42 g) Amarillo hops 7% alpha (10.5 HBU/294 MBU)—60 min
1.5 oz	(42 g) homegrown Cascade hops 5% alpha (7.5 HBU/210)—30 min
1.5 oz	(42 g) homegrown Cascade hops 5% alpha (7.5 HBU/210)—10 min
3.0 oz	(84 g) homegrown Cascade hops 5% alpha—2 min
2.0 oz	(56 g) fresh-immediately picked homegrown Cascade hops 5% alpha—1 min
0.33 oz	(10 g) Simcoe hop pellets—dry hopping
0.25 tsp	(1 g) powdered Irish moss
	English or American type ale yeast
0.75 cup	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

Target Original Gravity: 1.054 (13.5 B)
Approximate Final Gravity: 1.018 (4.5 B)
IBUs: calculated at 108, but tastes like 55-65
Approximate Color: 10 SRM (20 EBC)
Alcohol: 4.7% by volume

Directions

A step infusion mash is employed to mash the grains. Add 9.5 quarts (9 l) of 140° F (60° C) water to the crushed grains and rice flakes, stir, stabilize and hold the temperature at 132° F (53° C) for 30 minutes. Add 4.75 quarts (4.5 l) boiling water and add heat to bring temperature up to 155° F (68° C). Hold for about 30 minutes. Raise temperature to 167° F (75° C), laut and sparge with 3.5 gallons (13.5 l) of 170° F (77° C) water. Collect about 5.5 gallons (21 l) of runoff. Add 60-minute hops and rapadura sugar and bring to a vigorous boil.

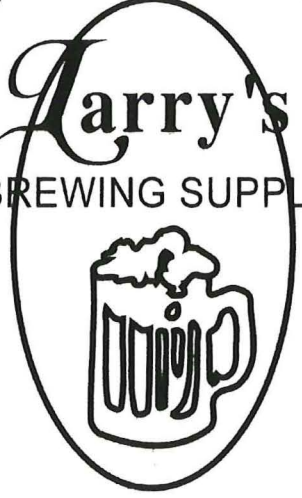
The total boil time will be 60 minutes. When 30 minutes remain add the 30-minute hops. When 10 minutes remain add 10-minute hops and Irish moss. When two minutes remain add the two-minute hops. When one minute remains add the one-minute hops. After a total wort boil of 60 minutes turn off the heat and place the pot (with cover on) in a running cold-water bath for 30 minutes. Continue to chill in the immersion or use other methods to chill your wort. Strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5 gallons (19 l) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at 70° F (21° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability "cellar" the beer at about 55° F (12.5° C) for about one week.

Prime with sugar and bottle or keg when complete.

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hard to find hops. Equally the lighter base that rice provides can also elevate the complex nuances of many specialty malts. In particular I've enjoyed complementing rice with aromatic type malts.

I've brewed two versions of my Neptune lager series: Claude of Neptune Red Lager (see the May/June 2006 *Zymurgy*) and Rings of Neptune Red Lager. Both were brewed with no Pilsener or pale malts. Rather I used 10-degree colored Munich malt as 80 percent and 60 percent of the base malt, respectively.

With Claude I used flaked corn at a rate of 9 percent. With Rings I used a combination of flaked corn and unmalted torried wheat at a rate of 12 percent. I also added wheat malt at 8 percent, all of which served to balance and actually enhance the character of the specialty malts and dry hop flavors and aromas.

I've brewed Corny Donkey IPA with flaked corn at a rate of 10 percent and Nick of Time IPA with rice flakes at a rate of 10 percent. Both had IPA hop bitterness, flavor and aromatic strength of

world-class IPAs but with a subtle dryness and crispness that enhanced malt and hop complexity.

I could go into detail regarding the flavor and aromatic qualities of all these brews, but the real test has always been serving these beers to my beer-loving friends. Without comment on my part, the verdict was unanimous. "This beer is really good, what is it?" "I really like this beer. I'll have

some more." Fact is that the rice and corn adjunct beers held their own against my all-malt favorites. Neither better nor worse. The beers held their own ground.

So let's cut the shuck and jive and get on with the recipes.

Charlie Papazian is founder of the American Homebrewers Association and president of the Brewers Association. 

