
MECCA
GRADE™
Estate Malt

March 18th, 2017

Yes You Can: Home Malting for the Homebrewer

- Mecca Grade History
- Central Oregon Farming
- Malting Essentials
- Historical Malting
- Home Malting (Considerations and Metrics)
- Steeping, Germination, and Kilning
- Process Evolution of Mecca Grade

ABOUT US

Mecca Grade Estate Malt is a craft malthouse located on 1,000 irrigated acres in the beautiful Central Oregon High Desert. Our eighth-generation Oregon farming family grows and malts all of our own specialty grain.


THE FARM

What makes Central Oregon so special?

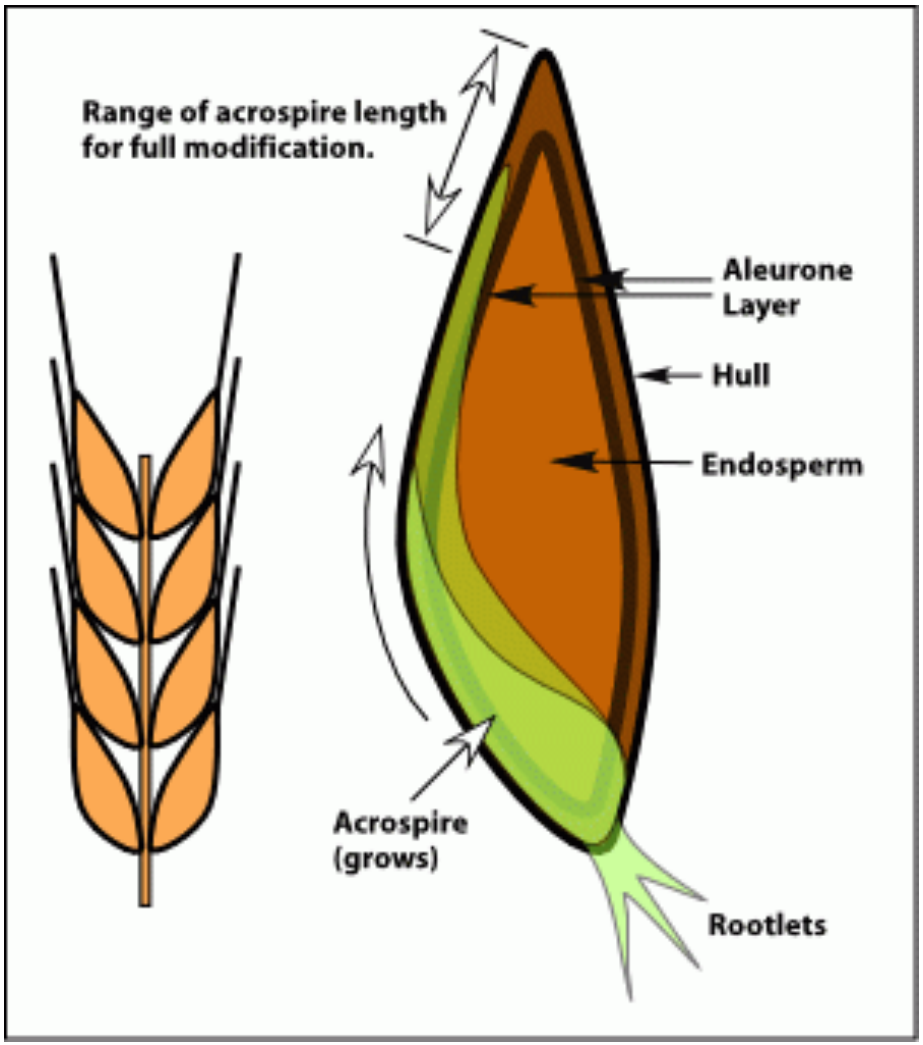
- Climate - Hot days, cool nights, 8” annual rainfall, specialty seedstock/grain growing region. Only two other places similar in the entire world

