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THE AMATEUR BREWER

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AMATEUR BREWER
Number Two, Spring 1977
April to June

Apologies for being late. I am beginning to wonder what I have gotten myself into--"What am I doin' here?" I found out what a great guy I am, everybody told me so, so it must be so, musn't it? I already knew how great I was, but I'm glad you folks were kind enough to confirm it. You wouldn't believe that a great guy like me would have enemies, but I do--I have met the enemy and he is the Post Office. It's a long story, but I am sure some of you folks out there didn't get your **AMATEUR BREWER No. 1**, and I am equally sure I didn't get all of your money. Some people were kind enough to send their subscriptions to me twice, I've no idea how many others gave up, and kept their money. I have had the same PO box for 14-years, never ran any scams through it, never even subscribed to dirty pictures. I've always paid my box rental on time, and smiled at the various postmen, so why do they hate me? I don't even ask for justice, I'll settle for mercy. (If I can get it).

Actually, although you were very complimentary, there weren't really enough of you; but I am enjoying myself so much that I can't bring myself to quit, and I have confidence that this thing will grow. We will have to be careful about the costs of such things as typesetting. That's one of the things we can't afford yet. I was able to cut corners a little because the materials article (**Part I of Barley**) is a reprint, but since the information is very essential to future articles, I can see no reason not to use my previously published information. You will have to bear with me, since much of the material may have to be presented in this fashion, in typescript. I seem to have no other choice. My consolation, and yours, is that the information is good, if not pretty. We have changed one plan, we are postponing the Bock beer recipe until about **AB#4**, so it will be more timely for you to make a good bock beer for next spring. I am substituting an American Brown Ale--drier and more sparkling than an English Brown Ale.

I wonder if you folks out there realize that I am neglecting my wine, and may have ruined a batch of beer--it's all your fault. I have a lovely batch of Washington State Riesling waiting to be bottled, and some strawberry (to become) champagne, and a faltering dark beer I am neglecting--doesn't your conscience bother you. I do talk to my beer, but actions speak louder than words, and it is indeed aware of my gross neglect. Right now we aren't speaking.

Here is something for you to ponder:
"Die Brauerie ist die beste apotheke."--"The Brewery is the best drug store." (Old German saying, which also had a prescription:
"To cure yourself of any complaint don't waste money on spas, just stay at home, avoid spice and wine, drink good old beer, eat asparagus and watercress salad.")

Also, you should know that beer is the only alcoholic beverage that contains vitamins! It makes you sleep well and wake up happy... if drinking makes you fat--eat less! In beer the activating agent is lupulin...because it stimulates deep-breathing and song, (and) makes the beer drinker feel richly contented.

In the 13th century, at a summit conference between King Ludwig I (Bavaria), and King William (Wurtemberg), Bill asked Luddy what Luddy thought of Wurtemberg beer. Old Luddy (fingering his crown jools) said: "Your beer, even when it is good can't touch our beer, even when our beer is bad!"

At the old brewing school in Munich, the beer tasting syllabus (**Beer Tasting 401, 402, and 403**) informed apprentice tastors:

Beer must effect "all 5 senses..to the sight it must ring clear as a bell, it must snap in the ear, feel pleasantly sticky between the fingers, smell fresh and tempting, and taste heavenly. The foam must be sprightly, up-standing and crackling, it is as important as the head on old ale or wine. The connoisseur can tell much about the body of the beverage by the mere sight of the white collar." As to color: "Exactly the right shade is as important in judging beer as in judging diamonds."

to Back cover

Barley and malt (Part one of two parts)

By FRED ECKHARDT

Traditionally, beer has been made only from malt, hops and water. These are the basic ingredients, without them we cannot call it beer, although legally beer is ANY alcoholic beverage made from grain. Barley wine and Japanese sake are beers, for example, though neither has carbonation. What we usually call beer is technically "Malt Liquor."

Beer can be made from any malted grain, and any grain can be malted, but barley is preferred for many reasons. Barley is the hardiest of the cereal grains and can be more easily malted for brewing than any other cereal. The solubles, which can be extracted from barley malt, are more desirable, more complete and more satisfactory for beer than those of any other grain. Once malted, barley is easier to work with in brewing. Barley malt enzymes are produced in abundance, and there is enough enzymatic power to convert the starch in any other grains used as adjuncts in making beer.

Malting barley is the highest quality barley the farmer can grow and is usually evaluated according to the potential power of its enzymatic action in two groups; diastatic and peptonizing enzymes.

The diastatic or amyolytic power of a malt is measured by the alpha- and beta-amylases which work during the mashing cycle. The alpha-amylase is called the liquifying enzyme and has the ability to liquify starch, thereby making it possible for the beta-amylase to break down the starch. The beta-amylase is called the saccharifying (sugar producing) enzyme and works in conjunction with the alpha-amylase to produce maltose (fermentable malt sugar) from starch glycogens and dextrins.

The peptonizing power of malt is measured by the quantity of its amino acids or enzymes which have the ability to break down, or simplify, protein molecules. These enzymes are called proteases, and they break down the more important proteins, making them soluble and usable in the beer. Most important of these proteins are the peptones, which contribute to the foam holding capability of the beer and give it palatfulness or body. These proteases also degrade certain other proteins, and thus aid in the elimination of protein haze (a fine precipitate), which occurs mostly when the beer is chilled. This is called chillproofing.

The malting process

The hard, tasteless barley is changed during the malting process to sweet

tasting and crispy malt. This process can be done by the amateur, but it is illegal in some places; it is also tedious and difficult. I am speaking now of the malted barley grain, and not the product which we purchase in the supply store, which is properly called malt extract, or sometimes malt syrup. Malt extract is made from the malted grains which have been carried through the mashing process which we will describe later in another issue.

Basically, the malting process revolves around germination of the grains. The ripe grains must be germinated or started growing in order to produce malt. During this germination period the enzymes are activated. The malting process produces the taste and aroma which we associate with malt, and this carries over to the finished beer.

Barley for malting should be fully dried, since it is often stored for long periods before being malted. It should be light to dark yellow in color, similar to straw, with a glossy appearance and no objectionable odors.

The barley berry consists mainly of a starchy part called the *endosperm*, which along with *germ* and the *husk* completes the berry kernel. See Fig. 1. The *husk* serves to protect the *germ*. Between the husk and the *endosperm* (where the nourishment is) there is a thin layer, called the *aleurone layer*, consisting mostly of protein, which conducts the nourishment to the *germ* during the germinating cycle.