Nick of Time IPA

Malt Extract Recipe

Ingredients

for 5 U.S. gallons (19 liters)

4.0 lb	(1.82 kg) light malt extract syrup or 3.2 lb (1.5 kg) light DRIED malt extract
1.0 lb	(454 g) English crystal malt-15 lovibond
1.0 lb	(454 g) rice extract syrup
9.0 oz	(252 g) dark rapadura (Brazilian sugar)
0.66 oz	(18 g) Simcoe hop pellets 12% alpha (8 HBU/222 MBU)-60 min
1.5 oz	(42 g) Amarillo hops 7% alpha (10.5 HBU/294 MBU)-60 min
1.5 oz	(42 g) homegrown Cascade hops 5% alpha (7.5 HBU/210)-30 min
1.5 oz	(42 g) homegrown Cascade hops 5% alpha (7.5 HBU/210)-10 min
3.0 oz	(84 g) homegrown Cascade hops 5% alpha-2 min
2.0 oz	(56 g) fresh-immediately picked homegrown Cascade hops 5% alpha-1 minute boiling
0.33 oz	(10 g) Simcoe hop pellets-DRY HOPPING
0.25 tsp	(1 g) powdered Irish moss
	English or American type ale yeast
0.75 cup	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for keggling

Target Original Gravity: 1.054 (13.5 B)

Approximate Final Gravity: 1.018 (4.5 B)

IBUs: calculated at 108, but tastes like 55-65

Approximate Color: 10 SRM (20 EBC)

Alcohol: 4.7% by volume

Directions

Place crushed grains in 2 gallons (7.6 l) of 150° F (68° C) water and let steep for 30 minutes. Strain out (and rinse with 3 quarts (3 l) hot water) and discard the crushed grains reserving the approximately 2.5 gallons (9.5 l) of liquid to which you will now add malt extract, rice extract, rapadura sugar and 60 minute hops. Bring to a boil.

The total boil time will be 60 minutes. When 30 minutes remain add the 30-minute hops. When 10 minutes remain add 10-minute hops and Irish moss. When two minutes remain add the two-minute hops. When one minute remains add the one-minute hops. After a total wort boil of 60 minutes turn off the heat.

Immerse the covered pot of wort in a cold water bath and let sit for 15-30 minutes or the time it takes to have a couple of homebrews.

Strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 l) of cold water has been added. If necessary add cold water to achieve a 5 gallon (19 l) batch size. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability "cellar" the beer at about 55° F (12.5° C) for about one week. Prime with sugar and bottle or keg when complete.

by Amahl Turczyn Scheppach

International Mead Festival

The fifth annual International Mead Festival, held February 9-10 in Denver, is one of the largest competitions of its kind. More than 100 commercial meaderies are estimated to be operating in the United States, nearly double the number seven years ago, and this is the event they brew their finest for. More than 1,300 people flocked to the festival, which outgrew two locations in Boulder and was moved to the Sheraton Denver West Hotel for 2007.

Homebrewers also had a chance to enter meads in their own competition, held in conjunction with the professional judging since 2005. In all, there were 242 entries from 32 states. All medal winners received gift certificates from The Bee Folks, and Best of Show winner David Baldwin of Grand Rapids, Mich., received a gallon of heather honey from The Bee Folks as well as a \$100 gift certificate from both Beer Beer & More Beer and Northern Brewer. Baldwin's spiced, oaked orange mead was a hit with the judges, winning the BOS award in a tight race with a habañero metheglin and a semi-sweet traditional mead.

Aside from the competitions, educational seminars were an important part of the festival. The Bee Folks and Beer at Home had tables set up for honey tastings, and four different seminars quickly filled for the event, including a food and mead pairing, a seminar on beekeeping for the mead maker, a panel discussion of dry mead, and a session with a beekeeper brought in from Poland, including a special treat of seven Polish meads that were not available during the public tasting session or entered in the commercial competition.

Zymurgy caught up with the homebrewed mead competition organizer Deborah Lee to talk about this increasingly popular mead event.

Zymurgy: BJCP guidelines are followed as far as judging categories. What sort of judging pool did you get, both for home-made and professional entries?

