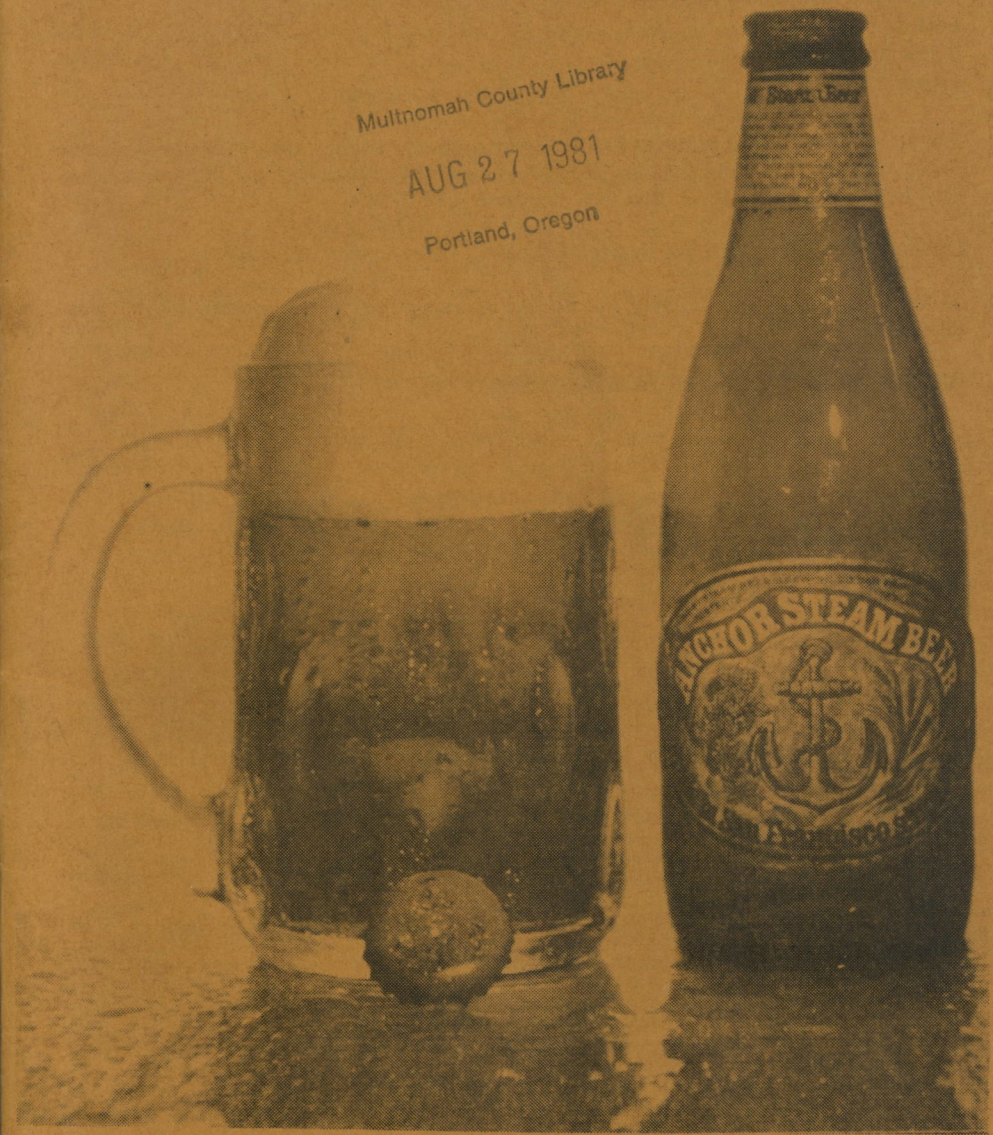
THE Amateur Brewer

FOR THE SERIOUS HOME BREWER



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Cover: Steam Beer Still Life, by Fred Eckhardt, from a color original.

AMATEUR BREWER No. 8, Summer 1981.

Talk to Your BEER

IF THERE's A RED "R" ON YOUR LABEL, you've expired, send money ($5) to Renew. After October, the price will be $6, but there'll be more for your money.

I suppose you are going to rant and rave about our being "late". Well, we've corrected that in our time-honored fashion: we changed the "due" date to August! Actually this first year of combination Annual and Newsletters has been more demanding (deadline-wise) than I had expected, hence the changes. I really do expect to find a schedule I can actually meet. August may seem to stretch things a bit, but I think you'll find that an AB in August will prepare you for good brewing in September-October which is when most people start their their brewing season. I was going to move it to August next year anyway! So there!

This issue has more than you ever wanted to know about Steam Beer: history, photos of the old brewery, and recipes. Alan Tobey of Berkeley's WATP has written a delightful paper on beer design wherein he bares his all. I was more than a little startled, last fall at UCDavis, when Alan expounded on his ideas of beer design. He was using a system, similar to my own, for formulating recipes, that is I thought that was what he was doing, but as his presentation moved on I realized he had gone much farther than I had ever done. Alan had a formula for everything, and I just love formulas. The more mathematical they are the better I like 'em. I rushed down after the lecture and begged him to do an article for AB. You'll love it, especially the part where you do cube roots! Sigh! Ain't life wunnaful!

(Continued on page 87)

THE STEAM BEER STORY

By Fred Eckhardt

One of the most fascinating success tales in U.S. Brewing history is the *Anchor* Brewery's story. I discovered ANCHOR Steam in 1969, when visiting San Francisco, I was dragged to an establishment called "The Olde Spaghetti Factory", on Green Street, to try this "very special beer", as my friend described it. He said it had the "real" taste of good beer. Well, we tasted that beer, and it was indeed quite different from any beer I'd ever tasted. I loved it.

ANCHOR STEAM BEER is now, and was then, a delightful and refreshingly different beer. Its heavy amber color, and heady hop flavor readily distinguish it from the pale dreary domestic beers I had been accustomed to drinking.

What actually makes steam beer different? To understand this we must look into the historical antecedents of modern Steam Beer.

Steam beer is a country cousin of German lager beer. As you know, lager beer is bottom fermented at cold temperatures from 50°F. down to 39°F., the temperature being lowered as the fermentation progresses. This slow fermentation is followed by a storage period of up to six months, during which the beer is aged or "lagered" at about 33°F. Lager beer is usually artificially carbonated, bottled and delivered for consumption.

In the mid-nineteenth century, when lager beer was introduced into this country from Germany, the practice was to make beer in the fall, winter, and spring, using natural ice from rivers and lakes to maintain the low temperatures. This "Ice Crop" was an important factor in the nation's economy. At this same time gold was discovered in California, and that territory became a state.

Among the large numbers of people who migrated to California were migrant German brewers, who soon found their liquid gold to be even more profitable than digging for the metal stuff.

The first California brewery dates from around 1849 in San Francisco, and by 1856 there were 15 breweries in that city. British style ale and porter can be

brewed in warmer climes, but many of these new settlers wanted the German style lager beer. Some brewers went so far as to import ice by sailing around the Horn; but this was costly and time consuming, and something else was needed immediately, so presto: Steam Beer! This was lager beer, warm-fermented in the British manner and, to give it life, it was krausened rather than primed. That is about one-third volume of new fermenting beer was added to the casks before delivery. This additional ferment gave the product a rich creamy head, especially so because the beer was served warmer and therefore under much heavier carbonation than we are accustomed to these days. Hence the name "Steam Beer". By all accounts it was a crude unpolished product, quickly made, and quickly consumed by the working man of that era. The first steam beer appears to have been made in about 1851.

Even though ice machines became available by the late 1850's, steam beer still flourished in San Francisco. A Mr. John Buchner writing in the *Western Brewer** in 1898 says "(Steam Beer) is bottom fermenting (like lager), and the fermentation proceeds at the high temperature of 60-68°F . . . steam beer is allowed from ten to twelve days from the mash tub to glass."

"The 'steam' refers to the strong carbonation, 'a pressure of fifty to sixty pounds per sq. inch,' caused by the introduction into the beer, when it is already in the barrel, of a portion of new wort at the early stage of fermentation ('green beer') — a process called 'krausening'. This is a priming operation, also used by some lager brewers, which leads to after-fermentation in the barrel, thus building up the 'steam'. Generally speaking, steam beer is not a connoisseur's drink; (Buchner had nothing better to say for it than that 'it is a pretty fair drink' . . .At any rate, it tastes better than the raw, hopped, bitter and turbid ales."

Actually, the original steam beer must have been a very unpredictable product. That which was brewed in summer was much harsher than the cooler fermented winter variety, while different ingredients, or lack of them, could very much influence the end product. If a brewer troubled to tunnel into a hill or deep in a stone cellar he would have produced a better product. It is quite obvious that some steam beer must have been quite wretched, not unlike prohibition home brew, while other steam beer would have been a very high quality product.

By the end of the nineteenth century there were over a hundred steam beer breweries in California, with others in Oregon, Washington, Idaho, and as far east as Wisconsin! There were 27 steam breweries in San Francisco, but the number declined as did the popularity of the product so that by prohibition there were only 7 steam breweries.

When prohibition was repealed in early 1933, only one steam brewery, the *Anchor* Brewery, founded in 1896, was revived under the leadership of Joe Allen, who kept it going with the cooperation of 25 or so San Francisco bars which served steam beer.

The *Anchor* Brewery was the smallest, and always lowest in production during these years but Allen hung on. He finally retired in 1959, and the brewery passed on to Lawrence Steece and Bill Buck, who revived it somewhat and,

*Baron, Stanley, *Brewed in America*, Boston: Little, Brown and Co., 1962.

in 1959, moved from their location at 398 Kansas St. to a smaller, tiny ramshackle un-brewery-like warhouse at 541 8th Street in the Potero district under a freeway. Even so production continued to drop from up to 1500 barrels (31-US gals each) down to less than 700 by 1965.