Before malting, the barley is washed and cleaned, and separated or graded according to berry size. The barley is then steeped in hard water for two to three days at temperatures between 50-65° F. (10-18° C.). The steeping is carried out in cylindrical steeping tanks equipped with water supply and overflow troughs. Often the bottom of the tanks are supplied with compressed air outlets which allow vigorous aeration and stirring of the barley and water. The steeping is complete when the

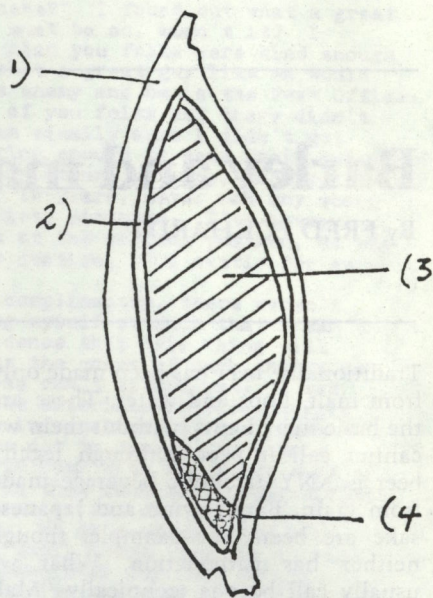


Figure 1—Barley kernel

1. Husk.
2. Aleurone layer—source of enzyme and color.
3. Embryo or germ.
4. Endosperm—starch portion of germ.

white tips of the rootlets are just appearing. These are called chits. The steeped malt has absorbed about 45% water by this time.

The next step is called germination. The water is drained off and the wet grains are allowed to germinate for five to eight days. In the commercial malt house, this is carried out in compartments, which are rectangular concrete boxes with perforated metal bottoms. The commercial malt house will have automatic leveling and turning mechanisms, but in the old days this was done by hand, as it still is at many European breweries, notably at the Peoples Brewery in Pilsen, Czechoslovakia.

During germination, the rootlets of

the barley grow away from the base, while the *acrosipre* grows under the *husk*, out of sight, in the opposite direction. If the growth were allowed to continue, the *acrosipre* would become the young barley plant. In malting, however, the germinating must be stopped before the *acrosipre* reaches the length of the berry.

The germination can only take place under proper conditions. The berries must be aerated by turning during the process, there must be sufficient moisture, and at this point the temperature is also carefully controlled at 60-77° F. (15-25° C.).

In the commercial malthouse water sprays are provided for adding moisture as necessary and air is drawn through the grain mass, from above and below, to control the temperature and moisture content.

The length of the germinating time varies between five and eight days, and this in turn depends on the temperature. The lower the temperature the longer the germinating period. The English, especially, use longer periods and lower temperature, since in the old days the English malted during the winter only, and steeped and moisturized with cold well water, often at about 50° F. (10° C.). European and American maltsters traditionally used warmer temperatures and shorter germinating periods. Canadian malts nowadays are normally made to American not English specifications.

During germination three different enzymes are activated: (1) Cystase, which dissolves the membranes encasing the starch, (2) Amylase (or diastase), which transforms the starch to sugar, and (3) Proteolytic enzymes, which transform the protein of malt from insoluble to soluble (in water) protein, or from unusable to usable protein.

The germination proceeds best when the grains are kept moist, within proper temperature range and aeration, to pre-

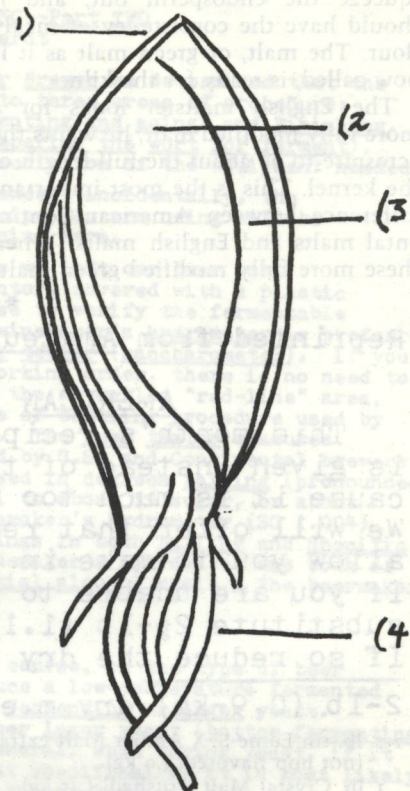


Figure 2—Cross section of germinated barley

1. Husk.
2. Endosperm—starch.
3. Acrosipre.
4. Rootlets.

vent fast germination. Good malt at this stage smells like green cucumbers.

In the U.S., Canada and Europe the proper state of germination is reached when the *acrosipre* is about three-quarters the length of the kernel. The maltster calls this "three quarters up." This can be determined by cutting the grain lengthwise. The rootlets will be about 1½ times the kernel length, and they cling together when a few are picked up. We can further check the germination state by pressing a berry between the thumb and forefinger to

squeeze the endosperm out, and it should have the consistency of mealy flour. The malt, or green malt as it is now called, is ready for the kiln.

The English maltster looks for a more fully modified malt, he wants the acrospire to be about the full length of the kernel. This is the most important difference between American-Continental malts and English malts. When these more fully modified green malts

are combined with the English kilning system, it accounts for much of the difference between English beers and Continental or American beers. In the next issue, we will discuss the kilning process and how it changes the character of various malts, and their resulting beers. An understanding of grain malts is, I believe, necessary to understanding the mashing process.
continued next issue

Reprinted from Amateur Enologist Fall 1972

AMERICAN BROWN ALE

This month's recipe--American Brown Ale--is given instead of the Bock Beer recipe because it is much too late to make bock beer. We will offer that recipe in the fall issue to allow you to make in time for next spring. If you are unable to obtain Edme SFX you may substitute 2½-lb (1.1 Kg) dark plain malt ext. If so reduce the dry malt ext. to 1.5-lb (0.7-K).

2-lb (0.9-kg) dry m.e.

1-2 lb. tin Edme SFX Amber Malt extract (not hop flavored) (.9 kg)
1 lb. Crystal Malt (crushed) (.45 kg)
1 lb. Barley Malt grains (crushed) (.45 kg)

¼ cup Black Patent Malt grains, whole (1.2 oz., 34 gm)

2½ lb. (1.1 kg) Kleenraw or Demarara sugar (if not available, use brown sugar or honey)

2½ oz. Hops (71 gm)

1½ oz. highest quality Hops (Fuggle or Bouillon preferred) (43 gm)

Water Treatment: 1¾ tsp. plain salt (8.75 gm), 1 tsp. Gypsum (3 gm)

Yeast: Top fermenting top yeast

Water: 6 gallons U.S. (5 Imperial) (23 litre)

Corn Sugar or Dextrose: 7½ oz. (1¼ cups) (210 gm) for bottling only.

