

BACKYARD BREWING

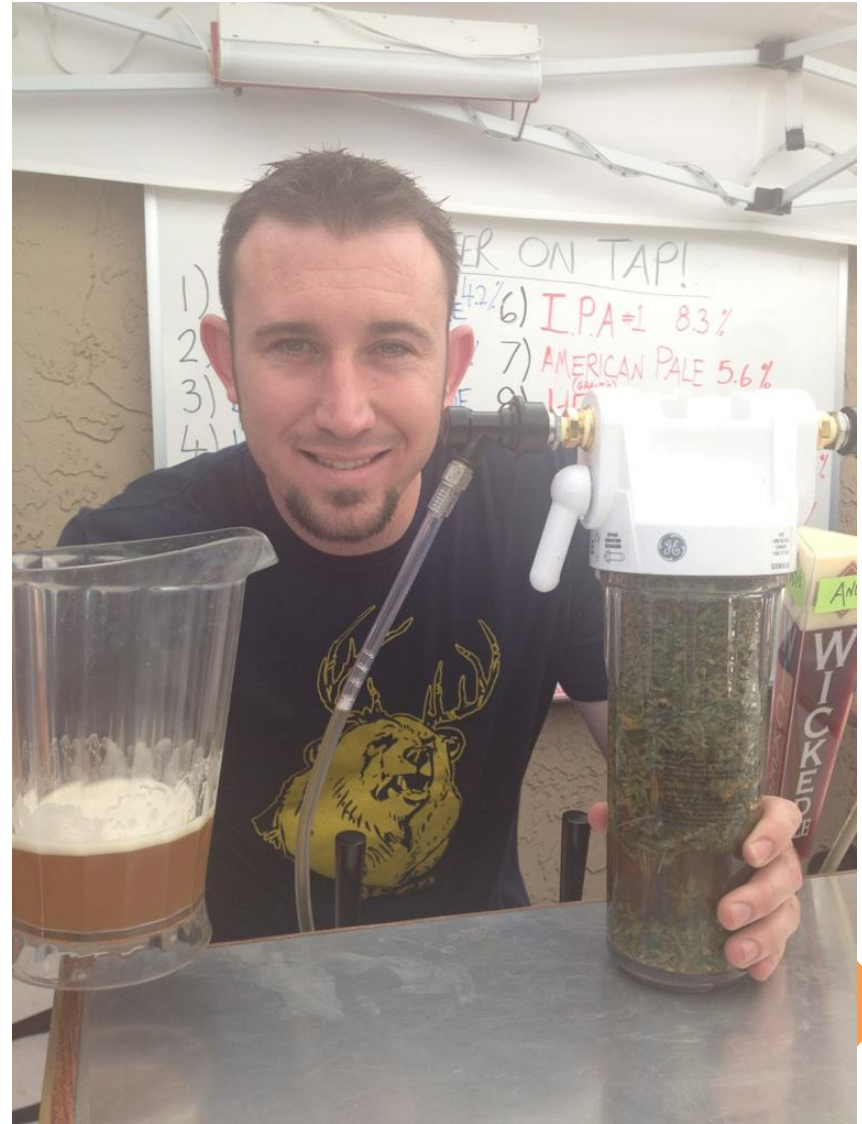
How to craft your own brew

Andrew Carroll & Derek Wolfgram



ANDREW CARROLL

- Andrew has been homebrewing for close to five years now, and in that time has managed to brew almost 100 batches. Mild-mannered construction worker by day and beer enthusiast by night, Andy is continually trying to spread the good word of brewing and drinking better beer. He is currently President of The Headquarters homebrew club in Campbell, CA established January, 2012.



DEREK WOLFGRAM



- Derek has been a librarian since 1996, and a homebrewer since 2001. This program is his opportunity to bring those two passions together. Library-wise, Derek is Deputy County Librarian of the Santa Clara County Library District. Homebrew-wise, he is Past President and Secretary of the Silicon Valley Sudzers homebrew club and was the 2010 club Brewer of the Year, primarily for making plenty of coconut porter.





HOMEBREW ROUNDS

Round 1 – Where Beer Comes From

PRIMARY INGREDIENTS OF BEER

Malted Barley – base ingredient of beer, supplying sugars, starches, and starch-to-sugar enzymes needed for mashing. Barley grain is sprouted and toasted in a process called “malting”. Other grains may be added for giving a beer its character.