Bankruptcy seemed inevitable for the faltering brewery, and it was only a twist of fate that young Fritz Maytag heard of the brewery's plight from Fred Kuhn, the owner of the Olde Spaghetti Factory. Fritz, 27, was just out of Stanford Graduate School (Asian Studies), and not at all enthused about his family's dairy business in Newton, Iowa, or in the other branch of his family's washing machines either, for that matter. He did like beer, and he had come to enjoy the special qualities of Steam Beer at the Olde Spaghetti Factory. The next morning he went to visit the brewery to offer his condolences to the owners, and ended up paying $15,000 for a major interest. Originally he had intended to leave the brewing to experts already there, but as time wore on and he learned more and more about brewing (favorite text: DeClerk, *A Textbook of Brewing* 1958, Chapman-Hall London) he became convinced that he would have to take command and return the brewery to basics: all-malt brewing, quality hops, steady temperatures, and most important, rigid quality controls. He had either to buy the brewery completely, or give the whole project back to the wolves. Fortunately for the small-brewing, he took control of the brewery, and proceeded to make small-brewing a sound idea. In a manner of speaking he could be said to have made good home brewing a successful idea as well, because his beer has been, and continues to be, an inspiration to all of us.

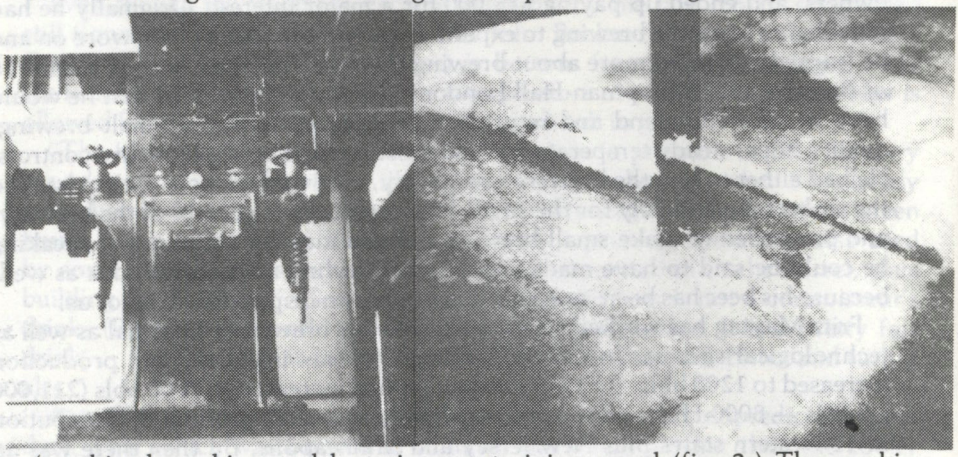
Fritz Maytag has worked steadily to make his brewery a financial as well as technological success. In 1971 a bottling line was installed, and production increased to 1200 bbls. By 1975 production had increased to 7000 bbls (211,000 US gals — 8000-HL), and the brewery finally showed a profit with distribution in 11 western states plus New Jersey and Minneapolis. By then there was an *Anchor Porter* (OG 1.060—15°B). It was clear by 1977 that the old warehouse was not a proper site, and Mr. Maytag bought a beautiful coffee plant not far away and, on a trip to Europe, he purchased a full storybook brewhouse — 3 magnificent copper vessels — in Karlshru, West Germany. The brew Kettle, Mash Tun, and Lauter-Tun were manufactured in 1956 by the famous *Ziemann* Corp. Brew capacity is 110 bbls (3410 gals, 12,908 litres) and two brews are produced daily.

Fritz Maytag makes an idealized beer, and infinitely more careful product than most of his lusty predecessors would have ever bothered to make. Modern steam beer is a completely natural beer, without any additives at all, (not even salt!), made only with San Francisco water (250 ppm hardness-filtered), barley malt (now from *Great Western* in Los Angeles) and almost all of the Yakima Valley crop of *Norther Brewer* hops (a Golding-type hop). Our description and these photographs are from my 1973 trip to the old brewery, taken with the kind permission of Fritz Maytag. You can see the new brewery on your next visit to San Francisco, but be careful to call first to make an appointment for a tour, and partake of steam beer where it is made.

* * *

BREWING IN THE OLD BREWERY

In 1973 I photographed the brewing operations in the old brewery and, in a sense, that may be of more interest to most of you because you CAN visit the new brewery, but the old one is gone forever. In the old brewery refrigeration was used to maintain steady temperatures, and this continues to be so even now. The brewing operation (weekly) began around 5 am with grinding the malt. The 54 barrel batch (1674 us gals — 6370 litres) required about 2400 lbs (1225 kg) pale malt and about 200 lbs (91 kg) of Caramel malt. The lovely old malt mill (fig. 1.) was manufactured around the turn of the century, and has been obtained by Fritz from the old *Acme* Brewery (out of business in 1957). The malt was ground and mashing-in took place in an English-style mash-tun



(combined mashing and lautering or straining vessel (fig. 2.) The mashing sequence was a modified infusion technique recommended by De Clerk; that is with temperature rests starting at 118°F(48°C), and conversion at 158°F(70°C), following which the temperature was raised to 170°(76°C); total time about three hours. About 57 bbls in the kettle at 1.047 (yield 1.034/lb/gal —

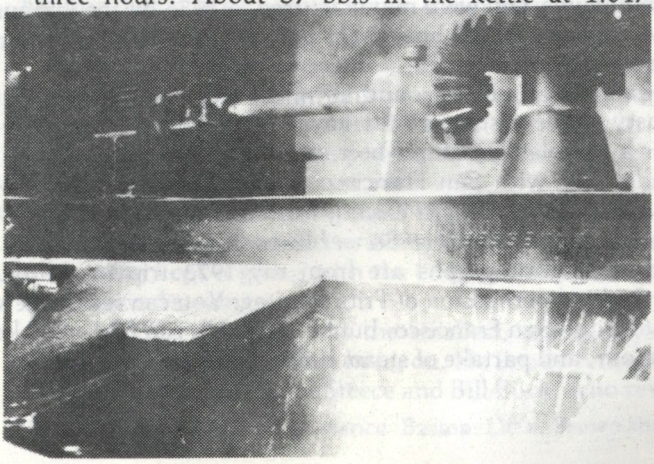
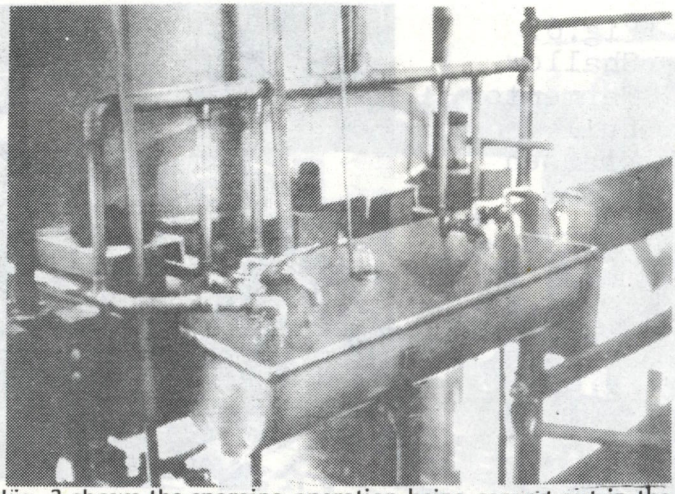


Fig. 1, 2.

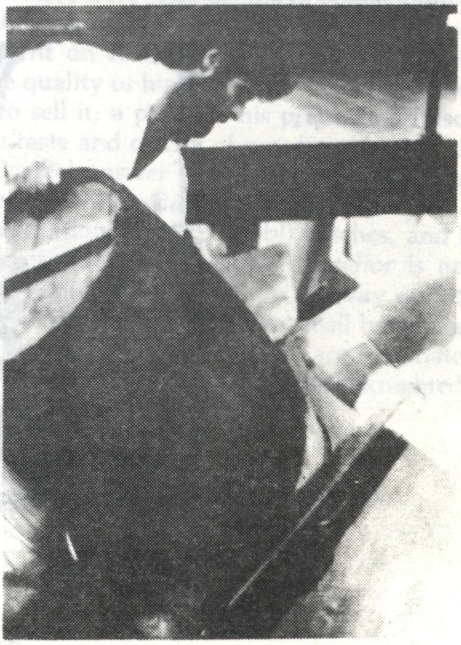
Fig. 3.

Fig. 4.



1.028/100gm/litre). Fig. 3 shows the sparging operation being carried out in the mash-tun. The wort was first run from the *pfaffs* (spigots) into the copper *grant* (basin) (fig. 4), and when clear, was run into the beautiful old copper kettle with a huge steam perculator in the bottom. The wort was brought to an immediate boil in the bottom of the kettle as that vessel was filled, and was held at a full rolling boil for an hour-and-a-half to two hours, until the wort had concentrated to an original gravity of 1.051. This usually resulted in 54 to 55 barrels of hot wort. Forty five to fifty pounds of *Northern Brewer* hops were added (fig. 5) in increments starting at first break; with the last being added when the hot wort was in the hop jack, where it was allowed to settle for about 30 minutes. The hot wort was then strained off, sparged, transferred to the hot wort tank, and then passed thru a heat exchanger to cool it to 60°F(15.5°C).

Fig. 5.



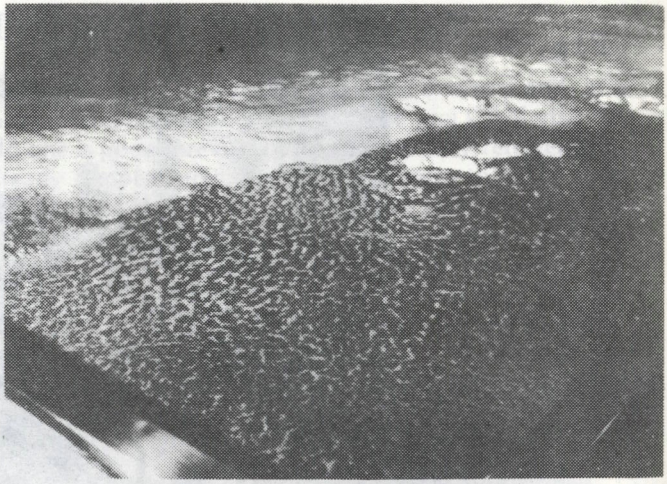


Fig.6. Shallow Fermentor, Full Krausen

The wort is pumped into the distinctive shallow pan stainless steel fermenting vessel, which is about 2½ feet deep at one end and about 3½ at the other — a small swimming pool, (fig. 6). Primary ferment takes about four days when it is racked into secondary fermentors at a gravity of about 1.014. Secondary ferment lasts from about 5 days to a terminal gravity of 1.012 or so and whenever a new batch of beer was available for the krausening process. Secondary ferment was carried out at 50°F(10°C) in capacity (fig. 7). These are called krausen tanks.