Ascorbic Acid, Brewing Salts, and Heading Liquid if desired.

Original Gravity: 1.05 (10.2° B.)

Racking Gravity 1.013 (3.4° B.)

Terminal Gravity: 1.010 (2.5° B.)

Alcohol: estimate 9.8% Canadian Proof Spirits, 4.9% by volume, 3.9% by weight.

Ferment as described below.

If you are using a liquid Ale yeast, prepare a yeast starter culture by one of the approved methods several days in advance. There are many dry yeasts which can be added directly to the cooled wort, but the prudent brewer would prepare a starter culture even when using these yeasts.

1. Preparing the wort for ferment

1. Add hot tap water to the brew kettle at about 155-158°F. (68-70°C.), and proportion the Water Treatment in accord with the amount of water in the kettle.

2. Place the crushed crystal and barley malt grains in a cheesecloth bag in the water, and steep these at the above temperature for at least one hour. Discard the spent grains after rinsing and pressing the fluid from them.

3. Add the malt extract to this fluid, rinse the tin, and bring the contents of the kettle to a vigorous boil. Add all of the first hops (2½ oz.) (71 gm) as the mixture is coming to a boil.

Continued on p25

The ABC's of BEERMAKING--Part TWO by Fred Eckhardt

In the last issue of the Amateur Brewer we determined that the beer-making process can be divided into three areas of procedure: Preparing the wort for ferment; Fermenting and aging; and Finishing. We discussed the first of these, (Preparing the wort for ferment), in that issue, as well as a brief description of the equipment needed.

These articles will not treat, except incidentally, the subject of ingredients. Whatever recipe you are using will be improved by the methods we are outlining here.

After our last thrilling episode we left our beer wort, cooling and resting in an open fermentor, covered with a plastic sheet. Before adding yeast it is wise to verify the fermentable sugar content with a hydrometer. A winemaker's hydrometer is preferred to the traditional home brewer's beer tester (saccharometer). If you already own a beer tester, in good working order, there is no need to buy the other, but you should ignore the so-called "red-line" area, since that refers to the special type of bottling procedure used by the old prohibition-era home brewers. The beer tester measures sugar content by the same method used by U.S. and Continental brewers. This is the sugar percentage, expressed in degrees Balling (pronounced BAY-Ling). The degree (1°B) is equal to about 1% sugar, or about 4-specific gravity points on the winemaker's hydrometer (SG 1.004). All of our recipes give gravity readings in both Balling and Specific Gravity scales, (°B and SG). The winemaker's hydrometer has both of these scales plus another, the potential alcohol scale. The beermaker may ignore this latter.

YEAST

Your choice of yeast depends of course, on the type of beer you are making. If you plan to produce a low-temperature fermented lager beer, you must use only bottom fermenting or lager yeast. For warmer ferments, you can use either lager yeast (bottom fermenting) or ale yeast (top fermenting). In general, when buying yeast, if it is not labeled lager or Bavarian yeast specifically, it is most likely top fermenting yeast, no matter what the merchant may tell you.

It is safe to add some yeasts (dried yeasts) to the beer wort direct, but it is much more prudent to make up a culture media of about 3-5% of the volume of beer you are making. I always draw about a quart of hot beer wort from my brew kettle, bottle it, cap it and store in my refrigerator to use as a starter culture media for my next batch of beer. Fresh pasteurized beer wort is perfect for that purpose.

FERMENTING METHODS

There are many possibilities in choosing a fermenting method, but we can divide them into six specific styles, using top and bottom yeasts. These are listed A through F below.

A. COMMON BEER METHOD (top fermenting). This is the historical method for making beer and it dates from before the Babylonian era. We do NOT recommend this method, because best results are only possible after a great deal of experience. I call this method the Prohibition method, because of its popularity during those times.

1. When the beer wort has cooled to 75°F (24°C) or lower, add the yeast culture, and thoroughly rouse and aerate the wort. The temperature is usually maintained above 70°F (21°C) for the "authentic" tart prohibition taste. True authenticity demands bread yeast!

2. A head will form after about 8-12 hours. Skim as necessary, and discard the residue.

3. When fermentation is complete, add finings gelatin (see sect. F.5.), and bottle by the priming method (see part three, next Amateur Brewer). Store four weeks or longer before drinking this stuff.

B. ALE METHOD (top fermenting common beer). This is a more sophisticated method for producing common beer, using a carboy or closed secondary fermentor in a process similar to that used in winemaking.

1. When the beer has cooled to 75°F(24°C) or lower, add Ale or Stout yeast (but never bread yeast). If you wish, keep the temperature around 70°F(21°C) for the first full day, and after that, lower to 60-65°F(15-18°C) for the remainder of the ferment. The fermenting temperatures are more or less optional, you may lower to 60°F(15°C) earlier, or you may not even be able to ferment below 70°F(21°C) due to your circumstances. Temperature recommendations are just that, not requirements. Generally speaking, the lower the fermenting temperature the smoother will be the end product, (with fewer off-flavors, less tartness), but in a beer such as ale, these off-flavors contribute heavily to the expected flavor. The brewer must judge for himself. Ale or top fermenting yeast will ferment well between 58°F and 86°F(14.5°-30°C), but lower temperatures are definitely preferred.

2. A head (or krausen, pronounced KROY-sen) will form after 8-12 hours. This should be skimmed when it reaches its peak (full krausen). Skim as often as new heads form, or at least once daily. Discard the residue, and be sure to remove all of the gummy brown hop resins.

3. When about three-fourths of the ferment has finished, or when racking gravity is reached, the beer should be racked, that is, it should be siphoned off its dregs, and transferred to a closed fermentor, such as a carboy, or a series of 1-gallon bottles. The size of the batch of beer is determined by the size of the carboy or fermentors available. Add nutrients at this time if called for in the recipe (brewing salts, supernutrient, energizer or vitamin B2). The beer is not filled fully into the neck of the fermentor(s), and a little should be set aside for this purpose. After about two days, top-up by adding this held-aside beer, or use water, so that the fluid level is up to the narrow neck of the fermentor. If you use finings gelatin, that may be added at this point or at bottling time, as desired, (see sect F.5.). The closed fermentor is topped with a fermentation lock (with water) at all times, and the beer is stored in a cool place, or as cool as you can manage down to 60°F(15°C).

4. After five to seven days fermentation should be complete (terminal gravity reached, although such may vary). The beer may rest in closed fermentors, topped-up, for up to three weeks at your convenience.

5. Bottle the beer using the priming method (see part three, next Amateur Brewer) as the preferred procedure, but any finishing method will suffice.