- Irrigation - Ability to control and conserve water applications

- Terroir - Varietal flavor influences expressed through environment

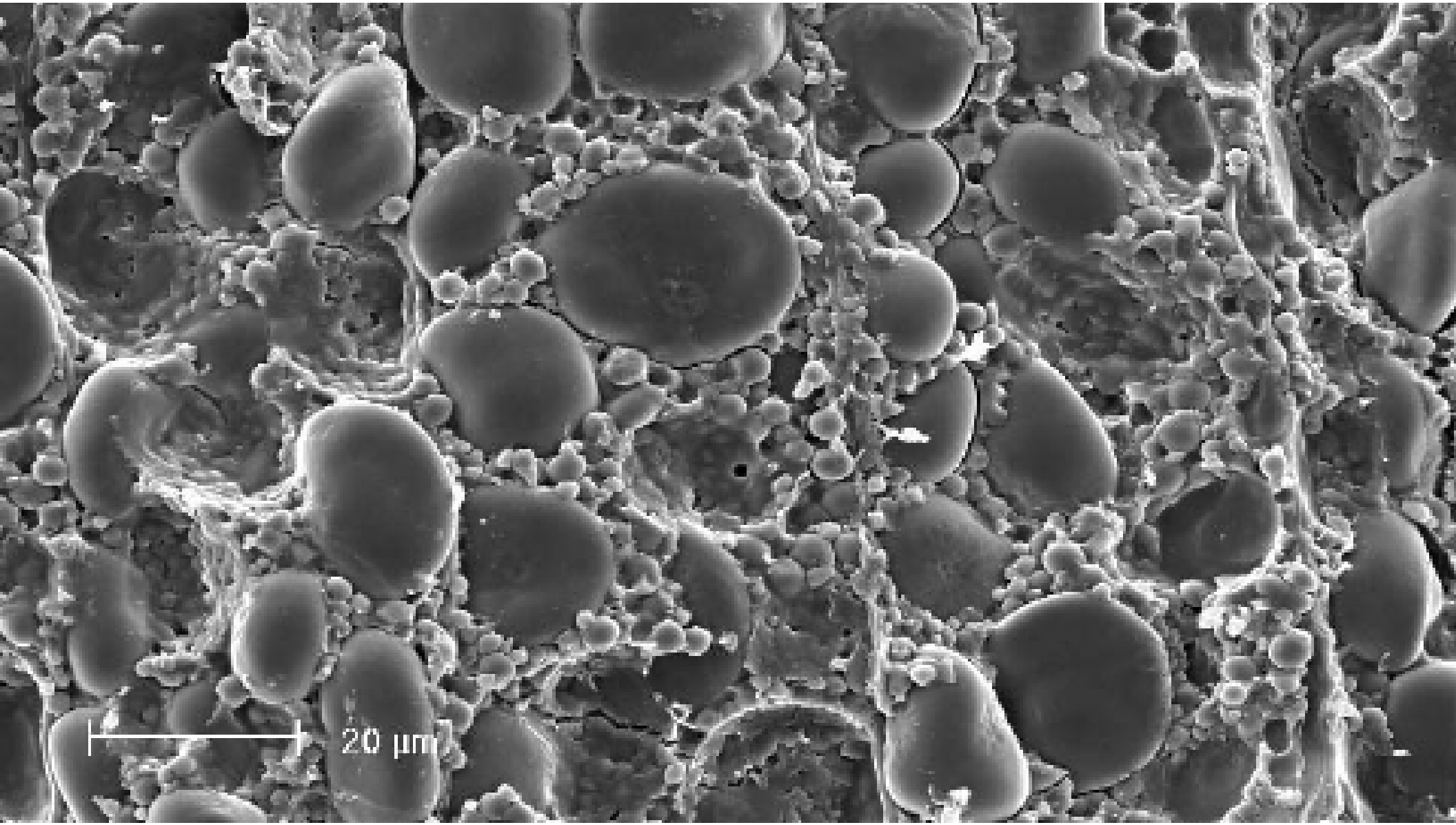

GPS
EQUIPPED
Reinke


NEW HOLLAND
TR99



Malting Essentials

- Steeping, Germination, and Kilning
- The process has remained virtually unchanged for thousands of years, because by nature, grain wants to grow; but it's takes human intervention to produce malt
- Turns a hard, raw seed into the perfect package of accessible carbohydrates and enzymes


20 µm

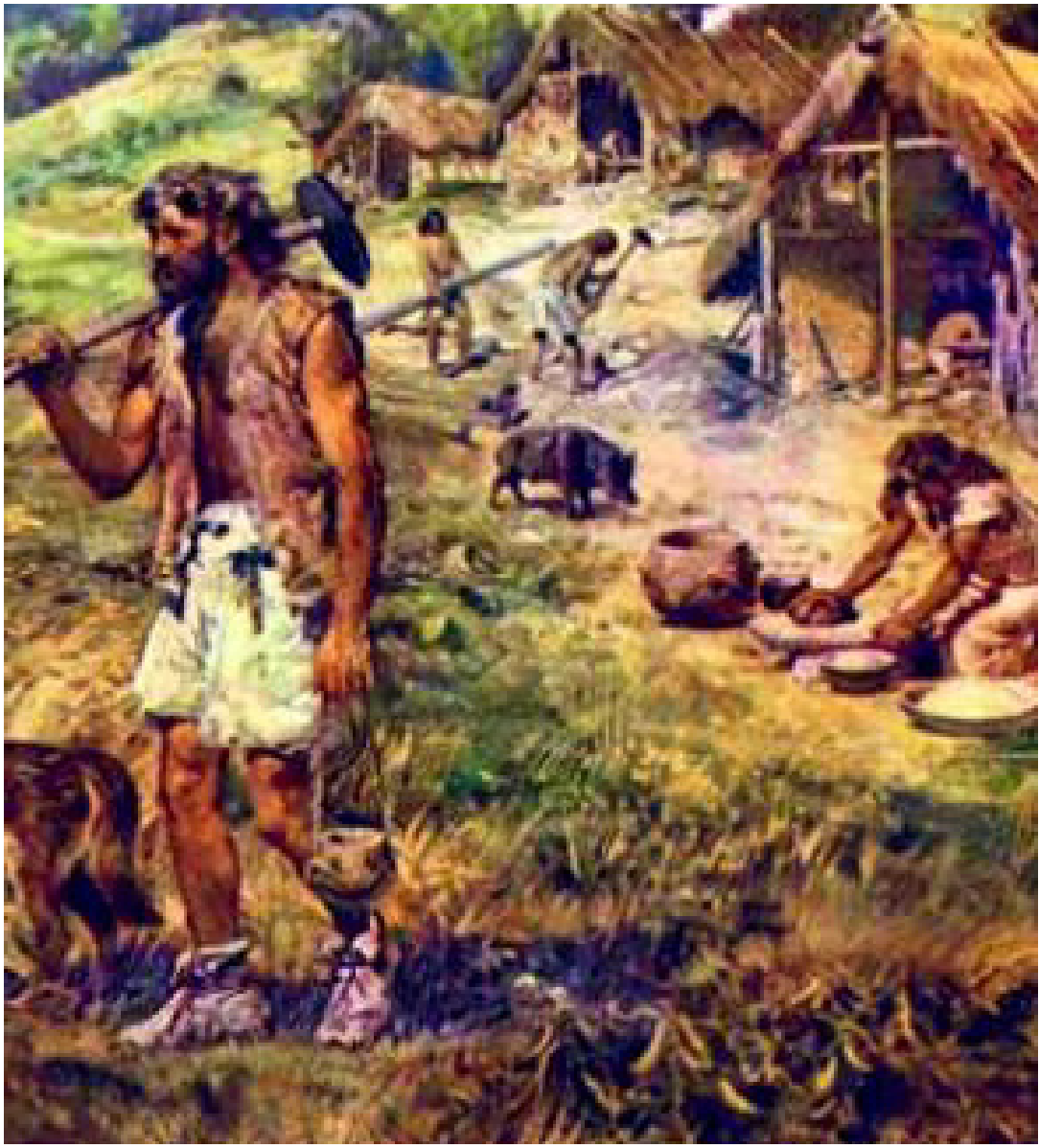
The Importance of Malt

- Controlled germination of seed; living process that affects all seed crops
- “Malt” primarily refers to malted barley
- Barley is an ancient grain native to greater Eurasia, and was possibly the first grain to be domesticated and cultivated. There are estimates of this occurring over 13,000 years ago
- Used for bread production, in soups and stews, but is mostly malted for use in brewing and distilling