Deborah Lee: For the first round of judging we had four professional mead makers, two professional brewers who are BJCP judges (one is the editor of *DRAFT* magazine) and five folks from the Brewers Association. About half the judges are BJCP certified (three of them National-level), and 80 percent of the judges each have a minimum 10 years brewing and mead making experience. The medal round and commercial meads were judged almost entirely by professional mead makers, as well as some commercial brewers and wine makers, a mead book author and BJCP judges.

Zymurgy: What is the most popular category entered?

DL: Other Fruit Melomels by far, with 68 entries last year and 70 this year! Last year we had 28 entries in the Open



Medal judging



The "Queen Bee"

Category; this year it went up to 43. Metheglin and Sweet Traditional are also popular categories.

Moose Pond Mead

(24A Traditional Dry Mead)

Recipe by Mark Healy (gold medal)

Ingredients

for 5 U.S. gallons (19 liters)

15.0 lb	(6.8 kg) honey
1 tbsp	(14.8 mL) gypsum
4 tsp	(19.7 mL) acid blend
0.25 oz	yeast nutrient
	Dried champagne yeast

Original Target Gravity: 1.120

Final Target Gravity: 0.998

Primary: 2 weeks

Secondary: 3 months

Tertiary: 3 months

Directions

Activate yeast in warm water. Pasteurize honey and water at 170° F (77° C) for 30 minutes. Cool and transfer to carboy. Add enough water to make 5.5 gallons. Add yeast and remaining ingredients.

Zymurgy: Do you get many single-variety honey meads? What sort of creativity did you see this year in 26C, Open Category Mead?

DL: A little less than half the Traditional meads entered had a varietal stated. Orange blossom and tupelo honey are two

popular varieties, and some different fruit blossoms. Foxglove, sage, mint, mesquite, coffee, killer bee and poison oak were some of the more exotic. The Open Category took Best of Show this year with a spiced, oaked orange mead. Three of the entries in this category used agave nectar, and one also had saguaro honey and “very

strong herbs” in it. One mead was fortified with cognac and another with brandy, three had chocolate or cocoa, there was a tej [an Ethiopian mead, fermented with wild yeasts, bacteria, and flavored with gesho, the bark of a species of buckthorn that acts as a bittering agent], cherry and orange blossom braggots, a coffee honey



AHA SPECIAL EVENTS

April 14–29

AHA 29th Annual National Homebrew Competition—First Round Judging
Denver, CO. Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: janis@brewersassociation.org, Web: www.beertown.org/events/nhc/index.html

May 12

AHA Membership Rally—Great Divide Brewing Co. Denver, CO. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

May 15

AHA National Homebrewers Conference—Early Bird Registration Ends Contact: Bradley Latham, Phone: 888-822-6273 x 145, E-mail: bradley@brewersassociation.org, Web: www.AHAconference.org

June 2

AHA Membership Rally—Arbor Brewing Co.’s Corner Brewery Ypsilanti, MI. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

June 2

AHA Membership Rally—Firestone Walker Brewing Co. Paso Robles, CA. Contact: Kathryn Porter, Phone: 888-822-6273, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

June 21–23

AHA 29th Annual National Homebrewers Conference Denver, CO. Contact: Bradley Latham, Phone: 888-822-6273 x 145, E-mail: bradley@brewersassociation.org, Web: www.AHAconference.org

July 21

AHA Membership Rally—Left Hand Brewing Co. Longmont, CO. Contact: Kathryn Porter, 888-822-6273 x 123, kathryn@brewersassociation.org, www.AHArally.org

October 13

GABF Pro-Am Competition Denver, CO. Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: janis@brewersassociation.org

Gewürztraminer Pymment

(25B Pymment, Grape Melomel)

Recipe by Eric Sprague (gold medal)

Ingredients

for 10 U.S. gallons (38 liters)

1	Gewürztraminer wine kit (Vino del Vida was used for this recipe)
15.0 lb	(6.8 kg) honey
2 vials	White Labs WLP735 French white wine yeast
6.0 tbsp	(88.7 mL) yeast nutrient

Original Target Gravity: 1.120

Final Target Gravity: 1.010

Primary: 3 months

Secondary: 3 months

Tertiary: 3 months

Directions

Pasteurize honey and water at 170° F (77° C) for 30 minutes. Cool, divide and transfer into two carboys. Divide and transfer wine kit. Add enough water to make 5.5 gallons (in each carboy). Add yeast and yeast nutrient.