C. STEAM BEER METHOD. (Bottom fermenting common beer). The steam beer method was developed, by California brewers during the Gold Rush, as a warm temperature fermenting style to replace the popular lager beer, which required ice to maintain low temperatures. Ice was not available in California, and had to be shipped around the Horn.

The "steam" comes from the vigorous head on this beer, and the discharge of carbon dioxide when tapping a keg, both typical of the higher pressure finishing system used at that time to keg the beer (by krausening, see part three). In short, steam beer is bottom warm fermented common beer similar in many ways to Ale. Our process is also similar, with only a very few differences.

1. Add bottom fermenting (lager or Bavarian) yeast when the wort has cooled to 70°F(21°C) or lower. Keep the temperature as low as you can (to 55°F--12°C). Remember, cooler temperatures produce a smoother product (with fewer off-tastes), but whatever temperature YOU can manage will be OK.

2. A head, or krausen, will start to form in about 9 to 16 hours (depending on temperature).

3. When the krausen reaches its maximum, and starts to fall or deteriorate, you should skim it off. There is only one skimming in bottom ferments.

4. When about two-thirds of the ferment has finished, or racking gravity has been reached, rack the beer by siphoning it off the dregs, and transfer to a closed fermentor, such as a carboy, (or 1-gallon bottles). Attach fermentation locks with water. If nutrients are called for, add them at this time. Nutrients are not necessary in all-malt beers. Finings (if desired) may be added two days later, and the carboys or fermentors should be topped-up at that time (see above pgh B.3).

5. After five to seven days, fermentation should be complete. The beer may rest two to three weeks in these closed, topped-up, fermentors, until it is convenient for you to bottle the beer.

6. Bottle the beer by the method of your choice, (see part three).

D. LAGER METHOD I (warm temperature--bottom fermenting with aging).

1. Follow the steam beer or ale ferment method as outlined above sect B or C. (Yes you can make lager beer out of your ale, the word lager is from German, and means to store. Lager beer is simply aged beer--normally at very low temperatures). When your steam beer or ale has finished its ferment, proceed as follows:

2. Rack the beer to a clean closed fermentor(s). You might wish to add ascorbic acid as anti-oxidant 100 mg/gal (25 mg/liter), this is a little over a teaspoon per batch (5-US, 4-UK, 20-liters). The beer is stored, or lagered, at the lowest temperature you can manage.

3. The length of time a beer is to be lagered is dependant on the original gravity, and the lagering temperature. Table I shows these times, and temperatures. The carboy or bottle may be stoppered when you are positive all ferment has ceased. I recommend the use of a small kit called DEXTROCHECK (about \$4-\$5 in many wine supply stores). Pharmacists sell it for use by diabetics (CLINITEST) to check sugar in urine. The Dextrocheck test should show less than 0.05% when the beer is fully fermented, probably 0.025% or so. Don't take chances, the dextrocheck kit is a good investment, and it has other (wine and champagne) uses. I consider it essential when brewing all-malt beers, because it is the only sure way to tell when the beer has finished its ferment.

4. Ten days before bottling, add finings if desired.

5. Bottle, using krausen, or sugar-hop krausen methods ONLY. (see part three).

TABLE I--LAGERING TIMES

Temp °F	°C	Lagering days per 10 SG (2.5°B) of Original Gravity
32	0	30
50	10	15
68	20	7½
86	30	3-3/4

To find total aging time divide Original Specific Gravity degree (e.g. 1.040 = 40) by 10, and multiply by the number of days (col.3) opposite the temperature you can manage. For example a beer has an OG of 10°B, which is SG 1.040, which is SG degree 40, how long to lager at 68°F? $40 \div 10 \times 7\frac{1}{2}$ (days) = $4 \times 7\frac{1}{2}$ = 30 days total at 68°F. The same beer would be lagered 60 days at 50°F.

E. LAGER METHOD II (refrigerated bottom fermenting with aging).

This method requires the use of a refrigerator for all or part of the fermenting and aging cycle. The brewer may do the entire ferment in the refrigerator, as outlined here, or he can move the beer into the refrigerator for secondary ferment and beyond, or he can do just the lagering stage in the refrigerator. The procedure outlined below applies for the entire ferment in the refrigerator.

1. After the wort has been placed in the fermentor, and the gravity adjusted, move to the refrigerator (set at defrost). For most refrigerators this will allow a temperature of about 58°F(14.5°C).

The primary ferment is best conducted between 50-60°F (10-15°C). When the temperature of the wort has fallen to 65°F (18°C) or less, you may add the yeast, already active in a wort culture.

2. The low temperature ferment is much slower than that at warmer temperatures. It may take up to 20-hours for even the first sign of ferment, and 36-hours to early krausen (head). The ferment usually takes two or three times as long as usual.

3. When the krausen reaches its maximum, and then starts to collapse, with the appearance of the brown gummy hop resins, the head may be skimmed (about 96-hours--4 days). A better procedure, however, would be to rack the beer off to closed secondary fermentors (hard plastic carboys are nice for this, since they fit more readily in refrigerators than carboys, but gallon bottles will also suffice). These fermentors should be half to two-thirds full, and the fermentation locks should have a cotton plug in them instead of water. The beer is still in primary ferment.

4. When racking gravity is reached (2/3 to 3/4 of the ferment--about 8-10 days, rack the beer to closed fermentors, set under fermentation lock with water in it, do not top-up. Lower the refrigerator temperature to 39-42°F (4-4.5°C), which will probably be the highest temperature setting available. If you are making a low-malt content beer, now is the time to add nutrients.

5. In another 5-8 days or even 10 more days, the secondary ferment should be complete. Verify with Dextrocheck (see pgh D.2 above). Again rack the beer to another fermentor, add ascorbic acid (as anti-oxidant to protect the beer) (see above pgh D.2). When you are certain there is no further ferment, close the fermentor(s), and set the temperature as low as possible (31-33°F, -0.5 - +0.5°C). Store or lager this beer 30 days for each 10 Original Gravity points (2.5°B) (see Table I). Save a small bottle of the yeast dregs from secondary, cap and store in the refrigerator.

6. Two weeks before bottling add finings if desired.

7. Bottle the beer, using one of the yeasted methods, with the yeast you saved after secondary ferment. (see part three, Krausen, or sugar-hop krausen bottling methods).

F. STRONG ALE METHOD, with dry hopping. Follow Ale or top fermenting common beer method outlined earlier (Sect. B--above), but when racking gravity is reached, proceed as follows. This method is particularly recommended for those strong ales of 1.055 (13.5°B) or higher Original Gravity.