Krausening takes place when a new batch of beer has been set, and has begun its heavy fermentation phase (krausen of foam head).

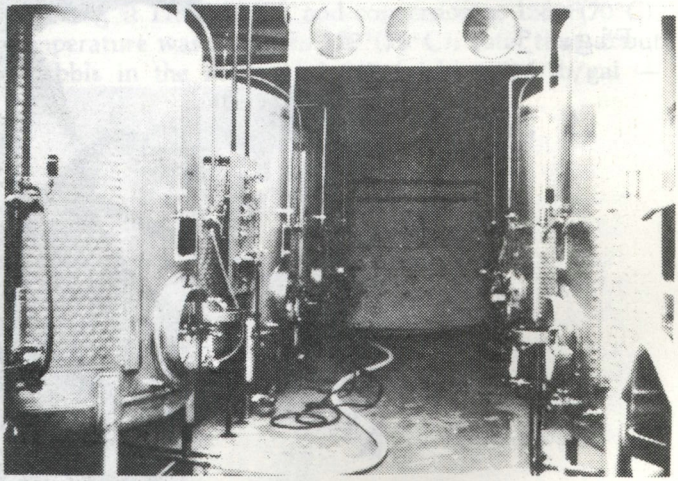
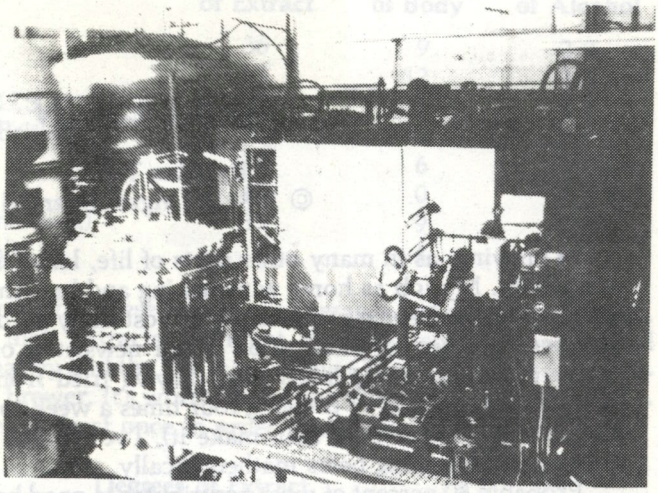


Fig. 7. Krausen tanks

Fig. 8
Bottling
Line.



At this time some of this new beer, equal to about 20% of volume, is pumped into the secondary tank, after which the fermentation lock is closed. This new fermentation provides natural carbonation for the beer and after 3-4 weeks the beer was ready to be racked into kegs for delivery to the some 50-odd outlets in the San Francisco area. The finished beer has an alcohol content of just under 4% by weight. This krausened beer has a distinctive flavor, and a rich creamy head.

There are those who might say that refrigeration — even to a modest 50°F— is not in keeping with the spirit of steam beer, whose *raison d'etre* is the absence of refrigeration. I asked Mr. Maytag about this, and he admitted that 50°F might be a little low, but he said there were wine cellars in Napa county just north of San Francisco, where the deep cellar temerature stays at about 55°F all the year around. Maytag went on to explain that fluctuations of weather in San Fancisco could hurt the quality of his beer, and even though he wanted to be authentic, he still had to sell it; a problem his predecessor also had. Temerature variations affect the taste and clarity of any fragile product like beer. Refrigeration is the only logical answer when brewing beer in a modern city like San Francisco, where deep wine cellars are a thing of the past.

The new brewery brews beer in larger (double size 110 bbl) batches, and I imagine that there are differences in production these days. *Anchor* is no longer the smallest brewery in the U.S., and indeed is well on the way out of the category of small brewery in the new definition of the *really* small breweries of today, nonetheless we all cherish their success story. If you are fortunate enough to find *Anchor* beer in your local store, drink one for those beknighted souls left in the darkness out there in *Bud-Schlitz-Millerland*.

* * *

BEER DESIGN

By Alan Tobey

In brewing, as in many other parts of life, laziness is often the best spur to creativity. My job as home winemaking and brewing manager for Berkeley's Wine and the People requires me almost daily to develop new custom beer recipes — either for publication in our newsletter or for customers who just have to duplicate the latest beer they've tried from Tahiti or Pottsville or Ochsenfurt. Instead of brewing four times a week to test out my instincts (I'd much rather drink beer than make it), I've worked instead to develop techniques for designing beers mathematically.

Probably 80 percent of what contributes to good beer flavor can be precisely calculated — alcohol level, body, bitterness, balance, texture, etc. — while developing the final nuances of hop aroma, basic malt character and flavor, and the like, remains an art that is best developed by practice and experience. Here I'll show you what can be generated in numerical terms; the art I'll leave to your own brewing and drinking abilities.

The Basic Priciple for Calculation

All home brewers are indebted to Britain's Dave Line (*The Big Book of Brewing, Brewing Beers Like Those You Buy* and others), who began the process of mathematical modeling that I extend here. Line's useful insight was to use as the basis for calculation an artificial variable created by seeing how much of a particular flavor component is contributed by a unit weight of an ingredient to one gallon of beer wort. "Degrees of extract," for example, is his term for the number of points of specific gravity contributed to one gallon of wort by one pound of malt extract, barley grain, or adjunct. One pound of malt extract, when boiled in water and adjusted to one gallon volume, will produce a specific gravity of about 1.036 — in Line's terms, 36 "degrees of extract." For hop bitterness, he invented the term "alpha acid unit" (AAU), the relative amount of bitter alpha acids contributed by one ounce of hops to one gallon of wort. For example, one ounce of Cascade hops with 8 percent alpha acid weight contributes 8 AAUs to a gallon of wort. Using these basic conceptual units (and others like them), it is possible to calculate just how much of the various components of beer will be required to produce any quantity of a particular style or flavor of beer.

The Malt Variables

In the table, three variables are charted, which are contributed to the beer by the malt (or by sugar or adjuncts). How to use the variables for calculation is explained in the following sections.

Ingredient	Degrees of Extract	Degrees of Body	Degree of Alcohol
Malt Extract (Syrup)	36	9	2.9
Malt Extract (Dry)	45	12	3.5
Pale Malted Barley (U.S.)	28	7	2.2
Pale Malted Barley (British)	32	8	2.6
Crystal Malt	15	6	0.1
Corn Sugar	43	0	4.6
Corn or Rice (after mashing)	35	9	2.8
Roasted Grain or Malt	4	4	0

It's important to stress that these figures are averages and cannot be precise. Different brands of malt extracts, different mashing techniques, seasonal variations in malted barley and the like may produce somewhat different numbers for an individual brewer. It's worth measuring the contributions of the ingredients actually used at least once in order to develop an accurate table.

Degrees of Extract

This variable is used to calculate either the original specific gravity (OG) of a beer wort made from known ingredients or else the amounts of ingredients needed to produce a wort of any desired OG. The calculation is based on the number of degrees of extract (specific gravity points) produced by one pound of ingredient in one gallon of wort. British/Canadian readers, multiply this figure by 0.833 for lb./Imp. gal. or 100 gm/liter — metric degree of extract. To calculate original gravity, add up the individual degrees of extract contributed by each ingredient and divide by the number of gallons being brewed.

Example 1. What is the original gravity (OG) of a 5-gallon beer wort using 5 pounds of light dry malt extract and one pound of crystal malt?

Dry Malt Extract: 5 lbs. × 45 degrees/lb. = 225 degrees of extract
Crystal Malt: 1 lb. × 15 degrees/lb. = 15 degrees of extract
Total (sum of both ingredients) = 240 degrees of extract

There are 240 degrees of extract in the beer as a whole; to find OG (degrees of extract *per gallon*), divide by the number of gallons:

240 total degrees of extract ÷ 5 gallons = 48

The original specific gravity of the beer will be 1.048.

To calculate the amounts of ingredients needed to produce a desired OG, first find the total degrees of extract in the wort and subtract from it the degrees of extract contributed by each ingredient:

Example 2. How many pounds of U.S. Pale Malted Barley are needed to produce 8 gallons of wort with an original gravity of 1.040 if the mash includes 3 pounds of crystal malt?

OG 40 × 8 gallons = 320 total degrees of extract
3 lbs. × 15 degrees = 45 degrees from the crystal malt
Subtract: 275 degrees needed from pale malt
275 ÷ 28 degrees of extract per pound = 9.8 lbs. pale barley needed

Degrees of Body

One of the most useful things for a brewer to know is the final or finishing specific gravity (FG) of a given beer wort. Not all of the degrees of extract contributed by the malt ingredients are fermentable: a proportion remains after fermentation to give body and substance to the beer. I've called "degrees of body" the number of *unfermentable* specific gravity points contributed to a gallon of wort by one pound of an ingredient. Note in the table that corn sugar, corn and rice all contribute *no* degrees of body to a wort; all of their specific gravitiy contribution is made up of fermentable sugar. Roasted grains are just the opposite: *none* of their small contribution to specific gravity is fermentable, so their degrees of body are the same as their degrees of extract.

To calculate final gravity (FG), add up the degrees of body contributed by each of the ingredients used and divide by the total number of gallons of wort:

Example 3. What is the final gravity of the beer in example 1 above?

Dry Malt Extract: 5 lbs. × 11 degrees of body = 55 degrees
Crystal Malt: 1 lb. × 6 degrees of body = 6 degrees

Total degrees of body in the wort = 61 degrees

61 total degrees of body ÷ 5 gallons wort = 12.2 degrees per gallon. The final gravity of the beer will be about 1.012.