Hops – *Humulus lupulus*, provides the bittering component (*lupulin*) to beer and other hop flavors and aromas, which balances the malt sweetness and helps preserve the beer

Water – essential to the chemistry of extracting sugars from the malted barley, yeast fermentation, and makes up ~90% of your beer!



Yeast – Actually, they make your beer, you just make their food, the *wort*)



GRAIN GUIDE

Malt supplies most of the flavor and sugars for the beer. The base malts are combined with the other forms of grain or malt to create the beer character. The color of malt (darkness) is described in degrees Lovibond (°L).

Malt Extracts

Use for extract brewing, creating yeast starters, or to adjust target gravity of beer.

- DME – Dry malt extract, very stable
- LME – has 80% of water removed, there are more varieties available.

Base Malts

- 2 row pale malt – primary base malt for brewing (6 row is typically used for whisky) 2L
- Pilsner – smoother, lighter, sweeter than pale 1L
- Wheat – for wheat beers

Specialty Malts

Add color, flavor, and/or body to the brew. Some can be steeped when extract brewing

- Carapils – for head retention and stability w/o affecting color, flavor
- Munich – increases body, aroma, malt sweetness
- Rye – Must be mashed, adds a spicy, fruity flavor
- Rauch – smoked malt used in Rauchbiers, with peat flavor 25L
- Special Roast – Imparts a toasty or biscuity flavor 50L

Crystal Malts

Sugars are caramelized and non-fermentable, used to add color, flavor, and head retention

- Crystal 15L to 120L – L denotes darkness of roast
- Caramunich – 70L
- Caravienne – 25L from Belgium
- Carastan – British version, 30L

Roasted Malts

For porters and stouts

- Chocolate Malt – has a chocolaty bitter flavor
- Black Patent Malt – very dark and bitter

Adjuncts

- Corn – lightens body, and adds corn taste
- Flaked Barley – added to stouts for head retention
- Black Roasted barley – Very dark grain (500L) used in stouts, very strong bitter flavor
- Flaked Maize – add to lighter American pilsners for lightening color and body
- Honey – adds fermentable sugars, some flavor and aroma
- Oats – adds a silky texture
- Rice – used in light colored beers for a dry or crisp flavor, very little taste

HOP GUIDE

Hops are selected and added to boiling wort to impart specific qualities to a beer. Some hops are considered best for bittering or

- **Bittering** : added early in the boil, 90 to 30 mins boil time
- **Flavor**: 30 to 0 mins boil time
- **Aroma**: 0 mins, or after fermentation, called “dry hopping”

VARIETY	ACID RANGE (ALPHA %)	FLAVOR PERCEPTION	COMMERCIAL EXAMPLE
Amarillo®	8-10%	A flowery, citrus-like aroma with medium bittering value that is gaining acceptance as a substitute for Cascade due to its hardy nature.	Ales, IPAs
<u>Cascade</u>	4-7%	Flowers, citrus & spice with grapefruit the noticeable fragrance quite often. This medium aroma balances the low bittering value. Very popular hop among craft brewers.	Pale Ales, IPAs, Porters
<u>Centennial</u>	8-11%	Flowers & citrus most evident. A medium aroma with mid to high bittering value makes it a dual purpose choice.	Ales, IPAs
<u>Chinook</u>	11-13%	A pine forest washed with exotic spice and infused with grapefruit. This alluring aroma and a high bittering value has gained this hop full respect from craft & major brewers.	Most beer styles from Pale Ales to Lagers
<u>Columbus</u>	14-17%	High on the bittering scale yet also valued for its oil content creates a hop that is an interesting dichotomy of sharp and herbal.	American IPAs & Pale Ales, Stout, Lager
<u>Crystal</u>	3-5%	Genteel, continental lady meets American belle with a delicate blend of spices and flowers. Low bittering value adds to the charm. Craft brewers love her style.	German-style Pilsner, Lager, Kölsch, ESB, Belgian Ales
<u>Fuggle</u>	4.0-5.5%	Classic English aroma hop with moderate bittering value. Pleasant wood and fruit tones will have you heading off to the hunt.	English-style beers (particularly Stout), American Ales
Hallertau	5-6%	Named for its origins in the Hallertauer region of Germany, this is a noble aroma hop with ever-so-subtle flower and spice fragrances defining its “über alles” superiority. Very low bittering value.	Pilsner, Bock, Lager, Wheat
Kent Golding	3-5%	The refined older English gentleman with his flowery tones that have produced some of England’s best bitters.	All English-style beers (Ales, ESB, Bitter), Belgian-style Ales
Liberty	2-6%	American cousin to Hallertau with very similar flower and spice characteristics. Best used as a finishing hop in German-style lagers.	Lager, Pilsner, Bock, Kölsch
Magnum	12-17%	A German thoroughbred with limited Pacific Northwest plantings. Prized for its high bittering value, the aromatic nature is one of spice and citrus.	Pale Ales, IPAs, German-style Lager
Mt. Hood	4-5%	Hybrid of Hallertau with similar mild flower/spice aroma characteristics with a hint more of the forest. “Clean” commonly describes it.	Lager, Pilsner, Bock, Wheat