Accidental Malting

- In all likelihood, the first thing pre-historic peoples would have made when they first started foraging barley was a type of watery gruel.

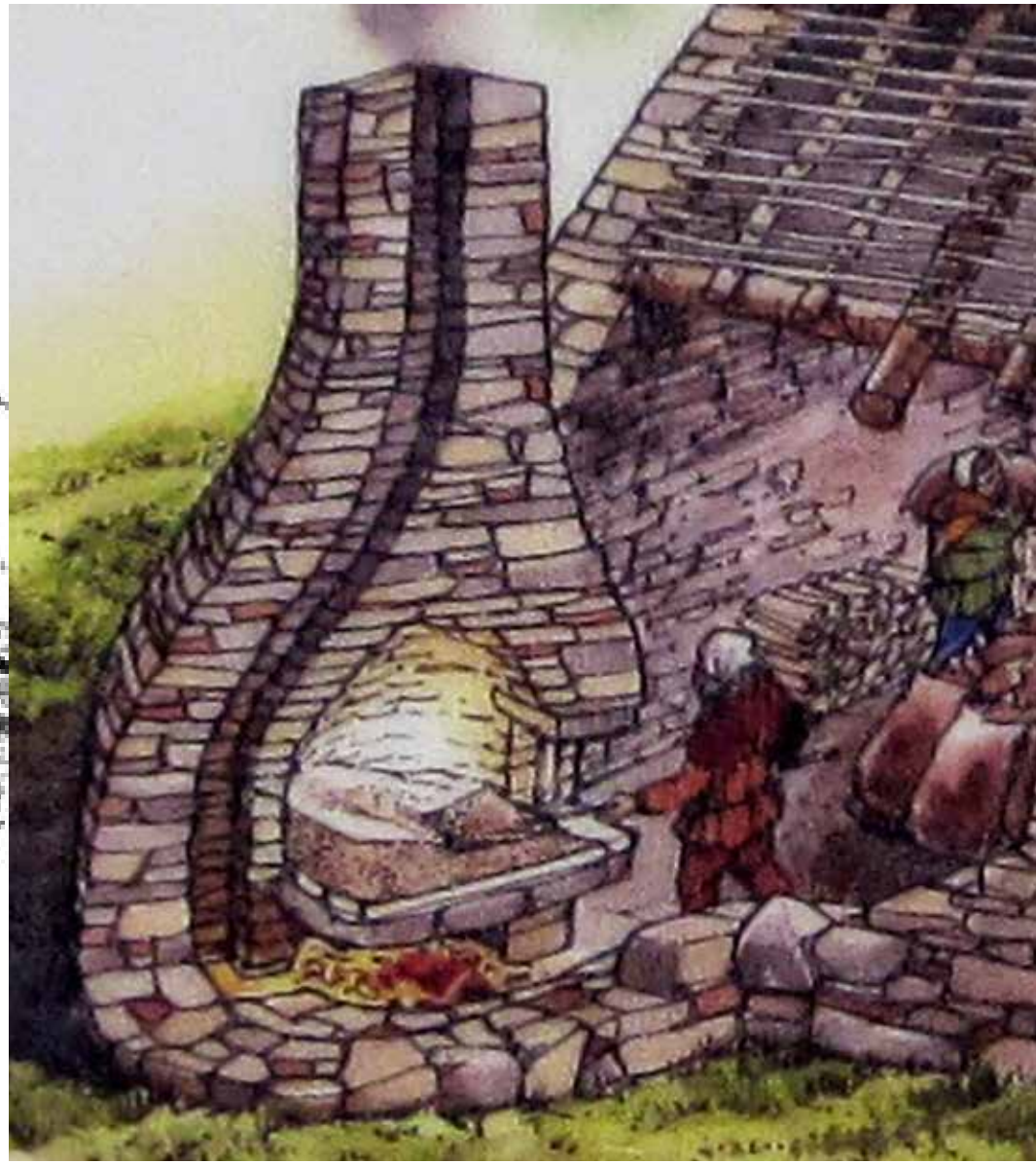
- Grains would have been steeped in water to be softened, and if let alone, would eventually germinate. If the gruel was neglected or poorly stored, wild yeast would eventually ferment the mixture making a sweet (or sour) beer with a low alcoholic content.