Alcohol Level

The difference between the original specific gravity and the final specific gravity is a measure of how much sugar from all sources has fermented into alcohol. For most beers of normal strength alcohol can be approximated with sufficient accuracy by the formula

% alcohol by weight = (OG-FG) × 0.107

For the beer in examples 1 and 3, alcohol = (48-12) × 0.107 = 3.9% by wt.

Most of the time, home brewers don't need or want to design a beer with an exact alcohol level (flavor and body are more important concerns), but the calculation is easy enough to do if desired. Use the variable "degrees of alcohol" in the table; this is the amount of alcohol produced by one pound of ingredient in one gallon of beer. The calculation is the same as for the other malt variables:

Example 4. To make 10 gallons of beer with commercial strength 3.8 percent alcohol would require 10 × 4 = 40 total degrees of alcohol. You can adjust the amount of ingredients used so that the individual degrees of alcohol add up to 40, for example:

10 lbs. Malt Extract Syrup × 3.5 deg./lb. = 35 degrees of alcohol
3 lbs. Crystal Malt × 1.2 deg./lb. = 3.0 degrees of alcohol

Total: 38.0 degrees

This may require a bit of fiddling with quantities, especially if you use several malt or adjunct ingredients. Once you know how much of each ingredient you need to produce the desired alcohol level, though, you can easily calculate OG and FG by the means described above.

Degrees of Bitterness

Using similar variables, it's possible to calculate the level of bitterness of a beer and how much of a given hop variety is needed to produce the bitterness level desired. The predominant contributors to hop bitterness are the alpha acids, which may range from about 6 to 12 percent of the weight of the hop. By Dave Line's formulation, 1 ounce of hops contributes 1 Alpha Acid Unit (AAU) to 1 gallon of wort for each 1 percent of alpha acid it contains. I've called this 1 "degree of bitterness" to emphasize that the bitterness calculation is done in the same way as the calculations for malt and alcohol:

Example 5. To see this in familiar terms, calculate the degree of bitterness of a 5-gallon batch of beer using 2 ounces of Cascade hops for bittering at 8 percent alpha acids:

2 oz. hops × 8% alpha = 16 total degrees of bitterness in the beer
16 degrees of bitterness ÷ 5 gallons = 3.2 degrees of bitterness per gal.

Degrees of bitterness, then, measures the relative bitterness of a beer based on the amount of alpha acids per gallon. Once you know what level you prefer (a matter of personal preference again), it is easy to calculate how many ounces of hops are required to produce a given degree of bitterness in any quantity of beer wort:

Example 6. How many ounces of Pride of Ringwood hops (11 percent alpha acids) are required to produce 2.5 degrees of bitterness in 12 gallons of ale?

12 gals. beer × 2.5 degrees of bitterness = 30 total degrees required
30 total degrees of bitterness ÷ 11 degrees/ounce = 2.7 oz. hops needed

Balance

Although the level of bitterness of a beer is ultimately up to personal taste, translating a preferred bitterness level into an amount of hops required is not a completely simple calculation. It's the perfect balance of malt sweetness and hop bitterness which is the final glory of an excellent beer. To create a beer that's balanced between malt and hop flavors, more hops are required to balance full-bodied or high-alcohol beers than to balance light-bodied or lower-alcohol beers. This is because the unfermentable dextrins and higher sugars which contribute to a beer's body partially mask the perceived bitterness contributed by the hops. In practical terms, the 2.5 degrees of bitterness per gallon you might prefer for a full-bodied Stout would be far too much for a light American Lager. How, then, can this bitterness level be calculated in a way that takes beer style into account and still produces balanced beers?

Beer balance is a hard concept to calculate from abstract principles. After a lot of experimentation, though, I've developed a formula which works reliably for me:

$$\text{Degrees of bitterness per gallon} = 0.111 \times \sqrt[3]{OG \times FG \times (OG - FG)}$$

To see how this works, think of it this way: Relatively more hops are needed to balance higher original gravity (OG), higher final gravity (FG, a measure of body) and higher alcohol (proportional to the amount of OG fermented, OG-

FG). Multiplying them together and then taking the cube root is a way of averaging out the effects of each element's contribution to hop needs. The number 0.111 is arbitrary, a way of translating specific gravity numbers into a level of hop bitterness that I personally prefer. That number is easily changed to suit personal taste — use a higher number to produce a more bitter beer (i.e., 0.125 or 0.14), a lower number (i.e., 0.08) for less bitterness. Once you've determined by experiment your personal "bitterness constant," though, it will accurately predict the amount of hops to use to meet your taste over a wide range of beer styles.

Let's look at several styles of beer to see how the balance calculation works:

Example 7. How many degrees of bitterness per gallon are required for:

a) an American-style Lager — OG 36, FG 4
b) an English Bitter — OG 45, FG 10
c) a full-bodied Porter — OG 52, FG 16
d) a Barley Wine — OG 90, FG 24

The degrees of bitterness per gallon are calculated as follows:

a) $\sqrt[3]{36\times4\times(36-4)}\times0.111=1.8$
b) $\sqrt[3]{45\times10\times(45-10)}\times0.111=2.8$
c) $\sqrt[3]{52\times16\times(52-16)}\times0.111=3.5$
d) $\sqrt[3]{90\times24\times(90-24)}\times0.111=5.8$

Remember that to convert degrees of bitterness into ounces of hops required, use the calculation shown in Example 6. Using the same figures (12 gallons beer, hops with 11 percent alpha acids) produces the following hop requirements:

a) 12 gals. × 1.8 degrees of bitterness ÷ 11% alpha = 2 oz. hops
b) 12 gals. × 2.8 degrees of bitterness ÷ 11% alpha = 3 oz. hops
c) 12 gals. × 3.5 degrees of bitterness ÷ 11% alpha = 3.8 oz. hops
d) 12 gals. × 5.8 degrees of bitterness ÷ 11% alpha = 6.3 oz. hops

It's unfortunate that this formula requires finding a cube root to solve it, but none of the other formulas I've tried work over the full range of beer styles. Cube roots, however, can be found at the touch of a button on many medium-priced pocket calculators (I use a Texas Instruments TI-55 that cost $35), and you may also use an even more inexpensive slide rule, so no mathematical skill is necessary.

An Alternate Method to Find Balance

If cube roots are out of your league, a less reliable, but still usable, method follows. Assume an empirical relationship:
(OG-FG) / FG × degree of bitterness (above), a constant. The higher the constant, the greater the bitterness at balance; I prefer C = 12; maximum range should be 11 to 13.

Example: What is the Balance Constant for my favorite beer — OG 40, FG 10, 2½-oz. hops @ 8% alpha per 5 gals. beer?
Constant = (OG-FG) / FG × Deg. Bit. = (40-10) / 5 = 3 × 4 = 12
Example: (36-4) / 4 × 6 × H / 10 = 12 (balance constant) = 4.8H; therefore, H = 12 / 4.8 = 2.5 oz. hops.

Finish Texture

Ales brewed with hard water have a drier, more mineral-like finish than lagers brewed with soft water. For all practical purposes, the perceived amount of this mineral flavor and texture is proportional to the amount of sulfate ion in solution in relation to the body of the beer. One gram of gypsum (calcium sulfate), for example, yields about 130 parts per million (ppm) sulfate in one gallon of wort. In order to balance this flavor component, I find it useful to calculate a ratio of ppm sulfate to final gravity (body) of the beer; knowing the ratio I prefer for a given beer style allows me to determine how much sulfate to add to my brewing water, which is quite soft. For example, for three beers all with a final gravity of 10, I would prefer:

Pale Ale: 500 ppm ÷ 10 FG = ratio 50
Dortmunder: 100 ppm ÷ 10 = ratio 10
Lager: 20 ppm ÷ 10 = ratio 2

If I were brewing a beer with a higher (or lower) expected final gravity, I'd adjust the level of sulfates proportionately. For example, for a pale ale with an FG of 8, I'd adjust my brewing water to contain 50 (my flavor ratio) × 8 (FG) = 400 ppm sulfates. This would require 400 ÷ 130, or about 3 grams gypsum per gallon.

The Art of Brewing (What Can't Be Calculated)

Beyond the numbers, brewing is still all a matter of preference and prejudice. For example, how much caramel or roasted malt to use per unit weight of pale malt to produce a particular style of beer is something that still has to be determined from tasting the results in the mug. Hop flavors and aromas, too (not just level of bitterness), are variables that only the palate of the brewmaster can decide on. Knowing what can be accurately calculated, though, gives the creativity of the brewer a firmer base to work from and at least prevents the grosser sorts of misproportions. For me, being able to calculate alcohol, original and final gravity and hop balance means that it now rarely takes me more than two tries to perfect a beer recipe I'm working on. I can concentrate on the nuances of hop and malt flavors and aromas because I know everything else will come out right. It's enough of an improvement to make a lazy brewer almost content.

Even More Laziness

As the final logical extension of this process, I'm now writing a computer program to do all my beer designing automatically. I'm basing it on the numbers I can generate mathematically and adding on my own prejudices about the flavor and aroma components of different beer styles. I may never have to do a "trial brew" again. Now if I can only automate my mash tun . . . .

* * *

Alan Tobey is the manager of the beer and winemaking supply department of *Wine and the People* at 907 University Ave., Berkeley, CA 94710, (415) 549-1266. Alan is also editor for *Wine and the People News*, a quarterly published by WATP, who, incidentally, have some English Golding hops for sale (4 oz./$4.25, plus shipping). The store has one of the widest arrays of beer supplies I have seen, including 10 varieties of bulk malt extracts, and seven varieties of hops (3 fresh, 4-pellets, including Nor Brewer pellets).

* * *

WANTED: WRITERS

We have a steady need for articles on any phase of beermaking. We are especially interested in your beer, your recipes, your equipment, your procedures and YOUR ideas. We need input. We are told regularly, and by a variety of readers, that we are doing a good job, but the editor has a relatively narrow viewpoint (traditional beer). We have no desire to make the magazine/newsletter a narrow publication. All ideas are welcome (and have been so). Most of our readers consider themselves fairly skilled at beermaking, and they are looking for new ideas and procedures and recipes that will enhance their product. YOUR ideas or procedures may be just what they need. We welcome your input.