HOP GUIDE (CONTINUED)

IBUs: stands for **I**nternational **B**ittering **U**nits, denotes the amount of bitterness in the beer. The Alpha Acid concentration of the hops (AAUs), quantity of the hops, and length of boil determines how many IBUs go into the beer.

VARIETY	ACID RANGE (ALPHA %)	FLAVOR PERCEPTION	COMMERCIAL EXAMPLE
Northern Brewer	7-11%	A plucky American filly found herself an affable English suitor and the happy union was this well-adapted hop with its neutral, clean aroma and slightly higher-than-average bittering value. Dual purpose.	English-style Ales, ESB, Bitter, Porter
Nugget	11-16%	Strong herbal/slight spice aroma and high bittering value (along with desirable growing traits) has brought this hop variety to the forefront of the industry.	All Ales, Stout
Perle	7-8%	A palate-pleaser with its moderate, clean bittering qualities and refreshing, spicy aroma.	A wide range from Pale Ale to Lager to Stout
Saaz	3-5%	The Old World steadfast standby made famous by Pilsner Urquell possesses the aromatic blend of earth and spice notable in European nobles. Low bittering value.	Pilsner, Lager, Wheat, Belgian-style Ales
Simcoe®	12-14%	A hop variety less than 10 years old that is quickly finding its way into the hearts of bitter-loving craft brewers. Intense pine aroma adds to the fresh, youthful vigor. Dual purpose but generally considered a bittering hop.	American Ales, IPAs, Double IPAs
Sorachi Ace	13-16%	A Japanese winner by all counts with its powerful lemon aroma, high bittering value and flavorful personality.	American Ales, Pale Ales, Wheat
Sterling	6-9%	Herbs and spices dominate, flowers and citrus around the fringes. Moderate bittering values with a mix of Saaz and Mt. Hood properties.	Ale, Pilsner, Lager
Summit (Dwarf)	17.5–19.5%	Quite new on the scene (2003) but the consensus is very positive with its “peak” bittering value coupled with robust citrus notes of orange, tangerine and grapefruit. Receiving accolades as an ideal hop for the ultimate Pale Ale.	<i>Drifter Pale Ale</i> , Widmer Brothers
Warrior	14.5- 17.0%	Its high bittering value and very mild aroma offers new dimensions to IPA & Double IPA brewers.	Three Floyd’s <i>Dogfish Head IPA</i>
Willamette	4-6%	The king of aroma hops in the U.S. with its modest bittering value and the joyous harmony of flowers, fruit, earth and spice.	American Pale and Brown Ales, English-style Ales