1. Rack the beer to secondary ferment in a closed fermentor, add nutrients (for a dry crisp ale), and place under fermentation lock with water in it, do not top-up.

2. Two days later, add loose hops for dry hopping procedure at a rate of 1-2 oz per 5-6 gallon batch (30-60 gm/20-24 liter). Fresh quality hops are best for this. Use "name" hops such as Northern Brewer, Brewer's Gold, Pride of Ringwood, Boullioun, Talisman, OR Cascade. This is a rate of about 6-10 gm/gal; 1.5-2.5 gm/liter). You may also use fresh "name" pellets or powder BUT only if they are dated, and you know the year. These are added loose in the secondary fermentor(s).

3. Reduce the temperature to as low as you can but not below 55°F (13°C).

4. The fermentor(s) are rotated, half turn to the right, half turn to the left, daily for three to four weeks (two weeks if the temperature is as high as 68°F (20°C)).

5. Add gelatin finings top-up and stand 6-10 more days, down to 32°F (0°C), undisturbed. See below.

6. This beer is best bottled by the priming method, using only about 1.2-oz dextrose per US Gallon (9-gm/liter; 1.4-oz/UKgal), which will produce about 2-atmosphere pressure in the bottle, and a more English-style ale. The beer should be aged about 6-weeks in the bottle before drinking. The lovely hop flavor will astound you.

With very strong ales and stouts of 1.080 (19°B) or higher Original Gravity, use half again as many hops and retain those (all

the hops for dry hopping) in secondary for as long as 4-6 months, rotating daily, at 55°F (13°C); or only 2-3 months at 68°F (20°C). In the case of such a strong ale, further bottle aging for another 6-months is advised before consuming.

FINING

It isn't always necessary or desirable to fine a beer, but it is nearly always desirable when a) the ferment is short, b) when dry-hopped in secondary, or c) when the beer has not cleared satisfactorily for any reason. Use finings gelatin or household gelatin (250-500-mg/gal; 70-130-mg/liter), (tspn = 3-gm US, 3.5-gm UK) or about half teaspoon the batch. Soak the gelatin in water for about half an hour, bring to a boil, and stir gently into the beer.

POST FERMENTIVE HOPPING

Always use the freshest finest quality hops you can find for either dry-hopping, or the sugar-hop krausen method (see part three). When these two methods are used, the finishing hops used at the end of the wort boil (part one, pgh C.7) may be of lower quality. (A less desirable method of dry hopping is to leave the hops (tied in a cheesecloth bag) in the beer during the early stages of primary ferment, that is, until the beer is skimmed.) A more delicate hop flavor is assured with the dry hopping method outlined above, but the hop rate is higher and more expensive.

The ABC's of Beermaking will be completed with part THREE in the next issue of the Amateur Brewer.

Continued from p20
AMERICAN BROWN ALE RECIPE

4. Boil the wort at a full rolling boil for a total of two hours. After one and one-half hours, add the Black Patent malt whole grain.

5. Near the end of the boiling (five minutes) or at the very end, add the 1½ oz. (43 gm) finest quality hops. If you plan to retain them in the primary ferment, tie them in cheesecloth.

6. When the boiling is complete, turn off the stove and allow to settle for 30 minutes. If you have a special Lauter Tub or similar vessel, place the hot wort in that container, and strain the hot wort through the hops. If you do not have the equipment for this, strain into the primary fermentor over the brown sugar, and add balance of water and water treatment. When this wort has been cooled and settled,

the beer is now ready to ferment.
II. Fermentation--use Ale Method
ABC's of Beermaking, Sect B.

III. *Finishing*--Use priming method of bottling

1. Boil two cups of beer (0.5 L) and add priming sugar (Corn Sugar or Dextrose to form a syrup.

2. Rack the beer carefully (so as not to disturb the sediment) from the carboy or secondary fermentor to an open vessel, such as a primary fermentor, and add the priming syrup. Add 1 tsp. ascorbic acid as an anti-oxidant (25 mg/L). Heading liquid, if it is to be used, is also added at this point. Stir in completely.

3. Siphon into beer bottles and cap.

4. Store for four days at room temperature, and then store as cool as you can for two weeks. Chill and serve.

NEXT: SUMMER Issue Recipe will feature a Queen Elizabeth II Silver Jubilee Ale for your palate.

BOOK REVIEW

THE BIG BOOK OF BREWING, by Dave Line, 1974, Andover, Hants, England, Amateur Winemaker, 248pp, illus., \$2.95.

The English have done it again, they've produced a really good book on home beermaking. Dave Line is very competent in writing on this subject. English beer is so vastly different from North American beer that there is a real problem of communication nevertheless, and moreover, his understanding of lager beer is very limited. He still sings the old tune that lagers need soft water. That is simply not true, as anyone who has drunk a Dortmund lager will attest. Mr. Line's simplified mashing procedures will not do well with North American malts, but the information he gives is very well presented, and when used with care you will definitely improve your own beer-making skills. A very fine book, and if English beer is your bag, you will love this book, I did.

--F. Eckhardt

BEER CLUB NEWS

The Woodland Hills (CA) Maltose Falcons celebrated their first anniversary by electing new officers: Scott Leland, Pres; Jeff Treffttes, VP; Sandy Hoppe, Secy; Gary Newton, Treas.; and TWO Sgt-at-Arms: Pat Rogers and Roy Clark, to handle enebriation problems. (Now that's really law 'n' order). The Maltose Falcons boast 65 members now. Merlin Elhardt, editor of their newsletter, describes the first meeting a year ago: "...we spent the first two minutes choosing up sides, and the rest of the afternoon huddled under a tin roof, toasting each other's health and making fools of ourselves." (sic) The precedent we set that afternoon has survived to this day...."

WE STILL NEED NEWS OF OTHER CLUBS.

OTHER NEWS OF INTEREST

New York

Margaret Herold (Wine Unlimited, Royal Oak MI) reports, the 1977 Home Wine Merchants Assn convention offered a panorama of products and ideas for your local suppliers, and they are looking forward to the 1978 Convention in California.

Portland OR

One of the oldest home brew and winemaking supply stores in the US is STEINBARTS, in business since 1914, selling beer and winemaking goodies, and tavern supplies. Proprietor Jos DeBenetti can tell stories for hours about how he sold malted barley, and ground same for the customers in a wonderful old antique coffee mill (which they still have). He quotes the store's founder, Frank Steinbart, as saying "it takes six months to make a good beer--you know the Germans start with barley malt, water and hops, and then do a lot of doctoring along the way." DeBenetti, who started in 1924 and ended up owning the operation, tells about prohibition beer. "In those days, they used to make it out of everything--raisins, rice, potatoes, and shoe leather." In those days there were 12 malt stores in Portland. After repeal and for a long time Steinbarts was alone in the business. DeBenetti tells of some fine old malt extracts made by such companies as Budweiser and others, including a local brewery, which produced 5-gallon cans of beer wort. The home brewer simply removed the lid, added yeast, and bottled it when it was ready!