PERIODICAL REVIEW

One of the more pleasant developments we have noted is the continuing improvement of our "competitors": *Home Fermenter's Digest* and *Zymurgy*. I use the word competitor loosely, because we really do not compete. We have each etched a segment of interest as our own territory, although they do overlap. These days, when I attend some brewing function, I can be sure to find Charley Papazian *(Zymurgy)* or Georgia Weathers *(HFD)* there as well. The evenings we spend drinking, during and after such functions, have begun to be well-remembered occasions for myself, especially since there are usually several other home brewers with whom to exchange greetings and share secrets. Now we have a new fraternity member: Al Andrews, who has begun publishing a short newsletter on home draft systems called *The Tapper*, a quarterly at $2 per year. *The Tapper* is offered in conjunction with Al's part-time business of setting up and selling parts for home tapping systems. Al Andrews, 5740 via Sotelo, Riverside, CA 92506.

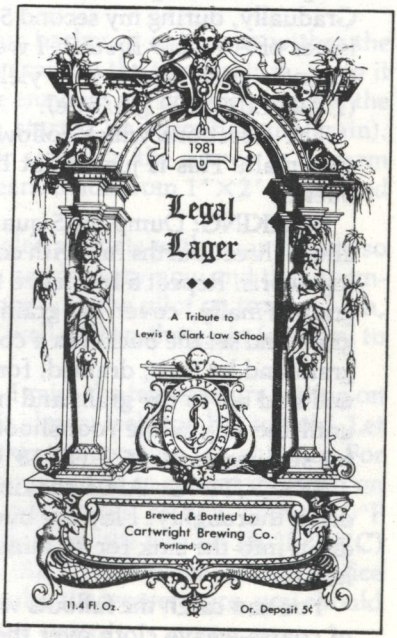
On the East Coast there is a publication called the *Beverage Communicator*, official publication of Home Wine and Beer Trade Association, but it is filled with interesting articles, many of them about beer. Editor and publisher, and one of the nicest ladies in captivity, is Tao Porchon-Lynch, and she is English. A quarterly at $8 annually from Box 43, Hartsdale, NY.

Incidentally, before I forget, let me say that HFD has gone *monthly*, and not missing their publication days like some we might mention. $12/year from *HFD*, Box 602, San Leandro, CA 94577.

Zymurgy has published a free special issue about their convention (p. 84). It is free from your supplier. If your supplier hasn't any left, or you deal mail order, or whatever, WE have some free copies of that issue of *Zymurgy* to give away, IF you send us an 8½×11 envelope, WITH a 52-cent stamp (there are limits to free). The new and bigger and better *Zymurgy* is $8 for 4 issues from American Homebrewers Assn., Box 287, Boulder, CO 80306. I like to think WE'VE improved, too, and we are still (but not for long) only $5 for the year, *AB Annual* and four newsletters.

f.e.

LEGAL LAGER IS A COMMEMORATIVE ALE



To the right we have reproduced the label of a local Brewer's commemorative ale, made for the LEWIS AND CLARK LAW SCHOOL'S 1981 graduating class. The beer was put together at the suggestion of Tom Burns, who works part time at the Brewery, and is himself a member of the graduating class. We think the idea is an excellent one, and it is something any small brewer might do. The label was designed by Professor Jack Lanau of the Law School. The beer is rich and full bodied with an OG of 1.050 (corrected to include priming with dextrose at 1.5% oz/US gal), and hopped with 55% Yakima *Cluster* pellets and 45% Yakima *Cascade* pellets at 0.9 lb/bbl (6.3 gm/US gal). The beer is brewed with a mixture of two row, six row barley, and caramel malts (10% the latter). 100 cases of the beer were produced (225 gallons). The beer is a real ale, not a true lager, although fermented with a bottom yeast. *Cartwright* Brewmaster-owner, Charles Coury said he might do other commemorative ales as well, since it seemed like a good business venture and great fun.

* * *

MALTING YOUR OWN BARLEY AT HOME

By Bill Petrij

In the fall of 1979, I went to my local beer supply store, only to leave empty handed. My order for malted barley was shorted and they had no idea when it would be in. I, being in a beer-making mood, drove straight to the local feed store and bought 50 pounds of feed barley and happily returned home. Then I exhausted the local public and college libraries. Armed as I was, my first attempts at malting mashed like cooked oatmeal and had a foul odor to boot. Gradually, during my second 50 pounds of barley and after getting all the back issues of *Amateur Brewer*, I worked out a malting procedure which gives consistently good results with yields in the range of 1.025-1.028/lb./gal. of wort (1.020-1.023/100 gm/litre).

The directions which follow are for malting a 5-quart (7-pound) batch of pale malt. This is just about the practical limit for a 4½- to 5-gallon plastic bucket.

SOAKING: Dump the 5 quarts of barley into a clean 5-gallon bucket and fill about three-fourths full with cold tap water. Stir briskly and skim off the floating debris. Repeat a few more times for the stragglers, then drain and rinse the grain. Finally, cover the grain with about twice as much water as you have grain and set the bucket in a cool, dark place. If possible, twice a day drain the grain and let it sit, drained, for an hour or two. Refill and let soak again. This will add air to the grain and help avoid suffocation. Do this for two days or until the tiny white root-shoots "chits" appear. The usual temperature range for soaking is 54-64°F (12-18°C).

SPROUTING: After soaking, drain the grain, rinse once more and then drain thoroughly. I lay my bucket on its side on the kitchen counter and let it drain into the sink for 10 minutes (a ½-inch block under the bottom end will help).

You can catch the fallouts with a wire strainer. After draining, place a piece of coarse-weave cloth over the mouth of the bucket and secure with a strong rubber band. Lay the assembly on its side in a cool, dark place. I use the area under the kitchen sink.

One point to keep in mind at this time is that shoot growth rate is independent of enzyme production. This means, keep the temperature as low as possible so you can keep the shoot growth down, and this in turn keeps more of the starch in the grain and less in the shoot; hence, better yields. Normal temperatures for this step run 64-72°F (18-22°C).

A perforated-bottom bucket to drain and sprout your grain is very convenient. You'll have to drill about 200 1/16th-inch (1.5mm) holes in the bottom of a plastic bucket and scrape the turnings off the inside. The plastic lid eliminates the cloth cover, too.

About twice a day, pick up the bucket and give it a gentle shake or roll. This will help keep the moisture and air evenly distributed in the grain. This is also a good time to peek inside and see what's happening. Should the grain feel dry to the touch, add an ounce or two of cold water. Be careful not to get the grain

soggy, as it won't sprout well if it does. As the next three to five days pass, the rootlets will grow longer and you'll notice a pleasant cucumber-like aroma as well as a gentle warming of the grain. You'll also notice the sweet taste of the grain as compared to the raw flour-like taste of the unmalted grain.

As a general rule, when the rootlets are about 1½ times the length of the grain, the acrospire (shoot of the actual plant) will be about three-fourths the length of the grain. You will have to break a grain open to see the slender, finger-like acrospire growing inside the husk. It grows away from the rootlets. For American six-row barley, let the acrospire get about three-fourths the length of the grain. For English two-row barley, let it grow just to the tip of the grain. Distillers let the acrospire grow out the top of the grain for 1 to 2 inches. You now have green malt.

DRYING: Now that you have malted your barley, it is time to wither the rootlets and dry the grain. Go slow at first in raising the temperature. Keep it below 90°F (32°C), or you will inactivate the enzymes which will complete the conversion of starches to sugars (what you started by sprouting the grain). Spread the now-malted barley on a sheet or screen in the sun or in a warm room for a day or two. I use two 2′ ×2′ screens made from 1″ ×2″ wood and aluminum screening.

You'll need to break up the clumps of tangled rootlets with your fingers so they will dry evenly. Stir the grain with your hands every now and then to improve air circulation. I used my heating furnace with the pilot on to start with, and I'm sure several light bulbs will work as well. When the grain feels dry to the touch, you are ready for the next step.

ROASTING: After the initial drying stage, I raise the temperature setting on the furnace and work stirring the grain until it almost feels too hot to hold. Let this take about an hour. Then let it stay at this temperature for an hour. For me, this is about 160°F (70°C). An alternative would be to spread the grain on cookie sheets and roast them in an oven set to its lowest setting, about 200°F (95°C), with the door slightly ajar as necessary to get the desired 160°F (70°C) temperature. A food dehydrator with a 180°F (82°C) thermostat should suffice also. Should your grain start popping as you raise the temperature, you should reduce the temperature and let it dry out some more.

About this time, you will notice the pleasant aroma of malt (or the smell of the furnace on fire if you let the rootlets fall in and don't clean them out). Periodically sift out the rootlets by shaking the screens over a drop cloth. This heating helps to caramelize (brown) the sugars, as well as make the grain easy to grind.

One hopefully effective way to minimize Nitrosamines from forming in your malt is to ensure that your heating source is indirect so the exhaust gases don't come in contact with the malt.

To get a fair approximation of your malting efficiency, drop about 100 malted, roasted grains in a glass of water. Those that float flat on the surface are fully malted. Those that float on end are partially malted. Those that sink are unmalted. I get about 85 percent of mine to float flat.

Your malted barley may now be stored until ready for use. Be sure to keep it "bisquit-dry," as they say in England. When used, the grain must be broken in pieces to get the sugars, etc., out. I use the coarsest setting on my flour mill

(about 1/8-inch separation on the stones). Before that, I used a hand coffee mill, and before that a rolling pin. The flour mill takes about five minutes to grind 10 pounds of grain; the hand coffee mill about 45 minutes for 5 pounds. Ideally, you want the husks intact and the inside broken into a spectrum of sizes. The husks serve as a filter bed during sparging. With the husks ground up, you'll extract the flavor from them, and this gives a grainy off-flavor to your finished beer.

To make a mild-flavored "Dortmund-like" malt, you'll need to roast your pale malted barley an additional hour at 195-205°F (91-98°C). Raising the temperature to 212-220°F (100-105°C) for the second hour will produce a rich, malty-flavored "Munich-like" dark malt.