All-grain Brewing

Extract Brewing

FLOW CHART FOR MALTING AND BREWING

Harvest

Malting

Steeping

Germination

Kilning

Milling

Oxygenation

Trub removal

Hops

Boiling

Decoction

Infusion

Mashing

Pitching

Yeast strain

Fermentation

Lagering

Packaging

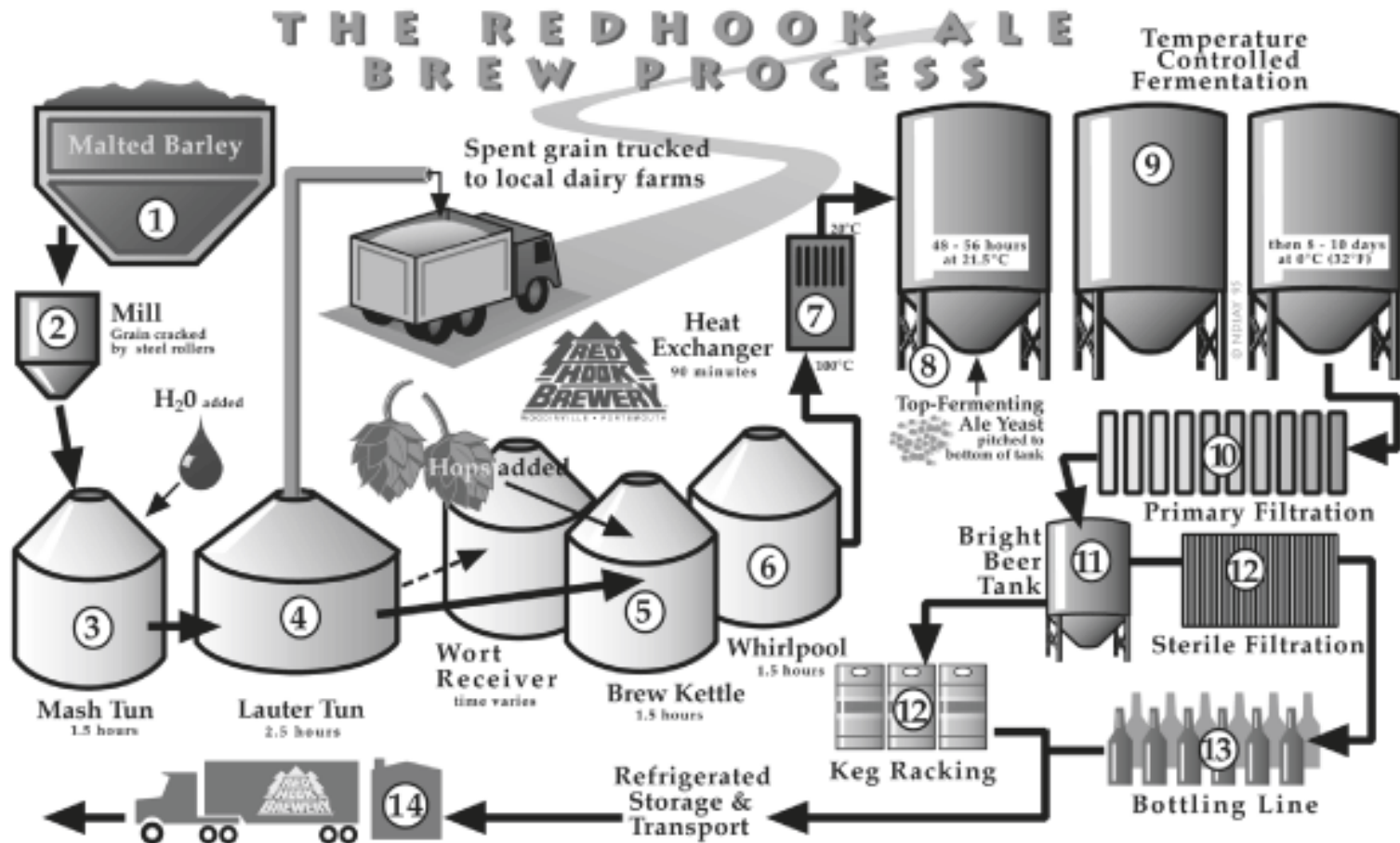
Conditioning

*Barley and
Malt processes*

Wort production

*Conversion of
Wort into Beer*

BREWING AT VOLUME – FOR LARGER BUDGETS





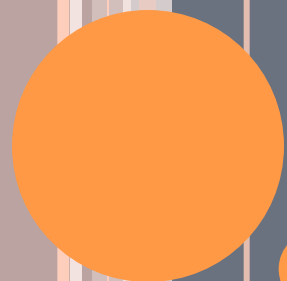
ROUND #2

Equipment and Process

THE HOMEBREWER'S TWELVE-STEP PROGRAM

- 1- Formulate your recipe, What do you want to brew?, What is your goal?
- 2- Water, If your water tastes good, the beer should!
- 3- Malt Extract vs. all grain brewing
- 4- The Mash
- 5- Sparging
- 6- The boil, hop additions and specialty ingredients
- 7- cooling the wort
- 8- Pitching Yeast and fermentation, Temp control!
- 9- Take your readings and write everything down(in case it turns out good!)
- 10- Cleanliness is next Godliness and Sanitation is King!
- 11- Bottling vs. kegging
- 12-Most importantly, Have fun!, its a *hobby* not a job.....yet!