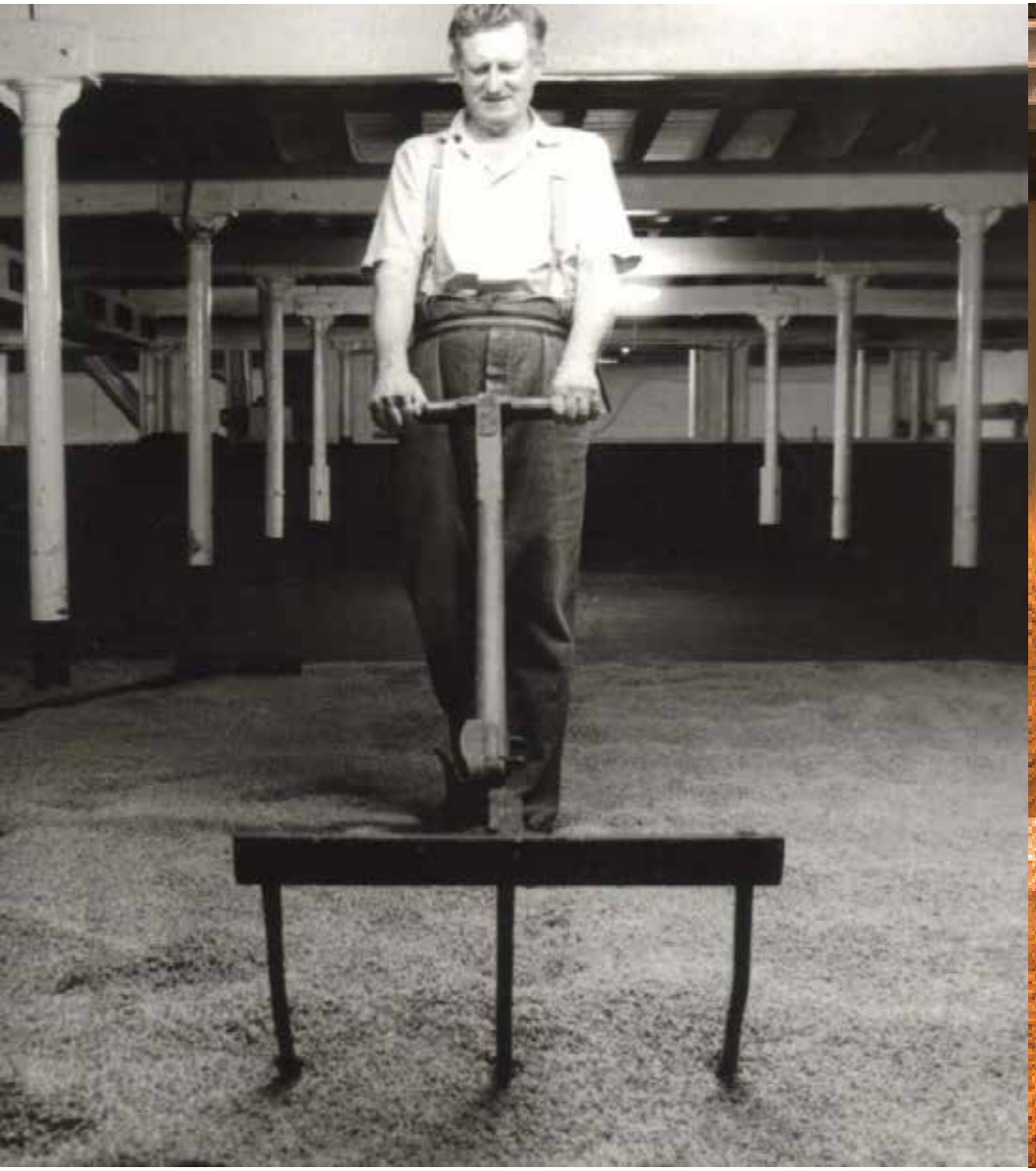


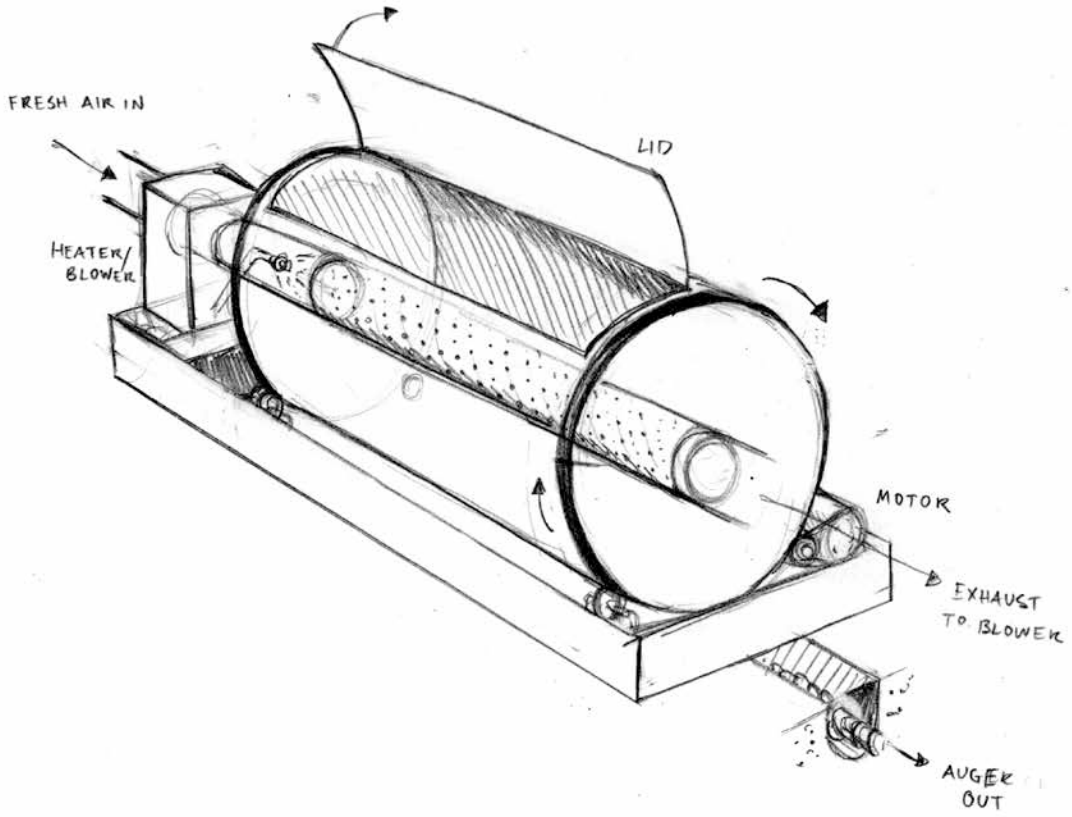
Accidental Malting

- The impact of alcohol and intoxication would've been profound and magical. It's easy to imagine how the beverage would have been given spiritual significance early on.