Crystal malt can be approximated by covering the damp green malt and quickly raise the temperature to about 160°F (70°C) and "mashing" the grain whole. You need to keep the grain from drying out for about an hour while heating it. Then uncover and roast as for pale malt or hotter as you prefer.

* * *

Bill Petrij is a Santa Rosa homebrewer who resents paying the high price of malted barley. He decided to do something about it when he developed his home malting method (1979). Since then, he has been working steadily on methods of improving the product. There is a fair amount of work here, and you may prefer to restrict your own efforts in home malting to that of producing specialty malts which are not available in this country. These include Munich, Dortmunder and Vienna malts and, to some extent, wheat malt which, although available, is not easy to find. Bill is presently working on formulations for those malts using information from old brewing texts. We are looking forward to publishing his efforts in that direction. Bill also told us that feed barley is not always "feed" barley. Quite often it is "malting" barley which may have been surplus to a brewery or maltster's immediate needs.

* * *

If you edit a beer club newsletter, remember to add us to your mailing list. Add us to your list and we'll add you to ours (assuming a return address).

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CALIFORNIA STEAM BEER RECIPES

By Fred Eckhardt

This is not the steam beer recipe used by the Anchor brewery of San Francisco. Rather, it has been compiled from various sources, principally Wahl & Henius, *American Handy Book of Brewing, Malting and Auxiliary Trades*, vol. 2, p 1235: Wahl-Henius Institute Chicago, Third Ed., 1908. We have modified the recipe in the light of recent trends both in amateur brewing and micro-brewing worlds. I am going to present two methods for brewing this beer: a simple method, and an all-grain procedure. The simple method will make excellent beer, but you *must* try the all-grain recipe. The beer is fantastic! When I told Fritz Maytag that my steam beer was better than his, he just laughed and said every brewer should be proud of his beer. I hate to part with the recipe because I have a feeling that some of you will make even better beer than I did. Here's the simple recipe, but just skip on to the next recipe if you're into all-grain beers — the product is MUCH better.

INGREDIENTS

INGREDIENTS	US gals	Metric
Initial volume	6 US gal (5 Imp gal)	23.75 liters
Hop flavored pale malt extract	2 x 3.5 lb tins	2 x 1.6 kg tins
Crystal or Caramel malt	2.25 lbs	i kg
Imported dry malt extract	to adjust gravity	135 gm plus gravity adjust
High quality finishing hops	1 Oz	30 gm

Original Gravity: 1.048 (12°B)
Racking gravity: 1.025 (6.5°B)
Est. Terminal: 1.010 (2.5°B)

PROCEDURE

Save about a half-gallon of beer wort from a previous batch of beer for a starter culture. If you don't do this, make up a starter with a couple of tablespoons of hop flavored malt extract in about a quart of hot water, cool, and add a vial of AMATEUR BREWER L (Wine Lab, 1200 Oak Ave, St Helena CA 94574), or use a good English liquid lager yeast culture. When the starter shows ferment you are ready to proceed.

Place the crystal or caramel malt in a nylon bag, after crushing it (this may be done in a blender if necessary, although it is possible to extract them without crushing), add about a gallon and a half of very hot, but not boiling water. Allow this to stand for about a half hour. Discard the grain bag, after pressing to extract all of the goodies. Add as much water as your kettle will hold, and bring to a boil. Add the hop flavored malt extracts, dissolve the syrup,

and rinse the tins, and bring the mix to a boil again. Boil until there is a clear break (white protein particles flashing to the rim of the kettle), this should take about 15 minutes. Add half the hops, turn off the stove, and add the other half of the hops direct, or tie them in cheescloth, and add them to the hot wort, and retain them into ferment. For best results follow the fermentation method and temperature as described for the all-grain beer, being sure to discard the hops at racking. Separate krausen-wort immediately after the wort boil, AFTER you have brought the wort to volume (6-gal/23.75 litre). Save 58 oz. or 1.75 litre (metric) for that, and if the wort has cooled be sure to reheat the krausen-wort to pasteurize that, so you can store it (stoppered) in your refrigerator until bottling time, (See later).

ALL-GRAIN ALL-MALT CALIFORNIA STEAM BEER

EQUIPMENT NECESSARY: Your usual will likely be satisfactory, but for grain mashing you need a lauter tun or straining vessel as described in our paper *Mashing for the North American Home Brewer* or in *Amateur Brewer Newsletter* 7-2 or in other publications. This upward-step mashing sequence is done on a stove, but it is also possible in a micro-wave, or in an oven. You need a vessel with about a 5-gallon capacity for the mash, and a brew kettle of about 7 gallons or larger. I use two smaller vessels to boil my wort in (so does *General Brewing* in Vancouver, Washington — 2 boils, 1 kettle). Anyway, whatever you do will probably be OK. You also need a grain mill, I use a Corona mill, but any good mill would suffice (Quaker City Hand Grinder $19.95 (last year) from Nelson & sons, Inc., POB 1296, Salt Lake City. Ut. 84110). Set the grinder discs about 1-1.5mm apart (.04-.06 inch, about a sixteenth). My first *year* of doing all-grain beers (1972) was spent using a blender, so don't be afraid - do!. The procedure sounds complicated, it reads complicated, but it really isn't. Anyway, you'll never know how good all-grain beers can be if you don't try.

INGREDIENTS	US gal	Metric
Total volume	6 US gal (5 Imp gal)	23.75 litre
US Pale barley malt (or Canadian)	9-12 lb	4-5.5 kg

actual amount depends on the fermentable yield of the malt you are using, if you don't know, assume 30 (1.030/lb/US gal—1.025/100gm/litre or lb/Imp Gal). That figure is a good starter and that would be

	10 lb	4.8 kg
Crystal or caramel malt	10 Oz	330 gm
Hops (boiling AND aromatic) use current vintage Northern Brewer or Brewers Gold* (English) not pellets*	2.5 Oz	80 gm

*You may find Northern Brewer hops scarce, if so substitute twice as many Fuggles, or 3.5 Oz/110 gm Cascades. If you *must* use pellets, use 20% less. 43 HBU by our formulation.

WATER TREATMENT to 550 ppm, about 3¼ tspn our Burton formula if your water is soft, less if it is hard. Alternately use about 1 tspn salt (non-iodized), 2 gypsum, ¼ epsom salts, aim for a Ph at mash-in 5.3 to 5.8 lager yeast (Amateur Brewer L, or a good English liquid yeast, Not Red Star).

Original gravity 1.051 (12.5°B)
Racking gravity 1.025 (6.5°B)
Terminal gravity (est) 1.014 (3.5° B)
est alcohol 5.2% (/4.1%/w)

MASHING SEQUENCE

Make a yeast starter as described in the *Simple* recipe.

Crush the barley malt in such a way that when 5 Oz. of crushed grains are placed in a standard flour sifter, and sifted, the remaining husks and large pieces weigh only 0.5 Oz. (1/10 remains, regardless of your weight measure).

Bring 3½ US gals/14 litre treated water to a temperature of about 122°F(50° C) in your mashing vessel. Add all of the crushed grains (both pale and caramel malts), which will bring the temperature down to 118°F(47.8°C). Stand at this temperature for 1:30 hours. Stir regularly.

Raise to 126°F(52.2°C) in 20 minutes, and hold there for 10 minutes longer, Keep stirring.

Raise the mash temperature to 145°F(62.8°C) in 10 min, and hold at that temperature for 5 minutes. Keep stirring.

Raise to 158°F(70°C) in 8 minutes, and hold at that temperature (not higher) until conversion is shown by the standard iodine test.* If you have no iodine to test for conversion, hold at the conversion temperature for an hour to be safe. Keep stirring.

Raise to 170°F(77°C), and transfer the mash to your preheated lauter tun (straining vessel), the temperature will settle to around 167°F(75°C). Allow the grains to settle for 30 minutes.

Rinse the mash kettle, and heat another equal volume of water to about 176°F(80°C). This is your "sparge" water. When that is ready pour it into a garden spray can, or whatever you use for "sparging." Sparging is the procedure of passing a fine spray of 160°F water thru the mash to wash out all soluble products prior to boiling the wort.

Draw off some of the liquor from the tap. At first it will run cloudy, then clear. Return this cloudy first draw to the lauter tun, then continue to draw off the clear wort, as it is now called. As you drain the mash kettle, gently spray

*Standard tincture of iodine is satisfactory, but that is sometimes difficult to find. A satisfactory substitute is 0.02 N iodine which may be made up with 1.25 gm Iodine, 2.5 gm potassium iodide dissolved in 500 ml of soft or distilled water. The mix is good for about 1 months if you keep it refrigerated. Check your local high school or college chemistry department.

(sparge), using the hot sparge water, over the spent grains. Sparge at the same rate the wort is drawn from the tap. Continue until all of the sparge water has been used. This will yield about 6¾ gallons (27.4 litre) in your brew kettle(s), at a gravity of around 1.045 (11.1°B). Don't worry — anywhere in the ball park is OK.

WORT BOIL

Bring to a boil as soon as possible, and when the wort "breaks" (throws protein particles against the kettle walls), add about 10% of the total hops, 30 min later add another 10%, and 30 min later add 25%. After 1:15 add 35%. Ten per cent at strike. Boil the wort for 1½-2 hours to concentrate to less than 5½ gallons or 22 litres. About 15 minutes before strike add ¼ tspn *Irish Moss, Kanten,* or *Carrageenan* as kettle finings.

When the wort boil has finished, pour it quickly back into your lauter-tun to allow the hops and protein to settle. Separate your "Krausen-wort" at this time while the wort is still near boiling temperature. You need 58 Oz for the US recipe, and 1.75 litres for the metric. Store this in a stoppered bottle and, when cool, place in the frig, for safe keeping until the beer is ready to bottle. Add the remaining 10% hops to the lauter-tun/hop-jack, and allow the wort to settle for 30 minutes. Open the tap and strain the finished wort into your open primary fermenter. (Or go thru your wort chiller if you have one). "Sparge" your final volume which should be 5½ gallon, or 22 litre. Gravity now about 1.051(49-53 OK). The krausen-wort amount is calculated to give you about 3 volumes CO2, about 30 lb/in at 5°F when added to 5 gallons/20 litres of finished beer for bottling. If you wish less CO2 in your beer use less Krausen at bottling time — see Finishing The Beer.