ROUND #3

Recipes and Resources

DEREK'S COCONUT ROBUST PORTER

Ingredients

10.8 lbs American Two-Row
1.2 lbs American Crystal 60
.6 lbs British Chocolate
Malt
.6 lbs British Roasted
Barley

.5 oz. Magnum hops (13.1%
AA) for 60 minutes
1 oz. Willamette hops (4.6%
AA) for 30 minutes
1 oz. Cascade hops (6% AA)
for 5 minutes

Safale US 05 Dry American
Yeast

2 pounds packaged flaked
unsweetened coconut,
toasted

Directions

Mash grains at 154 degrees with 3.5 gallons of water for one hour. Mash out at 170° F and sparge with 5.5 gallons of water. Collect 7.5 gallons of runoff and bring to a boil. Add hops as indicated in the recipe. After a 60 minute boil (which should leave about 5.75 gallons of wort), chill wort to 70° F and transfer to fermenter. Pitch yeast and aerate well. Ferment at 68° F for one week, then rack to secondary fermentation bucket. Add toasted coconut in a sterile grain sack for one week. Remove coconut with sterile tool and rack beer into keg for force carbonation.

Original Gravity: 1.054

Final Gravity: 1.012

Alcohol by Volume: 5.5%

IBU: 40

SRM: 40



PLINY THE ELDER DOUBLE IPA (PART 1)

Ingredients for 6.0 gallons (22.7 L) [Net: 5 gallons (18.9 L) after hop loss]

13.25 lb (6.01 kg) Two-Row pale malt

0.6 lb (272 g) Crystal 45 malt

0.6 lb (272 g) Carapils (Dextrin) Malt

0.75 lb (340 g) Dextrose (corn) sugar

3.50 oz (99 g) Columbus* 13.90% A.A. 90 min.

0.75 oz (21 g) Columbus* 13.90% A.A. 45 min.

1.00 oz (28 g) Simcoe 12.30% A.A. 30 min.

1.00 oz (28 g) Centennial 8.00% A.A. 0 min.

2.50 oz (71 g) Simcoe 12.30% A.A. 0 min.

1.00 oz (28 g) Columbus* 13.90% A.A. Dry Hop (12 to 14 days total)

1.00 oz (28 g) Centennial 9.10% A.A. Dry Hop (12 to 14 days total)

1.00 oz (28 g) Simcoe 12.30% A.A. Dry Hop (12 to 14 days total)

0.25 oz (7 g) Columbus* 13.90% A.A. Dry Hop (5 days to go in dry hop)

0.25 oz (7 g) Centennial 9.10% A.A. Dry Hop (5 days to go in dry hop)

0.25 oz (7 g) Simcoe 12.30% A.A. Dry Hop (5 days to go in dry hop)

White Labs WLP001 California Ale Yeast or Wyeast 1056 American Ale Yeast

Original Gravity: 1.072

Extract Efficiency: 75 percent

ABV: 8.2%

Final Gravity: 1.011

IBUs: 90-95 (actual/not calculated)

SRM: 7



PLINY THE ELDER DOUBLE IPA (PART 2)

Directions

Mash grains at 151-152° F (66-67° C) for an hour or until starch conversion is complete. Mash out at 170° F (77° C) and sparge. Collect 8 gallons (30 L) of runoff, stir in dextrose, and bring to a boil. Add hops as indicated in the recipe. After a 90 minute boil, chill wort to 67° F (19° C) and transfer to fermenter. Pitch two packages of yeast or a yeast starter and aerate well. Ferment at 67° F (19° C) until fermentation activity subsides, then rack to secondary. Add first set of dry hops on top of the racked beer and age 7-9 days, then add the second set. Age five more days then bottle or keg the beer.