DO YOU HAVE ANY NEWS FOR THIS COLUMN?

BREWERY NEWS

THE STATE OF THE BEER--a commentary.

The 1977 BREWERY DIRECTORY published by the trade journal BREWER'S DIGEST, gives some chilling information about the state of Beer in the US and Canada. The following table gives a comparison between 1972 & 77.

	1972	Can.	1977	Can.
1. States with breweries	US 31	9	US 32	9
2. Brewing companies	73	10	48	10
3. Brewing plants	133	46	96	49
4. Small breweries (und 250,000 bbl)*	32	21	18	1
5. Smaller breweries (und 100000 bbl)**	22	10	9	0
(**included in line 4)				
6. Sake Breweries	1	0	1	0

* A US beer barrel is 31-US gals (25.82 UKgal, 117.34 liter)

I find this to be a very disturbing trend. Some authorities estimate that there will be only about 15 breweries in operation by 1984. I think they'll all be brewing the same beer, unless we beer lovers do something. In Britain they have CAMRA (CAMpaigne for Real Ale), could we have CIRB (Citizens Interested in Real Beer)?

I think the reason for the demise of small breweries, and the reduction in the numbers of operating breweries, is that they are all trying to make the same beer. A beer with less and less taste to appeal to more and more people. They all hope to brew the same no-taste beer for everyone. So who needs 15 of those breweries? Mabe we should nationalize the breweries, and run them like the Post Office. Is there anyone out there who remembers Pennsylvania Swanky, Kentucky Common Beer or American Weissbeer? We know that California Steam Beer is alive and well at the San Fransisco Anchor Brewery, and there is still Rainier Ale (does anyone really expect that to survive Heilman?) (Has anyone tasted Carling or Ballentine Ale recently? I remember when they were great.) (Carling and Millers have bought Tuborg and Lowenbrau--'nuff said?) On the other hand there's a new small brewery in Anchorage Alaska! Their beer sounds good, too (see below). We beer drinkers must gird our beer bottles and stand by to repel bore-ders! I must apologize for editorializing outside my corner, but the trend towards bigger and bigger breweries making fewer and fewer kinds of beer to appeal to more and more non-tastes really disturbs me. Catch-22: They will get away with whatever we let them!

Anchorage, Alaska Sept 1976 NEW SMALL BREWERY OPENS.

The first Alaskan brewery to start operations in 33-years opened recently. The new Prinz Brau brewery is owned by the W.German co. Dr. August Oetker, Germany's second largest brewers (20 brwys, 204.6m US gals annual). Alaska consume just under 21-gals per capita per year, and were in dire need of their own brewery. The brewery is the brain child of a German immigrant Peter Bading, who convinced the Oetker co. to open shop here.

The first Alaskan brewery, the Abraham Cohen Co., in Sitka, was opened in 1890. Sitka, in those days, was a prohibition town, and the brewery went under when Mr Cohen died in 1892. A total of 26 Alaskan breweries came and went before prohibition, and 3 breweries folded by 1943. The Prinz Brau brewery is Anchorages first brewery.

The new brewery has a capacity of only 85,000 bbl (2,635,000 US gals), but is capable of expansion to about 500,000 bbls. Bud and Oly are currently the largest selling beers in Alaska. The new brewery will adhere to the Reinheitsgebot to produce a traditional all-malt product, which will not be pasteurized, using Canadian malt, (they hope to develop Alaskan barley) and water from 3 wells. The two beers, Prinz Brau, a premium beer with 3.5% alcohol (by wt, 4.4% by vol), and Prinz Extra, a super premium German style beer with 3.9% (4.9% by vol) alcohol, both beers will have an OG of 1.044. The new mash tun and lauter tun will each hold 4650 US gallons per batch, while the brew kettle has a capacity of 6820 gallons, and four fermentors with a capacity of 20,150 gallons each. The 12 storage tanks will store 18,600 gallons of beer each for the lagering period of 35 days at 0°C (32°F).

The new brewery is helped along by the US small brewery tax reduction on the first 960,000 gallons (AB#1), plus a special state tax credit incentive for up to 75% for the first ten years. Cost of the brewery is estimated at about \$13m. \$4.5m for buildings, \$6m for equipment and machinery, and \$1.3m payroll. Estimate income for 1977

is about \$6m. The Federal government requires a \$1000 bond from a new brewery (advance payment for taxes on 4,428.6 gals), in case you would like to open a new brewery. (extract Brewers Digest article by Flip Todd).

San Antonio TX OLYMPIA BUYS LONE STAR. Dec 1976.

The Lone Star brewery will continue to produce Lone Star, and Buckhorn beers along with OLY and probably Hamm's. This gives Oly a capacity of 263.5m USgals. That's a lot of water, but the new OLY labels no longer mention water.
Olympia WA LOW ALCOHOL BEER.

Olympia is producing a diet beer which offers "Half the calories of our regular beer", the inference being that the other diet beers are pretty bad, since they offer only a one-third reduction of calories. What OLY doesn't say about it's Gold is that it also has only 64% as much alcohol as their regular beer (2.3% by wt). Most diet beers have 3.1% alcohol. Oly Gold is an excellent beer if you feel you must drive after you drink, because of the low alcohol. It is too bad there are not more such low alcohol beers. In scandanavia the tax is much lower on such beers, and the accident rate is lower than in this country, where the beer tax in many Southern states is higher than that on hard liquor. No recognition is made for lower alcohol beer which could help keep accident rates down. Of course they'd have to charge less for low alcohol beer instead of more as is done now.

Yakima WA March 1977 DROUGHT AND HOPS.

The Hop Growers of America reported 1977 estimates of 56-57m lbs (508-517,000 Ztr) before drought. Drought may threaten the 1977 hop crop, but most breweries have about a 17-month hop supply on hand to tide them over the worst. 1978 may be the year they'll feel most.

NEW BEERS. In addition to the Alaskan beers mentioned already, and OLY Gold, there are other diet beers appearing: Lucky 66, from General Brewing, Anheuser Busch Natural Light, Bud's thin sister. Your diet beer recipe will be in a future issue of AB.