- Through trial and error, early people began selecting for strains of barley and wheat that yielded plumper kernels. Early harvests would've been poor and frustrating; why then would people even bother sticking with agriculture?

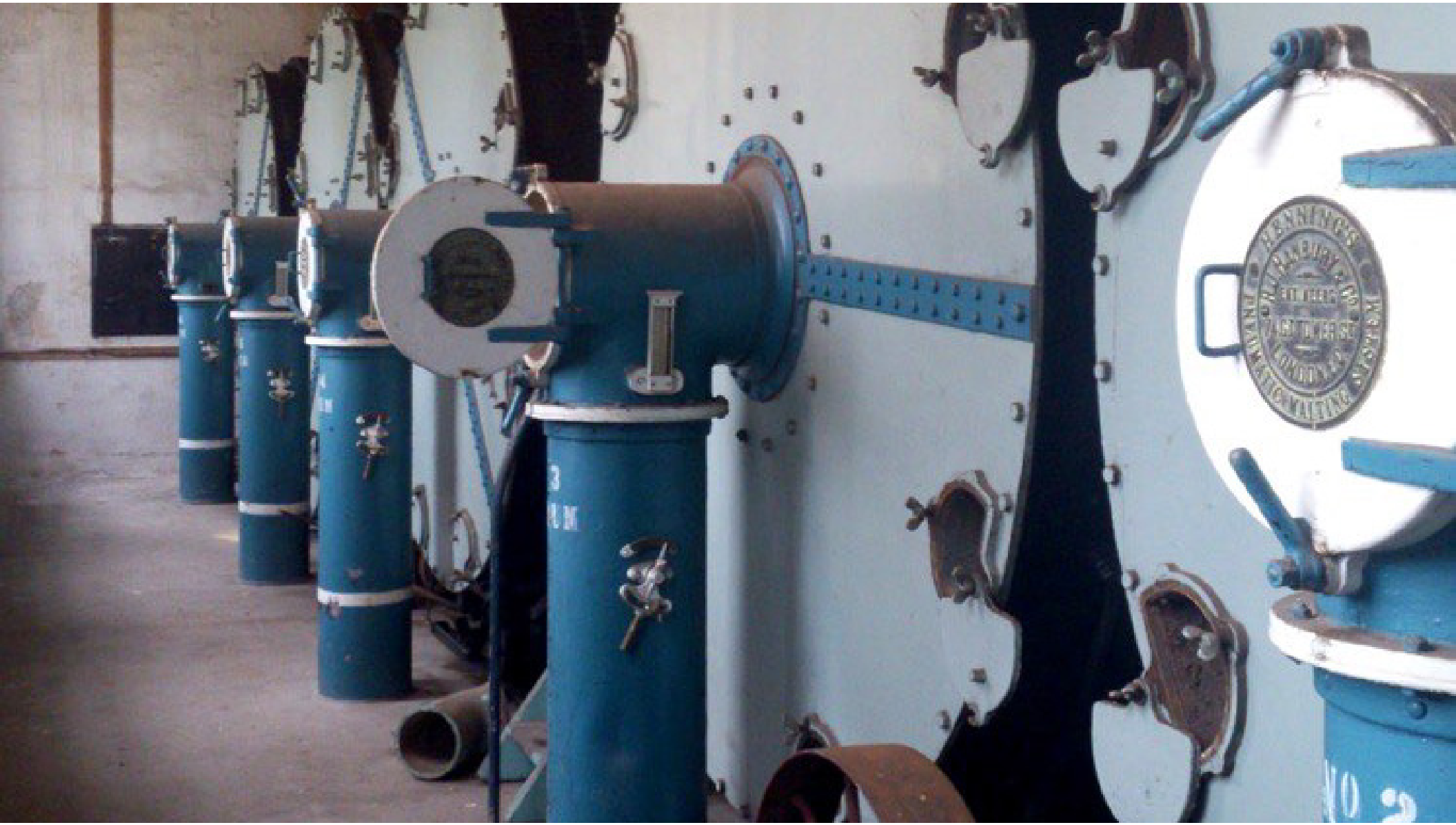






315 GAL. GERMINATION DRUM

4' = ~ 1 TON FINISHED MALTED BARLEY
5' INCL. 33% VOL FOR HEADSPACE




SCHULZ
SCHULZ

HOME MALTING

Grain Sourcing

- Check local feed suppliers, online, OSU Barley World, or your local maltster
- Be sure to ask for “untreated” seed. Farmers will often have seed treated with fungicides and/or insecticides for planting; you don’t want this in your malt
- For first time malting, source “malting” barley as opposed to “feed” barley varieties. You can malt “heirloom” grains, and should when you feel comfortable
- Also, search for grain by variety, which does have an impact on flavor.