THE FERMENT (BOTH RECIPES)

The volume of beer should now be 5½ gals/22litre. The gravity should be adjusted to around 1.048 (basic recipe), 1.051 (grain recipe). You should have set aside a bottle with 58 Oz/1.75 litre beer wort in the refrigerator for krausening later.

Use your starter culture to pitch the yeast, but save about a fourth, to use at bottling time. (Allow the starter to ferment out, and settle, then pour into a proper sized bottle, cap and store in the refrigerator alongside your krausen-wort.)

Cool your beer wort to about 60-65° and add the yeast culture and cover with a plastic sheet. In 8-12 hours your beer will show a ring of bubbles and fermentation will have begun. By 20 hours you should have a thick healthy head on your beer (krausen). When this head *starts* to fall, skim the head, or rack the beer into a closed, but NOT topped-up container, such as a carboy. Lower the temperature to 55°F(13°C). My refrigerator holds this temperature nicely when on defrost.

When the beer reaches 1.025, rack to a carboy and top-up, but if you have already racked instead of skimming, then place a fermentation lock on the car-

boy and leave it alone.

In 5 to 10 days when the beer has reached its terminal or final gravity (about 1.010 or 1.012-14, grain recip), and all fermentation has ceased — no bubbles: your beer is ready to be krausened and bottled.

FINISHING THE BEER

About 8 hours before you are ready to bottle, warm the yeast and krausen wort to room temperature, and add the yeast under a fermentation lock with a cotton plug instead of water. By bottling time it should show a ring of bubbles.

Rack the beer into an open primary fermenter, there should be 5 gallons now, allowing half-gallon loss in ferment, racking, etc. Adjust volume as necessary, because the krausen-wort is designed to prive 5 gallons/20 litres of beer.

Add your now-fermenting krausen beer which will increase the total volume be almost ½ gallon total.

Bottle immediately in good returnable bottles. Age the beer in the bottle for at least 6 weeks. If you enter this beer in competition, make sure you disgorge so there is no sediment. (Alternately enter it as a pale ale and leave the sediment). PROSIT!

* * *

LA newest beer capital

LOS ANGELES (AP) — For nearly 100 years, Milwaukee was known as the world's No. 1 brewer, but no longer.

According to the U.S. Brewers Association, Los Angeles has edged out Milwaukee for the title of brewing capital of the world.

Milwaukee forfeited the title when Jos. Schlitz Brewing Co. closed its 6.8 million-barrel facility there. Schlitz's slogan has long been "The beer that made Milwaukee famous."

Schlitz currently is being pursued for acquisition by Pabst Brewing Co. of Milwaukee and G. Heileman Brewing Co. of La Crosse, Wis.

Los Angeles is the leader with a 4 million-barrel Miller Brewing Co. facility at Irwindale; a 10 million-barrel Anheuser-Busch Cos. Inc. plant at Van Nuys and a 4 million-barrel Schlitz brewery, also in Van Nuys, the Brewers Association reported.

PROFIT & LOSS

This is the year I hope to make this rag profitable. I've even hired a computerized bookeeper.

	total loss so far
1977	about $1900
1978	1009
1979	913
1980	1541
total	$5363

Just in case you thought I was getting rich: $117.73/ month hobby. Of course there were employee benefits: trips, conferences, tax deductions, lots of good friends, etc.

NATIONAL HOMEBREW JUDGING

Boulder Co. National Convention, American Homebrew Association; May 21-23, 1981.

One hundred and eighty six beers on the wall — It certainly seemed that way as we judges sipped and sniffed blindly onward. Each beer was careffully examined for appearance, aroma, bouquet, taste and feel in the mouth, and its memorable qualities, in much the same manner fine wines are judged. We were able to conclude that the best homebrews in the country may be the best beer made in the U.S. Certainly that is so if one considers taste, rather than "lightness," or character, rather than "Smoothness."

This writer, who has made, judged, and drank many home made beers in his time, found a complete revolution brewing in homemade beer. No more the tart, watery, highly alcoholic beers of yesteryear. Instead, most entries were made from "scratch", that is, from the malted barley itself. Bill Petrij, a speaker, showed all of us how to make our own malted barley (see article, this issue). Today there are only a few commercial breweries capable of producing their own malts.

Today's amateur brewer may start his day at 5:00 am by grinding the malt for his beer, and then continue the long brewing cycle to its completion when the beer is ready for yeast about 12 hours later. The beer itself may be a reproduction of a 1910-era German Dortmunder lager, or a fine English-style barleywine ale. Some of today's amateur brew haven't been made in this country since prohibition. Other amateur brewers are busy designing entirely new styles of beer.

Twentyfour judges tasted 186 beers in 8 categories: light lagers (light as in color, not body); light ales; brown beers; black beers; porters and sweet stouts; dry stouts; specialty brews; and sparkling mead (the latter technically not a "beer"). Dave Miller of St. Louis, Mo., was declared home brewer of the year, with his light lager, a Pilsner style lager made with barley malt, rice and Czechoslavakian Saaz hops. Lager is quite the most difficult of all beers for the amateur to produce, because it must be fermented and aged in a refrigerator. Light colored lagers are even more difficult to produce, because the pale malts available to commercial brewers are frequently not available to amateurs. Homebrewer Miller's coup was a double one, because of these difficulties.

Almost two hundred home brewers from all over the country attended the three day conference to hear talks on such topics as home draft installations, malting your own barley, and a special panel on commercial micro-breweries, the emerging new breed of breweries. Representatives from BOULDER Brewery and Portland's CARTWRIGHT Brewery discussed such topics as how much money does it take to start a small brewery ($100,000 plus long work hours), and where does one find a kettle large enough to boil 200-gallons of beer wort, (dairy equipment manufacturers) or where can you find malted barley in 100 lb bags (economically), as opposed to buying it by the carload (we're still searching).

The conference ended with a panel of experts headed by Michael Jackson,

author of THE WORLD GUIDE TO BEER, leading a mass tasting of five commercial beers. The five member panel consisted of Jackson, Charlie Papazian, AHA president and conference director, Otto Zavatonni, BOULDER Brewery brewmaster, Pat Baker, Connecticut beer writer, Al Andrews, California home brewer, and this writer, discussed such wide ranging beer topics as why commercial beers are so bland and whether Oyster Stout is and aphrodisiac. The audience, who were served the same beers and tasted them along with the panel, were encouraged to ask whatever questions came to mind. At one point moderator Papazian saw a hand raised in the audience. "Do you have a question?", he asked. "No, I want another beer." was the reply!

* * *

LETTERS

MASH IN A MICROWAVE? Earlier we mentioned Mashing in an oven, well D.L. Mosley of Casper, Wyoming tells me he does his Mash (AB's upward-step infusion) in a microwave with a temperature probe at 10° increments (he uses Amana Touch Matic top-of-the-line with a probe). And incidentally my partner, Jime Takita does HIS Tofu in a microwave — what'll they think of next? Jim is an excellent Amateur Chef, and is doing (for the Amateur Brewer) a booklet on Beer cookery.

WILLIAM MOORE, Author of *Home Beermaking* (Ferment Press), and prop. of Williams Brewing (POB 461, Oakland CA 94604), wrote me recently to inquire about Irish Moss. "Can any dried seaweed be used as Irish Moss? I import the British stuff but the price is getting too high." My answer: "I do not think so." Irish Moss is sometimes available in powder extract form as Carrageehan. I think you can also use another Japanese Product called Kanten (agar agar) as a kettle fining agent. Use Irish Moss ar Agar at aboiut ¼ tspn/ kettle.

THIS DELIGHTFUL comment came from Mr. Patz of New York: "Thank you for writing the informative (though disorganized) *TREATISE ON LAGER BEERS*. what can I say, it's a good thing I don't have to review my own book! I am working on a totally disorganized More-than-you-ever-wanted-to-know-about-the-subject-book. I seem to be good at disorganization! (You should read some of the comments I've had about my subscription change letter sent to most of you in December last.) "Welcome back" "Fred, this is far out." "The last Amateur Brewer I received was no. 6." "I'm *very* confused." (Me, too) "Fred, please spell 'The Queen City' correctly: Cincinatti-History lesson: Cincinnati was a city Germans emigrated to in the 1850's because the Ohio River and Valley reminded them of the Rhine. Fine wines were (are) made in Germany, not to mention the great beers which I am attempting to duplicate through your informative publications" (Joe Metze). I also learned how to spell Berkeley. I even heard from BUDWEISER (they converted just like the rest of you — sent two checks, no less! I'm not the only discombobulated klutz around! Another comment "Hang in there!" Another: "Whatever it takes, please make sure I get all that you've written, just send me everything you are putting out and tell me when you want wome more money to keep it coming."

(Thanks Steven!) And finally this: "I have great success with serenading my beer with my saxaphone."

* * *

BOOK REVIEWS

Lundy, Desmond, *A Standard Handbook for the production of Handmade Beers.* 1979, Victoria, B.C. Canada: Fermenthaus, PO Box 4220, Victoria, B.C. V8X 3X8, Canada, paperback 47 pp., Illus. $5.00.

This book is well-written, and exquisitely illustrated by Reynold Knowlton. Indeed one is tempted to declare the illustrations better than the text. The text IS well-written, concise, careful and very "Canadian", i.e. a little like a cross between a good English author and a good U.S. author, with many of the good qualities one might expect from such a mix (as are many Canadians), plus he reads German and Russian as well as several other languages, and has a good grasp of both English and Continental Beer making technique. I was a little disappointed that he didn't write more. The major fault of this book might be its excessive metrics. One is overwhelmed with them, but of course the book is aimed at Canadians, who might also be said to have gone excessively metric! The book's other fault is that it is aimed at Mr. Lundy's own FERMANTHAUS clientele. Of course the company's product line is centered around a series of fine imported malt extracts (Ireland, Scotland, England, Denmark and German), along with very high quality whole Continental hops (Germany-HALLERTAUER, Czechoslavakia — SAAZER, Yugoslavia — GOLDINGS) (high quality but very expensive, and well worth it). In any case, the book is at its best when you use FERMENTHAUS malts and hops, which is one thing if you live in Canada, or Pacific Northwest USA, but quite another if you live in Southeastern USA, where you might balk at paying Canadian Import taxes (very high) on merchandise imported INTO Canada, and then US Import taxes (from Canada TO U.S.), plus shipping from Europe to Western Canada to USA. This is not Mr. Lundy's fault, of course, nor does it damage a very good book. I am pleased to recommend Mr. Lundy's book and for that matter his product line, since he does both wholesale and retail mail order business. Add this book to your library and go metric!