Tupelo Blossom Mead

(24C Sweet Mead)

Recipe by Curt and Kathy Stock (gold medal)

Ingredients

for 5 U.S. gallons (19 liters)

18.0 lb	(8.16 kg) Tupelo blossom honey
3.5 gallons	(13.2 L) filtered water
1 tsp	(4.9 mL) FermaidK (yeast energizer)
2 tsp	(9.9 mL) diammonium phosphate (yeast nutrient)
2 packets	Lalvin 71B (Narbonne) yeast 10 grams GoFerm yeast hydration nutrient

Original Target Gravity: 1.125

Final Target Gravity: 1.025


Directions

Blend yeast energizer and nutrient to make nutrient mix. Mix honey and water in a 7.9-gallon wine bucket until honey is completely dissolved. Heat 4 ounces of water to 106° F (41° C), add GoFerm and yeast, and let stand approximately 15 minutes. Add 0.75 tsp (3.7 mL) nutrient mix to mead must, mix and aerate well. Add hydrated yeast to must and mix. After fermentation has started add 0.75 tsp (3.7 mL) nutrient mix to must, mix and aerate well. Repeat again in 24 and 48 hours. Once fermentation is complete (approximately three to four weeks) rack to 5-gallon glass carboy for secondary fermentation. Once mead has cleared and fermentation is 100 percent complete rack to keg. Force carbonate to about 1.5 volumes, chill and bottle.

mead with coffee, orange juice and coriander, and three with apple cider. Of the cysers, one had orange peel and spices, another had apple butter and spices, and one had pumpkin.

Zymurgy: *Are there any special difficulties related to organizing a mead competition compared to a beer event?*

DL: The judging pool can be hard to draw from—most available judges don't have enough experience with meads to feel comfortable doing a fair job, so they decline. However, the judges we do get have tons of knowledge and experience. We can look forward to further educating those under-utilized palates, however, as the mead equivalent of the BJCP—the MJCP, if you will—is being developed at this time. Hopefully we will be able to start participating in that program by this time next year.

Amahl Turczyn Scheppach is a former craft brewer and associate editor for *Zymurgy*, and now brews at home in Lafayette, Colo. 



KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

November 2006

Castle Hill Agricultural Society Home Brewing Championship, 73 entries—*Tom Gardner, Denver, CO.*

BURP Real Ale Competition, 48 entries—*Tim Artz, Oakton, VA.*

Gambrinus Challenge, 90 entries—*Mike Broza, Regina, SK.*

December 2006

Happy Holidays Homebrew Competition, 205 entries—*Why Not a Fruit Beer, Curt and Kathy Stock, St. Paul, MN.*

January 2007

Big Beers, Belgians & Barleywines Festival, 153 entries—*Ryan Thomas, Westminster, CO.*

4th Doug King Memorial Specialty & Lager Beer Competition, 81 entries—*Todd Peterson, San Dimas, CA.*

Upper Mississippi Mash-Out, 919 entries—*Beer: Kris England, St. Paul, MN. Mead: Paul Dienhart, Minnetonka, MN. Cider: Gary Awdey, Eden, NY.*

Meadlennium 2007, 136 entries—*Mike Haws, Arlington, TX.*

February 2007

The Great Northern Brew-Ha-Ha, 162 entries—*Susan Ruud and Ray Taylor, Harwood, ND.*

KLCC Microbrew Festival Homebrew Competition, 88 entries—*Brett Thomas, Bend, OR.*

CABA Irish Red Ale Competition, 10 entries—*Erik Beer, Concord, CA.*

Kansas City Bier Meisters 24th Annual Homebrew Competition, 268 entries—*Ed Vandegrift, Lee's Summit, MO.*

War of the Worts XII, 443 entries—*Tim Caum, North Wales, PA.*

The Coconut Cup, 131 entries—*Nick Marshall, Boynton Beach, FL.*

AHA Club-Only Competition Low Gravity/Session Beers, 44 entries—*Earl Itrich, San Diego, CA.*

America's Finest City Homebrew Competition, 374 entries—*Christopher Shadrick, Santee, CA.*

Febfest 2007, 13 entries—*Pat Humphrey, Lake Villa, IL.*

Anchorage Fur Rondy Homebrew Competition, 75 entries—*John Trapp, Anchorage, AK.*

BABBLE Brew-Off, 253 entries—*August Altenbaumer, St. Louis, MO.*

March 2007

IBU Open, 95 entries—*Mark Simpson, Ames, IA.*

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AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR



The Beer Judge Certification Program (BJCP) has two major projects underway: revising the BJCP exam and adding a new Mead and Cider certification. Stay tuned for program changes in the upcoming year, including enhanced Web applications and new member services.

