



The Cellar

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Colonial Ale Smiths & Keggers
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Visit CASK on the Web for the latest news, photos, recipes, and updates: <http://www.williamsburgbrewing.com/CASK>

Interested in going to the World Beer Fest?

By Brian Hershey

I am planning a day long "Brews Cruise" to the World Beer Festival in Durham, NC on Saturday, October 8th 2005. This will be a joint event with James River Homebrewers and HRBTS. The chartered bus would depart Richmond (about 5:30 AM), stop in NN or Williamsburg for CASKers (about 6:30 AM), then stop in Norfolk for HRBTS (about 7:30 AM), and then off to Durham. At the World Beer Fest, you'll then have 4 hours to sample over 300 beers from 130 World-Class Breweries before the bus departs (about 4:30 PM). The initial cost estimate is \$75-\$100 per person which includes roundtrip transportation and a ticket for the Beer Fest. (The bus will be equipped with a bathroom).

See <http://www.allaboutbeer.com/wbf/> for more info.

For planning purposes, I need to find out ASAP how many CASK members would be interested in taking the trip. Email me at brian_hershey@yahoo.com or call me at 874-6619. ■

CASK Summer Party

By Brian Hershey

You and your family are invited to join CASK for its second annual summer party to be held on Saturday July 16th. We are getting together to celebrate three years of homebrewing on the peninsula. The party will begin at 2 p.m. and finish by 8 p.m.

Frank Clark has graciously offered the use of his large backyard again for the event. Frank has horsehoe pits and plenty of room for croquet, or badminton/volleyball. This event is **free** and open to all CASK members and their families and friends. Just bring a side dish or dessert, and your own chairs. The club is providing soda, BBQ pork, BBQ chicken, and cole slaw (catered by Kelsick Gardens). We'll also have some nice door prizes.

There will be a great abundance of homebrew because the featured activity will be a taste off for the title of IRON BREWER. Eight teams are vying for the coveted award this year. Each team brewed using only ingredients on the iron brew list, plus their choice of yeast. WOW! That equates to 40 gallons of homebrew. Everyone gets to taste and vote for their favorite beers. We will award first, second and third place. The first place team will be crowned CASK IRON BREWER(S).

We need loans of large coolers, taps, CO2, and folding tables. We also need volunteers to help setup and cleanup. Also, please let us know if you know a good source for ice because we're going to need lots of it. For those helping to set up, you need be there by 12:30 p.m. Also, Iron Brewers need to have their beers there early to get iced down. Please contact Brian Hershey if you can loan any equipment or help setup or cleanup. We hope to see all of you there. If you have had trouble making the monthly meetings, then this is the time come on out. Remember, there is no regular CASK meeting in July.

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RSVP by July 8th via email to Brian Hershey (brian_hershey@yahoo.com) or by phone at 874-6619. ■

The Cellarmaster

By Norm Schaeffler

Reflections on Baltimore.

Last week was the 2005 AHA National Homebrew Convention (NHC). It was the first NHC that I have ever attended. To sum it up in one sentence: It was a blast! I attended with my wife Louise and we met homebrewers from all over the country, even Hawaii! I even met another Norm, which is quite rare. For the most part, everyone we meet was extremely friendly, good-natured and excited about beer. We arrived late Thursday afternoon, in time for the "Star-Spangled Beer Fest", which featured commercial brews and heavy hor'dourves. The hotel had a hard time keeping up with the food, but there were plenty of beers. Sam Calagione, founder/brewer of Dogfish Head, was there pouring his own beers. Including a special 3 yr old stout that weighted in at 23% ABV! Clipper City, Du Claw, Fredrick Brewing, and Saranac were just a few of the breweries there. Charlie Papazian, himself, was one of the attendees mixing with the homebrewers.