Extract Substitution

Substitute 6.5 lb (3.0 kg) of light dry malt extract for two-row malt. Due to the large hop bill for this recipe, a full wort boil is recommended. Steep grains in 1 gallon (3.8 L) of water at 165° F (74° C) for 30 minutes, then remove and rinse grains with hot water. Stir in dextrose and top up kettle to 8 gallons (30 L), and bring to a boil. Add hops as indicated in the recipe. After a 90 minute boil, chill wort to 67° F (19° C) and transfer to fermenter. Pitch two packages of yeast or a yeast starter and aerate well. Ferment at 67° F (19° C) until fermentation activity subsides, then rack to secondary. Add first set of dry hops on top of the racked beer and age 7-9 days then add the second set. Age five more days then bottle or keg the beer.



RECIPE FORMULATORS

- BeerSmith (Mac or PC) – www.beersmith.com
- ProMash (PC) – www.promash.com
- Beer Alchemy (Mac) –
<http://www.kentplacesoftware.com/products/BeerAlchemy.shtml>
- Web-based recipe formulators
 - www.brewtoad.com
 - www.hopville.com
 - Many more!





SOURCES FOR MORE INFORMATION

LOCAL HOMEBREW CLUBS

- The HeadQuarters (groups.yahoo.com/group/the_headquarters/)
- Hetch Hetchy Hop Heads
- Silicon Valley Sudzers (www.sudzers.org)
- Worts of Wisdom (www.wortsofwisdom.org)



LOCAL HOMEBREW SUPPLY STORES

- Beer and Wine Makers of America (San Jose – www.beerandwinemakers.com)
- Fermentation Solutions (Campbell - www.fermentationsettlement.com)
- MoreBeer (Los Altos - www.morebeer.com)



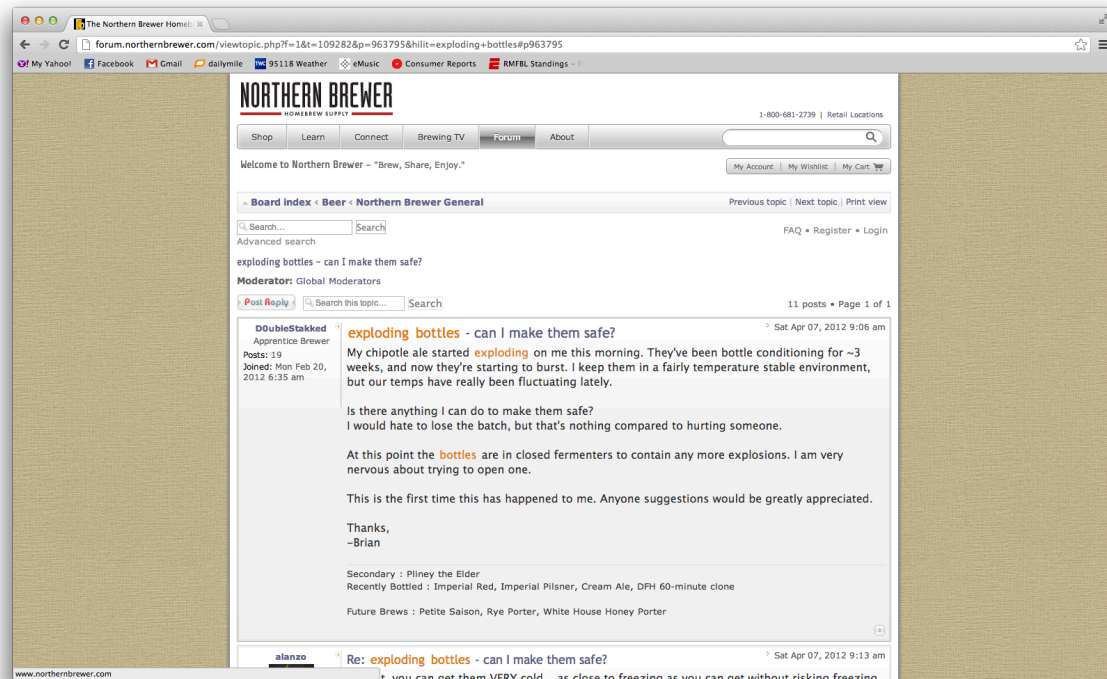
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- <http://is.gd/SKPzyL>



ONLINE FORUMS

- www.homebrewtalk.com
- forum.northernbrewer.com
- www.homebrewersassociation.org/forum/index.php





THANK YOU! CHEERS!

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