Want to discuss judging, beer styles, competitions and exams? Join the BJCP Members Forum at www.bjcp.org/phpBB2/index.php. We have started an Advanced Judging FAQ section based on the Commercial Calibration session at the AHA NHC 2006. Get all your judging questions answered!

To register a new competition, please go to www.bjcp.org/apps/comp_reg/comp_reg.html. Check the AHA or BJCP Web sites to see the latest calendar of events. Competition organizers: please remember to submit your results promptly using our electronic system. Competitions not filing organizer reports will not be allowed to register in the future.

Interested in becoming a beer judge? See www.beertown.org/homebrewing/scp/judge.html for information.



April 20

AHA National Homebrew Competition 1st Round East Region Westlake, OH. Contact: Dan Merk. Phone: 216-513-6367, E-mail: dan@dan-merk.com, Web: www.beertown.org/events/nhc/index.html

April 20

AHA National Homebrew Competition 1st Round Northeast Region Philadelphia, PA. Contact: Nancy Rigberg, Phone: 215-569-9469, E-mail: NRigberg@comcast.net, Web: www.beertown.org/events/nhc/index.html

April 21

AHA National Homebrew Competition 1st Round South Region Tallahassee, FL. Contact: Matt Ruddell, Phone: 850-491-3627, E-mail: ruddellmj@comcast.net, Web: www.beertown.org/events/nhc/index.html

April 21

AHA National Homebrew Competition 1st Round Northwest Region Portland, OR. Contact: Trevor Millund, Phone: 971-244-2758, E-mail: millund@yahoo.com, Web: www.beertown.org/events/nhc/index.html

April 21

Titletown Open Homebrew Competition XIII Green Bay, WI. Contact: Michael Conard, Phone: 920-388-2728, E-mail: mconard@itot.com, Web: www.rackers.org

April 21

Bluff City Brewers and Connoisseurs 18th Annual Competition Memphis, TN. Contact: James Lawrence, Phone: 901-725-7188, E-mail: cchatman@midsouth.rr.com, Web: memphis-brews.com

April 22

AHA National Homebrew Competition Cider Region Poughkeepsie, NY. Contact: Frankie Flynn, Phone: 845-838-3552, E-mail: fflynn@optonline.net, Web: www.beertown.org/events/nhc/index.html

April 25

HAG Baltic Porter Incantation Islington, NSW, Australia. Contact: Keith Grice, Phone: +61 2 49265615, E-mail: keith.beer.guy@hotmail.com

April 27

AHA National Homebrew Competition 1st Round Midwest Region St. Paul, MN. Contact: Curt Stock, Phone: 651-644-6098, E-mail: Curtis.Stock@state.mn.us, Web: www.beertown.org/events/nhc/index.html

April 28

13th Annual Eight Seconds of Froth/Liquid Poets Mugshot Challenge Ft. Collins, CO. Contact: Stephen Jones, Phone: 970-407-0717, E-mail: skijones@gmail.com, Web: www.bbriggs.vcn.com/8seconds.html

April 28

AHA National Homebrew Competition 1st Round Southwest Region San Diego, CA. Contact: Harold Gulbransen, Phone: 619-589-0987, E-mail: hgulbransen@sbcglobal.net, Web: www.beertown.org/events/nhc/index.html

April 28

AHA National Homebrew Competition 1st Round Great Lakes Region Aurora, IL. Contact: Tom Fitzpatrick, Phone: 630-761-8386, E-mail: tfitz@comcast.net, Web: www.beertown.org/events/nhc/index.html

April 28

Big and Huge Homebrew Contest Fitchburg, WI. Contact: Mark Schnepfer, Phone: 608-882-4523, E-mail: mschnepfer@yahoo.com, Web: www.madbrewers.org/MHTGContests.html