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- Soybeans
  - Recipes

Home » Barley Seeds

Barley Seeds

17 products

ALL | NEW | Sort by A-Z

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$4.00

6-Row Purple Barley
$4.00

6-Row Purple Barley Bulk Packet
$8.00

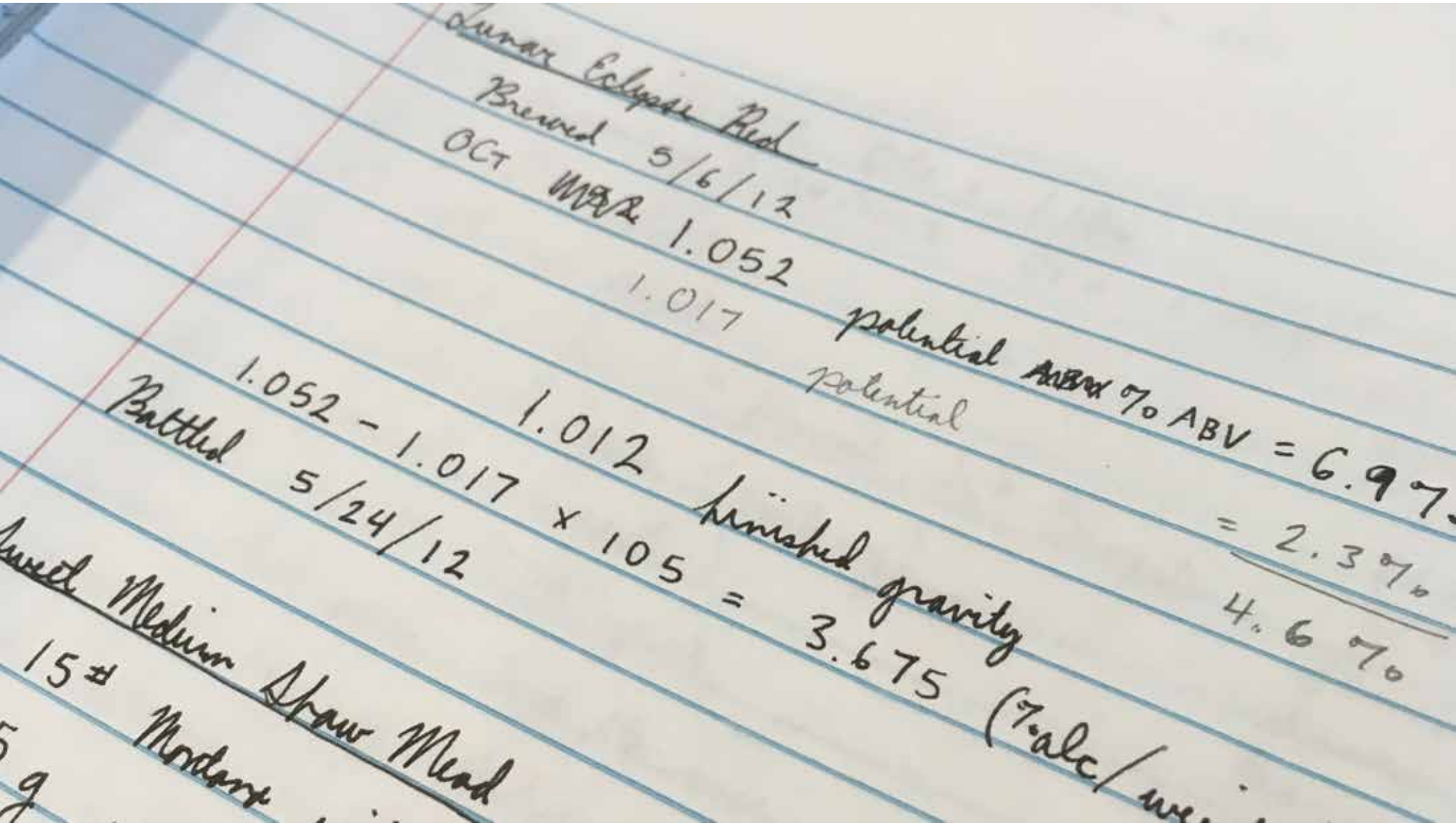
Alba Winter Barley
$4.00

Arabian Blue Barley
$4.00

Belford Barley
$4.00

Bere Barley
$4.00

Ethiopian Barley
$4.00


Lunar Eclipse Red
Brewed 5/6/12
OG MBA 1.052 potential ABV 7% ABV = 6.97
1.017 potential = 2.3%
4.6%
1.012 finished gravity
1.052 - 1.017 x 105 = 3.675 (% alc/vol)
Bottled 5/24/12
Spiced Medium Straw Mead
15# Mordant


BREWERIES


HUSKY

Home Malting Metrics

- It's easy to make malt, it's difficult to make consistent malt.
- **Goals** - what and why are we trying to accomplish in each stage of malting
- **Time, Temperature, Moisture** - 3 critical process metrics.
- Also, for each step we will discuss the **Tools** necessary for the job
- Fortunately, homebrewers have much of the necessary equipment readily available

Steeping Essentials

- **Goal - wet kernel until moisture reaches at least 45% moisture**

Time: Dependent*

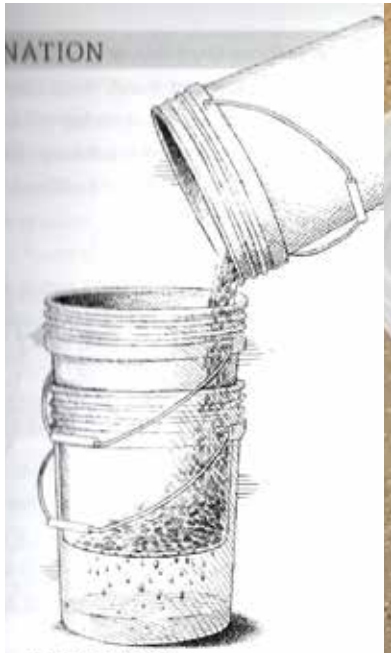
- Steeping takes place in “wet” and “dry” stages. During “wet” step, grain is fully-immersed in water. During “dry” step, grain is drained of water and allowed to rest. We call this the **air-rest**

- Grain can only absorb so much water during a given submersion steep

Steeping Equipment

- **Tools:** 5-6 gallon plastic buckets, storage totes, planter boxes
- Simply needs a vessel hold water and grain
- Enough volume to completely cover grain with 1-2” of water
- If using buckets and want to aerate during steep, make a nesting “colander bucket” for each ~5-7 pounds. This will take 3 buckets total.
- Also need: thermometer, floor scale, aquarium pump (optional aeration)