* * *

Leverett, Brian, *Home Beermaking*, 1980, Dorchester, England: Prism Press, Stable Court, Chalmington, Dorchester, Dorset DT2 OHB, England, 106pp. Illus. $5.95 at B. Dalton Bookstores.

Another English book, what can I tell you? Having said that, let me also add this is a cut above the usual. Leverett, who has also written about wine, is knowledgeable about beer, and the book is well constructed, well written, and without the nonsense that many English authors insist on adding to their writing. Not as good as Dave Line, but very good nonetheless. If you are into English beer, this book will be a handsome addition to your library.

* * *

OTHER NEWS OF INTEREST

UCD IS DOING IT AGAIN: They are offering a 6-day, 30-hour course for people in the brewing industry who do not possess formal training in brewing science. INTENSIVE BREWING SCIENCE FOR PRACTICAL BREWING will discuss such topics as a review of necessary basic siences; a discussion of barley, malt, and malting; the brewhouse, its operation and technology; yeast and fermentation; and beer finishing and product control.

The class will be coordinated by Michael Lewis, Davis' famous Beer professor AND James Hough, one of the authors of *Malting and Brewing Science*, which we consider THE definitive text for advanced amateurs and professionals.

August 30 to September 4 at University of California Davis. Contact University Extension, UCD, Davis CA 95616, telephone 916-752-0880.

If you are thinking of starting your own brewery, or if you want to know more about beer in a BIG way, spend you vacation in lovely Davis, when the grapes are almost ripe. Should be fantastic, you can combine California Wine country at its best AND quality brewing education all at the same time. You can visit Wine and the People, Home Fermentor Digest, Oakland Draught Board, San Andreas Malts, Byron Burch, Yeast Bay Brewers, Great Fermentations, Santa Clara Valley Brewers, Home Brew Co., Home Brewer's House, The Home Brewer, Williams Brewing, Guy Pawson, Lee Coe, and others too numerous to mention. What a Vacation! AND DAVIS IS LOVELY!! San Francisco's Anchor Brewery (Call or write first), De Bakkers Brewery; My God, can Mecca offer more?

* * *

(Continued from inside front cover)
And then Bill Petrij does the art of malting, something I had always assumed was way more trouble than anyone could want to do at home. Wrong again, as you can see, malting IS for the masses.

GUY PAWSON, International Brewing Supplies (387 Los Palmos Dr., San Francisco, CA 94127 (415)239-1782) tells me he has some fine fresh English and German hops, including English Northern Brewer 7% alpha. Guy does BOTH retail and wholesale. If your supplier doesn't carry fresh hops, isn't it time he did? If your supplier contacts me I'll send him the names of several wholesalers dealing in FRESH hops. Fresh is better.

If you can't afford the intensive expensive UCD course Aug 30 to Sept 4 (above), try the one-day "Successful Brewing at Home and Beyond", Nov 14, Alan Toby is directing this one, and it will be similar to last year's very successful effort: $35, such a bargain!

In my last Newsletter I mentioned Paul Kalmanovitz, and how he told the State of Nebraska to "shove it", by closing his brewery in Omaha. Well, everything seems to have been resolved, with the State of Nebraska deciding to mind its own business. I'd like to say a little more about Mr. Kalmanovitz, who is 76-years young, a self-made millionaire and a Polish immigrant to these shores 55-years ago. Five years ago he offered $15 million to the city of San Francisco to build a "Statue of Justice" the same size as New York's "Statue of Liberty". He offered to have a 151-foot statue erected of the traditional robed

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blindfolded woman holding a scale of justice. He said it would be a reminder of what America stands for. Well five years later the city of San Francisco may give it some thought. I remember about 15-years ago when General Brewing's Vancouver, Washington plant started the idea of recycling bottles--another Kalmanovitz first. He had them ground up and used in asphalt to pave the company's parking lot. The people at General Brewing have always spoken nicely of Mr. Kalmanovitz as a man to work for, and I am pleased to pass pleasant remarks about a the company that makes Beer beer (and Lite Beer beer) at a reasonable price, and keeps that wonderful Ballantines Old India Pale Ale flowing as well.

COORS COORS

SPEAKING OF BREWERIES, I and some others of my ilk had the pleasure of visiting the Coors Pilot Brewery, during the American Homebrewers Assn Convention at Boulder CO late in May (p84), where we were welcomed with open arms. On a tour (for the judges, arranged by Charlie Papazian, AHA Prexy) we were given gold carpet treatment by pilot brewery supervisor Gil Ortega. In a no-holds barred tour we were allowed to touch, fondle and rub against the "cutest li'l ol' brewery in the Rockies!" We sipped and slurped from every little fawcett, fountain and pfaff to taste various test-brews at every level of production, from malting (Bill Petrij flipped-out at that point and had to be led away, drooling fitfully) to the the neat little tile mounted brew kettles (when I examined the lovable copper brew kettle, mash-tun, and rice cooker, I could see people getting nervous about my own sanity). Most pitiful of all was Al Andrews. Anyone could tell he had fallen in love with the beautiful primary fermentors, a variation on the Burton Union system. Charlie had to sternly admonish him to "be brave" and "keep a stiff upper-lip." It was so pathetic, by the time we had drunk our way through the pilot brewery, that the officials were beginning to suspect that we had become total alcoholics.

BOULDER'S BEST

We ended our tour of Colorado, after the judging, and the conference, at the Boulder Brewery, one of America's smallest. We had the opportunity to become grossly acquainted with Otto Zavatone, Boulder Brewmaster, and Master Drinker. By then we had been drinking steadily for four days and we were joined by Michael Jackson (World Guide) and Michael Chapman (Munton & Fison rep, and fellow judge), and Wisconsin's own Lee Damkoehler (back cover AB#7), and Connecticut writer Pat Baker and several others. We sat in the sun on wooden picnic tables and drank vast quantities of Boulder Bitter and Porter and Stout and Summer Ale from Mason jars (actually they were Kerr jars). As the sank sunned slowly in the west we undertook a wild wild ride to the airport with "Kamikaze Otto". I'm prolly lucky to be alive.

MOVIE REVIEW

Home Brew Madness, Starring Charles Matzen, and a cast of hundreds (tens?) Produced and directed by Charles Papazian. $20 rental from AHA PO Box 287, Boulder CO 80306.

If you liked "Reefer Madness" you'll love "Home Brew Madness". The dialogue is ridiculous, the soundtrack frightening and the photography mundane. The result is a supercollossal spectacular. So great it rates nomination to the 1981 Academy awards (Best Beer!)

You, too, can learn the signs of a homebrew user, indeed there may already be one in your household, beware, because one sip and....

TREATISE SIXTH

We've passed that landmark of 100,000 copies and we have a new edition in print. If you have the Fourth edition, don't waste your money, and if you have the fifth keep the faith, but don't waste your money, because the changes are not all that much, changes in the basic recipes to reflect larger tins of malt extract available.

PUBLICATIONS AVAILABLE FROM THE AMATEUR BREWER INFORMATION SERVICE

These prices include postage or shipping. Increases in Postal rates, especially those for parcels under 4-oz., require us to place a minimum order requirement of $3.50, however, YOU may deduct 10% from orders OVER $15. MINIMUM ORDER $3.50
**items available wholesale, please write for price lists.

BOOKS

ECKHARDT, F., A Treatise on Lager Beers, Sixth Ed., 1981, Illus 53pp..... $3.00**
Burch, Byron, Quality Brewing, Second Ed., 1979, Illus. 3.50
Line, Dave, The Big Book of Brewing, 1974, 256pp Ill... 5.25
Line, Dave, Brewing Beers Like Those You Buy, Ill, 158pp. 5.25
Line, Dave, Beer Kits and Brewing, Ill., 158pp..... 5.25
Papazian, Charles, More Joy of Brewing, 1980, 86pp, Ill.. 4.50
Moore, William, Home Beermaking, 1980, 43pp..... 2.25
Morgan, Scotty, Brew Your Own, A Beginners Mashing Manual 1979, 28pp..... 3.00
Baker, Patrick, New Brewer's Handbook, 1979, 37pp..... 1.75
Lundy, Desmond, A Standard Handbook for the Production of Handmade Beers, 1979, Illus., 48pp..... 5.00
Weathers, Jim, Practical Beermaking for Beginners, 1980 Illus, 152pp..... 5.50

AMATEUR BREWER ANNUALS ARE KEPT IN PRINT, revised, etc.

AB#1, ABC's Beermaking, water, etc.16pp..... $1.65**
AB#2, Barley & Malt I, recipes, ABC's.16pp..... 1.65**
AB#3, ABC's, Malt II, Jubilee Ale, etc.16pp..... 1.65**
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AB#5, Bock Beer, ABC's IV (kegging), Index #1-4, 20pp.. 2.00**
AB#6, Special YEAST issue, 20pp..... 2.00**
AB#7, English Beer, Additives & Lite beer, 20pp..... 2.00**
AB#8, Steam Beer, Beer Design, Malting, etc.28pp..... 2.25**
AB Newsletters, while they last: 7-1, (letters, yeast), 7-3 (beer competitions), 7-4, (recipes) WHILE THEY LAST each .75**

MISCELLANEOUS PAPERS by Fred Eckhardt

1. Beer Tasting and Evaluation for the Amateur, Revised, 16pp $1.25**
2. MASHING for the North American Home Brewer, 6pp.... 1.00**

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