Saturday morning I was one of the judges in the National Homebrew Competition, judging Strong Ales. Nothing like a few barleywines at 9 AM! I had the good fortune to judge with a Grand Master II BJCP judge (this is the highest judge ranking in the BJCP) and it was a great experience to compare my score sheets against his. Saturday night was Club Night, where the club's provided the beer and most provided food. Again, more great beer, great food, and excellent people. If you can make it to the NHC next year, I would recommend it. I hope to be there!

Till next time, Cheers! ■

Harrison's A Winner!

At the 2005 AHA National Homebrewing Competition, our own Harrison Gibbs took the third place prize in Category 27: Standard Cider and Perry for his English Cider. Congratulations, Harrison! ■

Water and Brewing

By Harrison Gibbs

Water constitutes the major part of beer, as much as 85-90%, with the remainder being compounds derived from malt, hops and yeast. Some commercial beers taste like more, but then again, that is why we are homebrewers. When evaluating water for brewing the general rule is if it is drinkable, it may be used in brewing. However, some adjustments may be necessary if you want to recreate the water used in your favorite beer style.

When analyzing your brewing water, you need to consider its content, its mineral hardness, and its alkalinity.

There has been much discussion as to whether

to use tap water in brewing. Most tap water is treated with chlorine or a like compound to inhibit bacterial growth. It is always better to remove it as chlorine can bind with other compounds from the malt and hops to make unpleasant flavors. Straight chlorine gas may be eliminated by boiling, but charcoal filtration must be used to eliminate the more commonly used chloramines. Newport News primarily uses an ozone method but also uses chloramines as a secondary disinfectant.

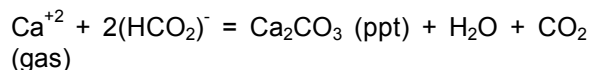
Reverse osmosis is not recommended since it also strips out minerals needed by the yeast. Most water generally also has very low concentrations of nitrogen-containing ions, iron, manganese, copper and zinc; trace amounts of these last four minerals are essential to a healthy fermentation. Finally, most water contains very low concentrations of bacteria, so it must be sterilized by boiling at some point in the brewing process. Many brewers break down and use bottled water. Others filter.

To get a good read on what your local water has contact your water department. They can tell you whether they use chloramines or chlorine and what the other compounds in the water are.

Alkalinity, pH and Hardness

Water is a solution of ions with negative (anions) and positive (cations) charges. The water molecules (H₂O) themselves are also partially dissociated into hydroxide (OH⁻) and hydrogen (H⁺) ions, and the *pH*, or percent Hydrogen, indicates the relative concentrations of these ions. Neutral water has OH⁻ and H⁺ concentrations of 0.1 ppm, which corresponds to a pH of 7. Lower pH values indicate a higher H⁺ concentration and a higher acidity, while higher pH values correspond to a higher OH⁻ concentration and a higher alkalinity. In brewing, the pH is determined by the hardness, alkalinity and buffering salts.

Alkalinity is a measure of the capacity of the dissolved anions to neutralize reductions in the pH value of the solution. The most important anion at the pH of brewing water and wort is bicarbonate (HCO₂)⁻, which reacts with Calcium (Ca⁺²) ions when heated to form a calcium carbonate precipitate and water:



This removes Calcium ions from the water, reducing the *temporary hardness*. *Permanent hardness* is a measure of the cations that remain after boiling and racking the water from the precipitate, and is primarily due to Ca⁺² and Magnesium (Mg⁺²) ions. These cations are permanent if they are derived from sulfate or chloride salts and temporary if they originate in carbonate or bicarbonate salts.

An important process in brewing that helps adjust the pH of the mash is the enzymatic degradation of phytin in the malt to form phytic acid and calcium or magnesium phosphates, which precipitate. Most of the phytic acid combines with free Ca⁺² to form more calcium phosphate, releasing hydrogen ions in the process. This reaction generally takes place during the acid rest and regulates the mash pH to the 5.2-5.7 range, which is appropriate for the breakdown of starches and proteins.