Azuza CA LOWENBRAU WEST. Phillip Morris' Miller Brg Co has taken to producing Lowenbrau at its AZUZA plant. Here in Oregon we have the German product, while in Washington Azuza reigns, the bottles are almost identical. We did a comparison tasting, and found the Millers product better than the 8000-mile traveled German beer, but neither was as good as our memory thinks old Lowenbrau was (5-yrs ago). Still a good deal better to our taste than Carling's wretched Tacoma Tuborg. Our local brewery, Blitz Weinhardt, has introduced a new premium version of their product: Henry Weinhardt Special Reserve. A fair beer, but it isn't a traditional lager beer to match Rainier Ale, San Fransisco Steam Beer and whatever Eastern beers of good taste there still may be.

New Orleans, LA DIXIE BREWING Co.

The Dixie Brewing Co has a \$500,000 renovation program in the works part of an ongoing \$3.5m 6-year improvement plan. Will they improve the beer?

BREWERY NEWS NEEDED. If you send me clippings of you local brewery news, we might improve this page. Include name of newspaper, and date the item, please.

BEER TASTING EXCHANGE. We'd like to see comparison tastes of your local beer with a national beer (Budweiser), send for information if you wish to participate in this. (so we can have uniform tasting comparisons).

Pennsylvania Swankey

"TEMPERANCE" BEER

In the old days in Germany they made a special low alcohol beer in the winter called schwenke beer, and when the old German settlers moved to Pennsylvania, U.S.A., they continued to make this beer, which became popular with the religious Pennsylvania "Dutch" as a peculiarly American common beer. The term Swankey, then, is a corruption of German *Schwenke*. Pennsylvania Swankey survived until the U.S. prohibition, being brewed in the Allegheny Mountain region. As far as I know it is no longer brewed anywhere, and maybe we can revive interest in it. I do not believe that low alcohol beers should be poorly received. There are many who might enjoy this beer for that reason alone. The beer itself has an interesting taste, since it is an all malt beer, flavored with a touch of licorice, from the addition of anise seeds available in most health food stores.

PENNSYLVANIA SWANKEY

Starting gravity: 1.027 (6.8 B.)
Terminal gravity: 1.003 (0.8 B.)
Alcohol: 3% by volume, 2.5% by weight,
6% Canadian proof spirits.

Ingredients:

Water: 5 U.S. gallons (4 Imperial gallons, 19 litres)
Malt Extract: 3 lb. dry (1.35 kg.)
Hops: 1 oz. (28 gm.)
Finishing Hops: 1/2 oz. (14 gm.)
Corn sugar or dextrose for bottling only:

6-oz (1-cup) 170-gm

Water treatment: 2 tspn. kosher salt (5 gm.) (or 1 tspn. plain salt)
Anise seed: 1 tablespoon (more or less according to taste)
Yeast nutrients: none needed
Ascorbic Acid as an antioxidant at bottling: 1 tspn.
Celatin Finings at racking: 1/2 tspn.

continued top p30

AMERICA'S ONLY SAKE BREWERY, by Fred Eckhardt

Although there were at one time or another 19 Sake breweries in the U.S., there is only one remaining. The Honolulu Sake Brewery was founded in 1908 by the father of the present owner, Shinsaburo Sumida, to provide inexpensive drink for Japanese laborers in the islands. The difficulties were many. The only safe way to ferment Sake is under cold conditions, and in Japan it was done in the winter only. Sumida and his co-workers pioneered the first year around operation by installing and using refrigeration. They also pioneered the use of American rice, when Japanese experts said it couldn't be done. Sumida used regular California short grain rice that produced high quality sake comparing quite favorably with the Japanese product.

After World War II, the company took on a young Japanese brewmaster, Takao Nihei, who has since been responsible for many innovations in sake brewing, including developing a special yeast strain (non-foaming), and exceptionally high quality Koji.

Amateur Brewer has just returned from photographing the plant, and we were able to gather a lot of information. Sake is produced by a 3-way bacterial action: a mold, Aspergillus Orzae, is injected into polished rice, which has been steamed, and cooled. The mold forms a mycellia on the rice grains, and the result is Koji. The koji is added to more steamed rice, producing amylase enzymes which convert the starches present into fermentable sugars. Yeast is added, and during the ferment lactic acid forms to acidify the mash and protect it. The result is a beverage which has a very high natural alcohol (up to 21% by volume). Sake is often drunk warm, but can also be consumed chilled. If you'd like to brew sake, we have full information, and sources of supply. Our SAKE pamphlet is 6pp ditto reproduction, and only 60¢ postpaid for a limited time.

This is a bottom fermented beer and the yeast to use is lager yeast. Always activate lager yeast in a yeast starter 2-3 days before brewing.

Procedure:

I. Preparing the wort—In a large kettle place up to five U.S. gallons hot water or as much as the kettle will hold to a minimum of two gallons (4 L.). Add the malt extract and salt, and bring to a good rolling boil. Total boiling time is one hour and 30 minutes. After boiling for 15 minutes, add the regular or lower quality hops, and after one hour add the anise seed. Fifteen minutes before the end of the boiling time add the finishing hops. When the boiling is finished, move the kettle off the stove and allow to settle for 30 minutes, then strain to your primary fermentor (if that is a crock, be very careful not to crack it with hot wort.)

II. Fermenting procedures—Since this is a common beer, the bottom fermenting steam beer method is preferred.

1. Allow the wort to cool to 70° F. (21° C.) or lower and pitch with your yeast culture, after stirring the wort completely and thoroughly with a paddle to aerate it.

2. A head, or "kraeusen" will form after 8-12 hours.

3. When the head reaches its maximum, and just starts to fall, skim it off.

4. In another day or so when the foam has receded, rack or syphon to a secondary fermentor such as a carboy, with a fermentation lock with water in.

5. Two days later add finings, first soaking them for 30 minutes bringing to a boil, and cooling them again.

6. Move the carboy to cool place— as low as 55° F. (13° C.).

7. After 5-7 days in secondary, the fermentation will probably be complete. The beer can rest two-three weeks longer if you wish, or may be placed in lager for two months or so.

III. Bottling & Priming— Bottle the beer in your usual manner, using the corn sugar or dextrose to generate sparkle while the beer ripens over a 10-14 day period.

QUESTIONS FROM OUR READERS

(Please enclose a stamped self-addressed Envelope if you wish a direct ANSWER TO ANY question, please ask only ONE question, and allow plenty of time. Sometimes I am quite overwhelmed with the questions people ask me.)

John Fitzgerald of Edmonds WA asks about the feasibility of malting his own barley.

BA #3 will give some information on the production of various malts, but I've done no experimental research on practical methods of malting barley at home. There is really no good reason to malt your own barley, mostly because of the hassle involved, and the fact that light barley malt (6-row), crystal or caramel malt, and black malt are readily available, and if expensive, they are at least no trouble to acquire. I know of no supply source of good barley which one could malt. The barley that is generally available is not malting barley, (but can be malted).