April 29

11th Annual Silver Dollar Fair Homebrew Competition Chico, CA. Contact: Dawn Letner, Phone: 530-342-3768, E-mail: homebrushop@yahoo.com, Web: www.chico-homebrewclub.com

May 5

Green Mountain Homebrew Competition South Burlington, VT. Contact: Lewis Greitzer, Phone: 802-658-2621, e-mail: lewis@together.net, Web: www.mashers.org/comp_20july/comp_page1.html

May 11

AHA Club-Only Competition Extract Beers Chillicothe, IL. Contact: John Martin, Phone: 309-249-4409, E-mail: fmh3@yahoo.com, Web: www.beertown.org/homebrewing/schedule.html

May 11

2007 Samuel Adams American Homebrew Contest—LongShot Boston, MA. Contact: Mark Irwin, Phone: 617-868-7381, E-mail: irwin@stat.harvard.edu, Web: www.wort.org/longshot07

May 12

Goblets of Gold Mead Competition Homer, AK. Contact: Laurence Livingston, Phone: 907-235-9412, E-mail: brewkahuna@hotmail.com

May 12

Hogtown Brew-Off Gainesville, FL. Contact: Mark Tumarkin, Phone: 352-338-4544, E-mail: tumarkin@hogtownbrewers.org, Web: www.hogtownbrewers.org

May 12

Spirit of Free Beer XV Ashburn, VA. Contact: Joe Gherlone, Phone: 202-767-1464, E-mail: joseph.gherlone@cox.net, Web: www.burp.org/events/sofb

May 12

The BrewMasters Open Alpharetta, GA. Contact: Robert Carlton, Phone: 770-945-2575, E-mail: BeerNec@aol.com, Web: www.brewmastersopen.com

May 18

Amber Waves of Grain Buffalo, NY. Contact: Terry Felton, Phone: 716-652-0722, E-mail: tdfelton@gmail.com, Web: www.niagarabrewers.org/awog

May 18

2007 Samuel Adams American Homebrew Contest—LongShot Chicago, IL. Contact: Joe Formanek, Phone: 630-378-4694, E-mail: jformanek@griffithlaboratories.com, Web: www.samueladams.com

May 19

San Joaquin Fair Homebrew Competition Stockton, CA. Contact: Rick Reineman, Phone: 209-952-1481, E-mail: rick@reineman.com, Web: www.brewangels.com/Frame1.html

May 19

Enchanted Brewing Challenge Albuquerque, NM. Contact: Stan Hieronymus, Phone: 505-898-7971, E-mail: brewer@nmbeer.org, Web: www.nmbeer.org/ebc

May 19

Cascade Brewers Cup Woodinville, WA. Contact: Jim Lanning, Phone: 425-398-3910, E-mail: jlanning_hg@msn.com, Web: cascadebrewersclub.org

May 19

11th Annual B.E.E.R. Brewoff Nesconset, NY. Contact: Peter Algerio, Phone: 631-757-1217, E-mail: petebeer@optonline.net, Web: www.hbd.org/beer

May 19

Alameda County Fair Homebrew Competition Pleasanton, CA. Contact: Roger St. Denis, Phone: 408-225-5834, E-mail: meadguy@yahoo.com, Web: www.draughtboard.org

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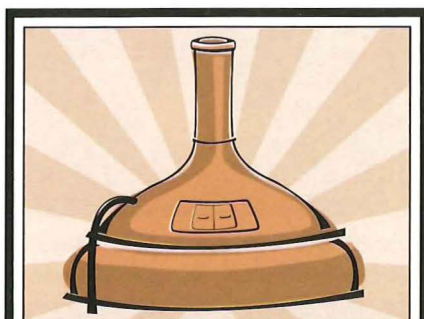
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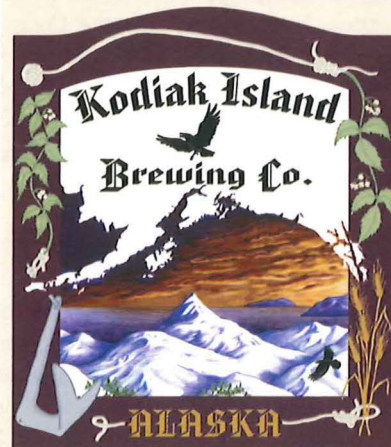
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Brewing at 14,000 Feet

It all started from a seemingly harmless discussion thread on our Liquid Poets club forum: brewing at high altitude. Not just 5,000 feet above sea level but Colorado 14er style: 14,000 feet. Volunteers were recruited at an AHA membership rally and we set the date: August 13, 2006.