Some water supplies are too alkaline for this process to be effective, in which case the pH

must be reduced to the proper level by adding lactic or sulfuric acid, or using a commercial pH buffer such as 5_ pH Stabilizer, a proprietary blend of food-grade phosphate buffers that locks in your mash and kettle water at a pH of 5.2, regardless of the starting pH. It also reduces scaling and mineral deposits on all your equipment.

Ions in Brewing

The most important cation in brewing is Calcium, which is essential for reducing the mash pH to the appropriate range, keeps oxalate salts in solution (they form haze and gushing if they precipitate), reduces the extraction of tannins, and assists in protein coagulation in the hot and cold breaks. Magnesium ions participate in the same reactions, but are not as effective. Yeasts require 10-20 ppm as a nutrient, but higher amounts give a harsh, mineral-like taste. Another cation is Sodium, which accents the sweetness at low levels, but tastes salty at higher concentrations.

The most important anion in brewing is bicarbonate, which neutralizes acids from dark and roasted malts, reacts with Calcium to reduce the hardness and promotes the extraction of tannins and coloring compounds. It is normally in solution with the carbonate (CO₃)⁻² ion, but the bicarbonate is by far the most important component at typical pH values of water and wort. The sulfate (SO₄)⁻² ion does not play a significant role in the brewing process, but accents hop bitterness and dryness at the high concentrations found in the waters at Burton-on-Trent. Another anion is chloride (Cl⁻), which enhances sweetness at low concentrations, but high levels can hamper yeast flocculation, or settling out.

Famous Brewing Waters

The ions described above are found in different concentrations depending on the source of the water, as shown in the table below for several major brewing centers (data is in ppm and is based on general averages):

Table 1 – Brewing Cities

City	Calcium (Ca ⁺²)	Magnesium (Mg ⁺²)	Bicarbonate (HCO ₃ ⁻¹)	Sulfate SO ₄ ⁻²	Sodium Na ⁺¹	Chloride Cl ⁻¹	Beer Style
Pilsen	10	3	3	4	3	4	Pilsener
Dortmund	225	40	220	120	60	60	Export Lager
Vienna	163	68	243	216	8	39	Vienna Lager
Munich	109	21	171	79	2	36	Oktoberfest
London	52	32	104	32	86	34	British Bitter
Edinburgh	100	18	160	105	20	45	Scottish Ale
Burton	352	24	320	820	44	16	India Pale Ale
Dublin	118	4	319	54	12	19	Dry Stout
Newport News 2004	32	1.5	89	38	8	19	
Williamsburg July 2003	112	8	101	24	20-56	28-35	
To get HCO₃ (ppm) from Alkalinity as CaCO₃ do this: Divide by 50 and multiply by 61							

These water compositions have played an important role in the development of world beer styles. In London, Dublin and Munich, the high bicarbonate content is needed to balance the acidifying properties of the dark and roasted malts used in porters, stouts and bocks. When brewing pale beers with this type of water, the alkalinity generally needs to be reduced through an acid rest, the use of acid malt, a pH buffer, or directly adding lactic or sulfuric acid to the brewing liquor. The water at Burton is extremely hard, and the high concentrations of sulfate and magnesium ions lend a dryness that accents the hoppiness of English bitters and pale ales from this region. On the other end of the spectrum is Pilsen, which has very low concentrations of dissolved ions (which is not the same as being very soft). The adoption of decoction mashing may have been in part due to the lack of minerals in the water, along with the use of undermodified malts. The elaborate series of temperature steps in a decoction mash helps the various enzymatic reactions proceed at a reasonable rate, even though the enzymes are working slowly due to the lack of calcium.