Now, if someone were able to find, plant, raise, and harvest their own barley, of a variety not easily available as malted barley, such as a good strain of 2-rowed barley; THEN, and only then, would the whole thing be rational. BUT only to make malts NOT available

on the market now, such as 2-row light malt or English style malt, or German Bohemian style malt, German Munich malt, Vienna Malt (no longer available even in Europe); well then, that would be another whole kettle, because you could make malts NOT available to the home brewer at any price. At this time I have no information on a source for any variety of seed malting barley, although growing barley is not difficult, and does not require extensive knowledge.

Mr. S.A.Screaton, Etobicoke, Ont., Canada asks: North American Brewers often use grains in their beers. Can these adjuncts be used by the home brewer, and if so how are they used?

There are two mashing methods for utilizing grains. One using "grain adjuncts" or "grits" such as rice or polenta (coarse corn meal), and another for "processed grain adjuncts" such as rice flakes, flaked maize, wheat flakes, etc. (these are not the toasted cereals). The first category, "grain adjuncts or grits" must be boiled, since the starches they contain are present in an ungelatinized state, and the conversion is possible only after boiling. Usually this process is carried out in two mashes. A cereal mash which is boiled separately to gelatinize the starches. The cereal mash is then added to the main mash where saccharification of starches takes place. In the case of "processed grain adjuncts" listed above such boiling is not necessary, and they may be added directly to the mash along with the malt in the regular mashing sequence. Use additional water at the same rate as called for in our mashing pamphlet for grain malt mashing. These flaked cereal adjuncts may also be used with a DMS malt extract (diastatic malt syrup), 2-lb of which will convert about 1-lb of flakes when held in the 150-160°F (65.5-71°C) for about an hour or more until an iodine test indicates starch conversion. Most of these flaked grains are imported from Europe, and carry incorrect instructions for their use (DON'T boil with the wort as suggested). Many health food stores carry rice flakes or maize (corn) flakes, at a lower price than the imported product now sold in winemaking supply stores. Your supplier can get lower priced flakes if he is really interested.

TOM SLOAN, San Francisco, CA asks: "How can a home brewer, using only malt, hops, yeast and water make sweeter beers, like some of the dark German lagers? My dark beers are generally quite dry unless I add lactose."

I have pondered this question for some time, and I can find no answer that would help. It may not be possible for the home brewer to do. You should know that German beer is about 75% as sweet as American beer (carbohydrate content, mostly dextrins), and therefore it may not be as sweet as you think. After the beer is filtered to remove yeast the breweries often add an enzyme called amloglucosidase, which converts dextrins into sugars, thus increasing the sugar in their beer. American beer averages between 1-1.5% these days. This is the equivalent of a specific gravity increase of 1.004-6, over the normal terminal gravity, which the brewer calls Apparent Extract. That is about equal to 1.6 to 2.3-oz dextrose per US gallon, a lot of sugar. What can I say? How are you gonna match that. The best thing you can do is in the mashing sequence, you can shorten the sugar rest, and raise the mash from the protein rest (122°F) which you cut down to 20-minutes in a shorter time, say 10 or 15 minutes to raise to dextrin rest (153°F), without pausing for a sugar rest. As you say, the alternative is to add lactose, which imparts its own taste which might not be so noticeable, if kept under 2-oz per US gallon. German beers do not use enzymes and so are natural just as your beer can be. You could be expecting the wrong taste out of your good German style dark beer, or you might be encouraging contaminating microorganisms by fermenting your beer too warm. A refrigerator is a dandy brewing (and WINEMAKING) instrument.

Jack Anderson, Twinsburg OH writes: "I am a little confused on the precise lagering procedure. You only state (in Treatise on Lager beers;) "simply add yeast to the priming sugar." (at bottling time,

after lagering the beer).

First you save a bottle of the yeast dregs at racking from secondary to lager storage, cap and store this in your refrigerator until you are ready to bottle. A few days before bottling, add this yeast, or a new packet, to some beer wort saved from the initial brewing, (hot wort, bottled, capped and stored until needed). When this new culture is active, proceed with bottling. Prepare a syrup from the beer and dextrose in the usual manner, cool and add to the beer (after racking that to an open vessel), along with the active yeast culture. Mix syrup, yeast culture, and beer carefully and thoroughly, stand for four hours, and bottle in the usual manner.

Joseph Haynie, Pomona CA, asks about using beer in wooden kegs.

In the old days, breweries used wooden kegs, both for bulk storage (lagering), and in draft packaging, but these kegs or barrels were not the same as the usual nail keg or wine barrel, which we are all familiar. The beer kegs of that era (prior to WWII, although they are still used in England) were made of very thick wood, oak, cypress, redwood or fir. According to Vogel and Associates in the Practical Brewer, 1946, (still found in used bookstores if you look carefully): "Wood containers provide good insulation and are fairly easy to repair, but relatively difficult to maintain. They are heavy and not suited for high pressure systems and lack uniformity of contents (volume). All wood cooperage must be kept moist when containing beer. Requires periodic 'pitching'." "Brewer's pitch (a compound of resin...oil... paraffin..neutral tasting. (used to) coat..wood or metal to facilitate cleaning. (further preventing) absorption of beer into the wood (and flavoring) the beer." The beer never came in contact with the wood.

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The author of this happy tome, a Bob Brown*, goes on to say "Beer is better for the nerves than coffee, tea or tobacco. It gives relaxation after physical and mental labor."

"If the doctor says you have high or low blood pressure, that your liver, kidneys, pocketbook and heart are either too small, or too large; if he tells you to take on flesh or reduce, you know what to do. Take the beer Cure!" Pardon me while I sip some suds. . . .

*Brown, Bob, Let There Be Beer, New York 1932: Harrison Smith and Rob't Haas, privately published.

THE NEXT ISSUE OF THE AMATEUR BREWER

We'll continue with part three of the ABC's of Brewing--Finishing Operations. The beer Ingredients' series will continue with part two of the Barley article. We hope this the end of part one and two articles for some time. I hate them. Next month we will have a special (traditional) Silver Jubilee Ale recipe for lovers of English style beer, and to honor Queen Elizabeth II, who is two weeks older than your editor. Barring the vicissitudes of fortune and the postmaster, we hope to appear about July 31.

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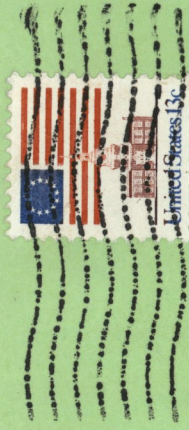
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