After much discussion, Mt. Bierstadt (one of 54 14,000-foot peaks in Colorado) was chosen, primarily because of the name, secondarily because of the moderate difficulty of the ascent (3.5 miles to the summit with an elevation gain of 2,850 feet). Our band of hardy (or foolhardy) souls soon dwindled to four volunteers and one adventurous spouse: Chuck Hancock, Steve Jones, Terry James, and Brian and Sara Thompson. We would attempt to brew an all-grain American brown ale, dubbed Bierstadt Brown.

Chuck formulated a recipe to everyone's liking with target volume of 3 gallons. Due to the possibility of inclement weather we agreed on a 30-minute mash and a 30-minute boil. The plan was to use 5.25 gallons of water bottled from a spring on Mt. Whitney, the empty bottles serving to carry the wort down to the trailhead. Our equipment consisted of two brew kettles, a 5-gallon cooler/mash tun, three single-burner camp stoves, screened funnels, refractometer, thermometer and miscellanea.

Our base camp was the trailhead for Mt. Bierstadt at the top of Guanella Pass. Spirits were high as we assembled the evening of August 12 and toasted to our expedition. We awoke to the sound of cell phone alarms, divided up the gear and hit the trail by 6:15 a.m. After a difficult trek Chuck and Steve reached the 14,060-foot summit around 9:15 and began the mash. Amazingly, and despite the un-insulated kettle, the mash stayed at 153° F for the

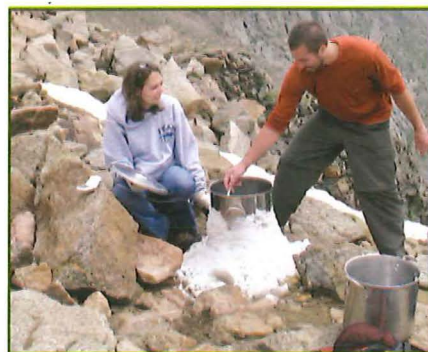
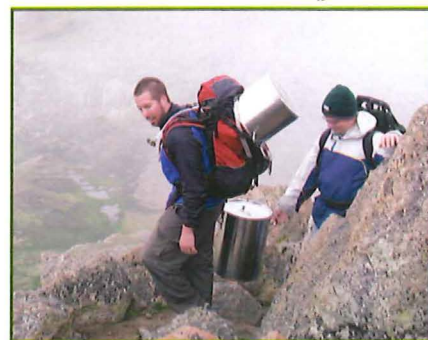
entire 30 minutes. At approximately 10 a.m. the rest of the party reached the summit and water was heated to 165° F for sparging. With one eye on the weather we batch sparged, achieving a gravity of 1.080 with the first runnings and a pre-boil gravity of 1.040.

A rock ring was hastily constructed to support the brew kettle and provide a wind screen for the camp stoves. With the first wort hops added and the boil underway we opened our celebratory bottles of homebrew. Fellow summiteers assailed us with questions such as "Are you making soup?" and "Are you boiling water for lobsters?" Their looks of surprise were priceless as we provided a quick and dirty primer on homebrewing.

We didn't plan on the lack of evaporation, so with the boil completed, our 4-plus gallons of wort was cooled in a snow bank, divided into water bottles and packed for the return journey down the mountain.

After fermentation, we bottled up our prize and divided it among the brewers: seven bottles each! It is a pleasant beer, a little low on hops due to the short, low-temperature boil. The beer may not win a competition, but if you could measure the satisfaction that comes from the adventure and accomplishment, each bottle contains 100-percent gold.

Terry James lives in Loveland, Colo. and is a member of Liquid Poets Homebrew



Club. He was introduced to the joys of homebrewing while living in Denver in 1988. Not counting the false start fermenting in a Florida garage in college, Chuck Hancock has been brewing good beer for over three years and currently resides in Fort Collins, Colo. He is also a member of the Liquid Poets.

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