Water Adjustment

The waters at these brewing centers may be reproduced by adding various salts to locally available water. For additions meant to improve the buffering capacity of the mash, use the volume of your mash for your calculations. For salt additions to change flavor in the finished beer, the target volume of the finished beer should be used. The most common salt additions are gypsum (CaSO₄·2H₂O -- CaSO₄ hydrated with two water molecules), Epsom salts (MgSO₄·7H₂O), non-iodized table salt (NaCl), calcium carbonate (CaCO₃) and calcium chloride (CaCl₂·H₂O). The addition of gypsum and Epsom salts is known as Burtonizing, since it elevates the hardness and sulfate concentrations to levels similar to that found at Burton-on-Trent. Other salts may be used, but these are by far the most common additives in brewing.

Table 2 – Salt Additions for Water Adjustment

Brewing Salt and Common Name	Concentration at 1 gram/gal	Grams per level teaspoon	Effects	Comments
Calcium Carbonate (CaCO ₃)	105 ppm Ca ⁺² 158 ppm	1.8	Raises pH	Because of its limited solubility it is only effective when added directly to the mash. Use for making dark beers in areas of soft

a.k.a. Chalk	CO ₃ ⁻²			water. Use nomograph and monitor the mash pH with pH test papers to determine how much to add.
Calcium Sulfate (CaSO ₄ *2 H ₂ O) a.k.a. Gypsum	61.5 ppm Ca ⁺² 147.4 ppm SO ₄ ⁻²	4.0	Lowers pH	Useful for adding calcium if the water is low in sulfate. Can be used to add sulfate "crispness" to the hop bitterness.
Calcium Chloride (CaCl ₂ *2H ₂ O)	72 ppm Ca ⁺² 127 ppm Cl ⁻¹	3.4	Lowers pH	Useful for adding Calcium if the water is low in chlorides.
Magnesium Sulfate (MgSO ₄ *7H ₂ O) a.k.a. Epsom Salt	26 ppm Mg ⁺² 103 ppm SO ₄ ⁻²	4.5	Lowers pH by a small amount.	Can be used to add sulfate "crispness" to the hop bitterness.
Sodium Bicarbonate (NaHCO ₃) a.k.a. Baking Soda	75 ppm Na ⁺¹ 191 ppm HCO ₃ ⁻	4.4	Raises pH by adding alkalinity.	If your pH is too low and/or has low residual alkalinity, then you can add alkalinity. See procedure for calcium carbonate.

Further Reading

1. Dave Miller, Dave Miller's Homebrewing Guide (Garden Way Publishing, Pownal, VT 1996).
2. Gregory J. Noonan, New Brewing Lager Beer (Brewers Publications, Boulder, CO, 1996).
3. George Fix, Principles of Brewing Science (Brewers Publications, Boulder, CO, 1989)

A Mini-Mash of News Items

By Norman W. Schaeffler

- **Want to be a Pro Brewer for the Day?** St. George's brewer, Andy Rathmann, has offered to let any club members that are interested to come down to the brewery and assist him in brewing a batch of beer. After all, who would pass up free labor! So if you want to see a commercial brew being made from grain to fermenter, let Norm Schaeffler know. We are shooting for a day in June and it will be a weekday.

- **CASK Mailing List:** The CASK Mailing list is up and running being hosted by HomeBrewDigest. You can subscribe here:

<http://hbd.org/mailman/listinfo/cask>

Once you are subscribed, you can talk to the whole club by sending mail to a single e-mail address, cask@hbd.org You can also talk to individual members by using the member directory. The new mailing list should improve communication within the club, over the next few months we will be moving all of the club mailings to the list. ■

Recycling Your Brewery Leftovers

By Harrison Gibbs

After the brewing, we are all left with spent grain, boiled hops, trub, and yeast from the bottom of our fermenter. Disposing of this refuse is not good for the pipes and creates a messy trash can. However, such byproduct makes great compost. Mixed with kitchen scraps or cut grass (nitrogen source) and tree leaves (carbon source), brewery leftovers are quickly broken down into nutrient rich compost. For best results use more leaves and keep it moist. Also aerate or turn the compost frequently so it keeps working. It should only take a month or so, if the temperature is kept warm. Put the rich compost on your hops, herbs, vegetables, or grass.

Another tip is to reuse the water used in cooling your wort to fill your washer machine. As it runs through the wort chiller, the cold tap water becomes hot from the exchange of heat. Instead of running it down the drain, try filling your washer with the hot water.

Also, if you have slug problems, take spent yeast from the bottom of a fermenter, place it in a shallow container and put near where the slugs are. Shallow bowls of homebrew work as well, but that can be a waste if tasty homebrew. Beer or yeast, they love the stuff even though the alcohol kills them. Remember give back to Mother Earth -- reuse and recycle. ■

Heavy Lifting

By Harrison Gibbs

Lifting and moving heavy carboys of beer puts all brewers at risk of back injury, broken carboys, and lost beer. This can especially be a problem for those who already have an old injury from lifting the grandkid or playing football in high school. Some home wine makers in Richmond, VA, came up with a clever solution.

“One day while walking downtown to lunch, my assistant found a discarded chrome rack from a defunct clothing storeroom out in an alley. Being very resourceful, he brought it back to the studio, purchased a small crank wench and fashioned a carboy hoist,” said Sonny Bower, a photographer and member of the Central Virginia Winemakers Group. “The idea is to be able to hoist a full carboy, roll it to another position and lower it onto a table without breaking a sweat,” he said.



The chrome frame is the type used in department stores and the black strapping around the carboy is available at most homebrew supply shops for around \$12.95. ■

The CASK Calendar of Club Events and Competitions

Plan your brewing year now and hit as many club-only and other competitions as possible.

2005 Monthly Beer Styles

June	Saisons
July	Summer Party!!] Belgin and French Ales
August	European Amber Lager
September	TBD
October	Baltic Porter
November	TBD
December	Free for all

July, 2005: American Beer Month: America has a beer tradition that goes back to the earliest days of American history. Help celebrate it.

July 16, 2005: CASK SUMMER PARTY!: The club had a good turnout last year. Even if you have not been able to make the Thursday evening meetings, this is one of those weekend family-oriented events that you should plan on attending. CASK will hold a great raffle and judge for the IRON BREWER COMPETITION.

August 2005: Belgian and French Ale Club-Only Competition: Category 16* Competition August 21, 2005: Hosted by Bob Kauffman and Hop Barley and the Alers of Boulder, CO. Entries due August 16, 2005.

August 6, 2005: National Mead Day: The American Homebrewers Association (AHA) Mead Day is a national event to help increase camaraderie among homebrewers and meadmakers and introduce or reintroduce the meadmaking hobby to people. Each year on the first Saturday in August, homebrewers around the nation are encouraged to invite non-brewing and brewing friends and family to celebrate by making mead.

Ways to Celebrate:

- Invite non-brewing and brewing/meadmaking friends to help make mead.
- Brew the Official Mead Day Recipe
- Bring out meadmaking literature for your friends to read Compleat Meadmaker and other meadmaking books
- Drink mead, pair your mead with food and HAVE FUN

September/October 2005: European Amber Lager Club-Only Competition: Category 3* Hosted by Jack Kephart and the Society of Akron Area Zymurgists (SAAZ) of Akron, OH.

September 29-October 1, 2005 Great American Beer Festival: Last year, the three-day event brought a record number of beer connoisseurs from around the world to Denver, Colo. (a city dubbed “the Napa Valley of beer” by many of the world’s beer experts) to sample 1,454 different American beers. The roster of beers was the biggest collection of American beers ever presented in one location. It took 2,439 volunteers and 24,390 hours to put this festival on. “The Great American Beer Festival is the world’s best beer festival by far,” says famed international beer writer Michael Jackson. “No other one comes close.”

November 2005: Teach a Friend to Brew Day

November/December 2005: Baltic Porter Club-Only Competition: Category 12C* Hosted by Brian Lanius and the Ruffian Brewers of Suffern, NY. Entries due October 21, 2005. Judging will be held November 5, 2005.

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