Check out: “The Homebrewer’s Garden” by Joe Fisher & Dennis Fisher

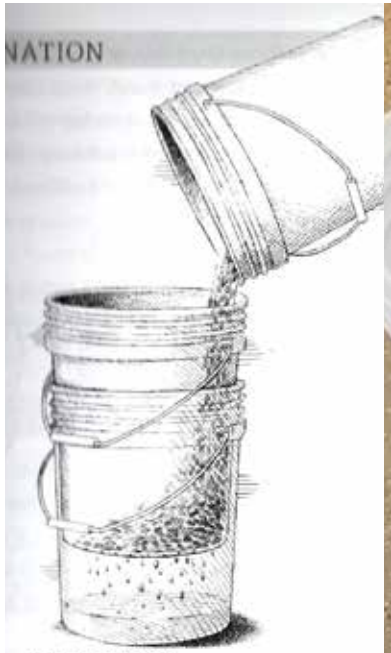


Draining the grain


Germinating grain

Steeping Equipment

- I prefer the aerated steep, which is the same process we use in larger-scale malting
- The embryo of the seed is a living thing, and can drown if all the oxygen is used up in the water
- Steeping is the most important part of malting, and we want <u>all</u> kernels healthy and happy
- Growing grain also produces CO2, which during the air rest can choke it out. The colander bucket setup allows CO2 to pool underneath



Draining the grain


Germinating grain

Steeping Temperature

- Time of steeps are relative to temperature of steep water
- 55˚ - 65˚F is the acceptable range. Too cold and it will “shock” the grain, too hot (100˚F+) can scald and damage the grain
- Start with 55 degree water, and maintain this as long as possible in your room or area.
- If temperature does creep warmer throughout steep, shouldn’t be a problem.
- Use fresh steep water every time
- Do not use chlorinated water

Draining the grain


Germinating grain


Molting

Example Steep Schedule

Rinse Steep - .5 to 1 hour

- Removes chaff, debris, excess soil

Steep #1 - 8-12 hours

- Increases moisture to 33-35% moisture

Rest #1 - 10-12 hours

- Lag phase: Allows grain to breathe, purge CO2

Steep #2 - 8-12 hours

- Increases moisture from 35-45%;
- "Chitting" at 24 hours into schedule

Rest #2 - 6-8 hours

Steep #3 - 6-10 hours

- Supplemental steeping as needed to fully saturate kernel. Perform "Steeping Index" test

Example Steep Schedule

The Old Maltsters Adage:

"Hours Steeped + Water Temperature = 110"

Rinse Steep: 1 hour

Steep #1 - 10 hours

Rest #1 - 12 hours

Steep #2 - 10 hours

Rest #2 - 6 hours

Steep #3 - 6 hours

45 hour Steeping Schedule

+60 - 65˚F average steep water

105 - 110 (Magic Number)

Steeping Index Test

- **Tools -** Moisture balance ($1200+)
  or
- Electric kettle, tea infusion ball
  and X-acto knife (~$50)

Grain should have grain 50% starting weight when fully-hydrated:

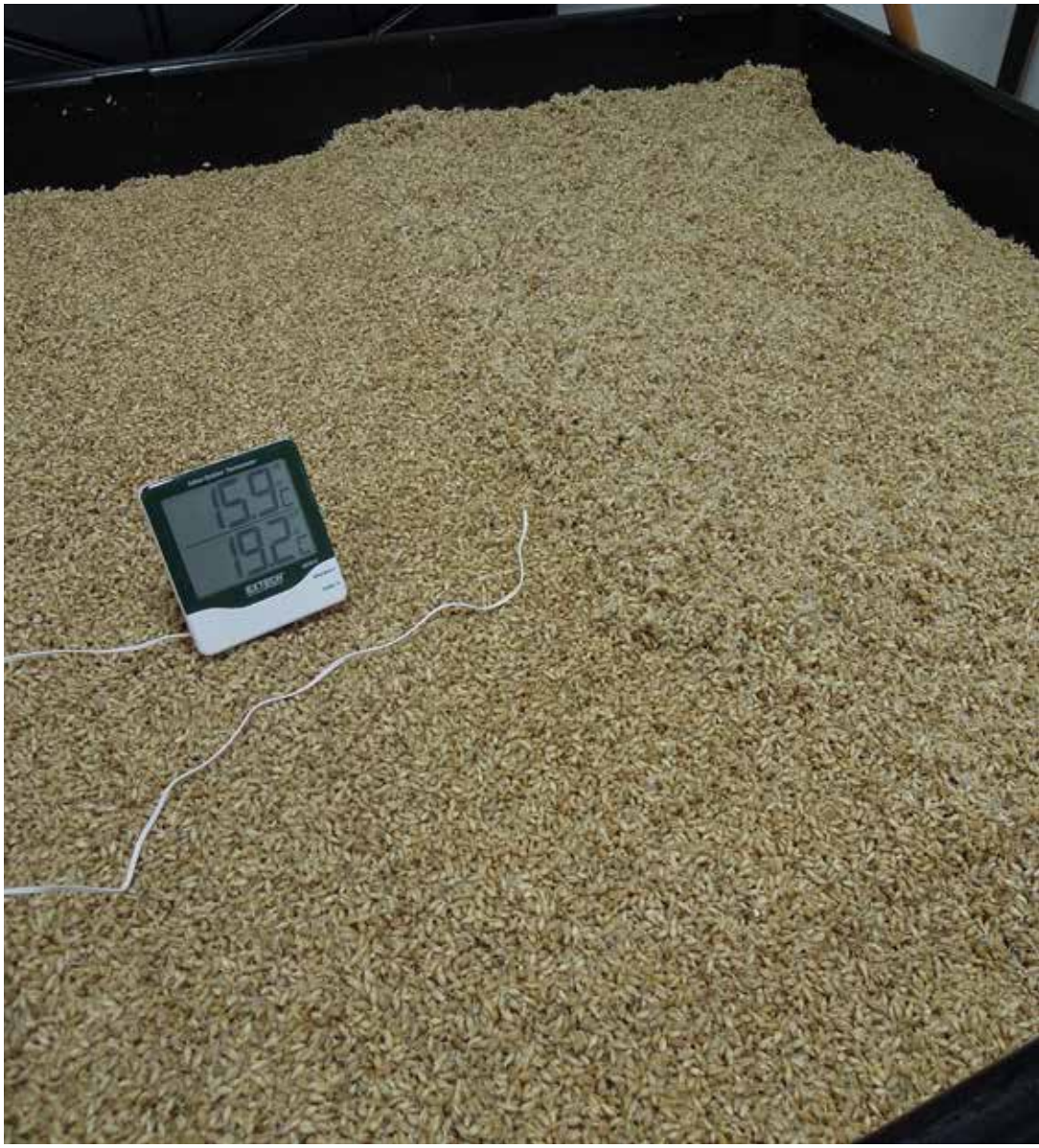
Ex: 50% of 7# = 3.5#

3.5# + 7# = 10.5#

- Grain should be easily bent in half without tearing or breaking
- Load tea ball with grain and boil for 3 minutes in kettle. Slice grains lengthwise to check for solubilized starch. Non-hydrated will have white spots.


Germination

- **Goals** - Maintain growth at steady temperature until grain is **fully-modified**
- **Time:** Usually 3.5-5 days, but dependent on temperature, variety, etc.
- **Temperature:** Try to maintain 55-65˚F grainbed temp. Hotter temps accelerate acrospire growth, but not necessarily modification
- Too warm of temps (80˚F+) can kill the grain. Important to keep an even, shallow grainbed.



Germination V1.0

- **Tools:** Quite simply:
- an area or vessel that can maintain a cool temperature. The Egyptians used clay amphoras, and we still germinate on the floor to this day
- ability to access the grain and turn
- thermometer to track temps
- way to feel or gauge humidity of grain
- patience and diligence

Germination

- Germinating grain will generate a fair amount of heat. Deep grain beds foster warmer temperatures. Keep beds shallow and cool by using AC, fan, etc.

- Rootlets will grow and tangle together if not separated. This process can either be done mechanically or by hand.

- Grain needs turned every 6 - 12 hours. Isn’t being a maltster fun?!

- Be sure not to dry out grain during this time. Hard to determine without moisture balance, but grainbed needs to maintain close to 100% relative humidity. Mist with water as needed.

Germination

- Use your senses of smell, touch, and taste to determine healthiness of grain

- If germination is going well, you'll smell and taste cucumbers at the beginning, and fresh grass when it gets closer to kilning time.

- Alternatively, mold or rotting can happen when the temperature is too high and the grain is too moist, or if you have too many broken kernels in the batch.

- The rootlets will be bright white and crisp at first, but some will likely turn yellow or brown as growth progresses, especially if the grain gets too dry.

Modification

- Track germination progress by looking at the length of the acrospire as it grows/ travels along the kernel. Grain is usually ready to kiln when the majority is at 3/4 - 1 length

- The old maltster's test to determine if modification is complete involves rubbing the kernel between the thumb and forefinger. If the grain still contains unmodified starch, it'll ball up.

- Fully-modified grain should be able to be completely smeared out.

SGV 2.0
(Steeping/Germination Vessel)

- **Tools:** Modified, food grade sauerkraut mixer (Home Depot - $700)
- Garden timer
- Tower fan or portable AC

Kilning Process

- **<u>Goal - dry grain until it free moisture escapes (20%); cure grain until 4% raising temps to develop flavor and color</u>**

<u>Time:</u> Dependent*, usually 24-36 hours

- Use 100-120˚F dry air to remove moisture from as shallow a grainbed as you can make. The deeper the grainbed, the more airflow you will need.

- Also, grain pan need to be permeable to allow air to pass through bed and carry away moisture.

Kilning Tools

- Food dehydrators are a great way to remove water during the **“free-drying”** stage (45%-20%) moisture

- Good for practice when you are first starting to malt your own, but not practical if you are wanting to malt enough to make a full batch of homebrew

- Ovens offer more room, but may go down to 120˚. Airflow is an issue. It can tie up your kitchen for at least 24 hours with the door open; Read - unhappy significant other

Kilning Tools

- **Tools & Challenges** - create pan that won't along small grain to pass through. Mesh BBQ pans have too large of pore space, and need to be wrapped with hardware cloth.

- **Heat Source -** controlled and measured heat with a range of 100˚- 250˚F

- **Kiln Box** - or any container than can be sealed. Fresh air will need to be introduced and moist air will need to be force ventilated. Box needs to withstand moisture and prolonged high temps

Vortex

Vortex Powerfans VTX600 Vortex 497 CFM Inch

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Size: **6 inch**

4 inch	6 inch	8 Inch	10 inch
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- Impact-resistant; sound-absorbing heavy gauge steel casing
- Rustproof hammertone powder coat epoxy finish
- Permanently lubricated balanced motor, which ensures long life

Upright Kiln v1.0

- **Tools:** Upright freezer or refrigerator
- Closet rack system
- Clothing drawers wrapped in hardware cloth
- Hydroponic fan
- Garden timer
- Ranco Dual Stage Controller w/ Probe
- Heat source - heat bulbs, hot plates, or ceramic heater
- Additional power cables, splitters, etc.
- Optional: radiant barrier - use depending on plastic makeup of kiln

Kilning Schedule for Pilsner-style Malt

- Each rack holds ~5 pounds of green malt
- Need to rotate racks every 6-8 hours
- If possible, oversize fan and use speed controller to dial in suction

Kiln A (Free Drying) - 16 hours @ 120˚F
Moisture drops from 45% to 20%. At the beginning you can squeeze water from the kernel; at 20%, kernel has firmed up

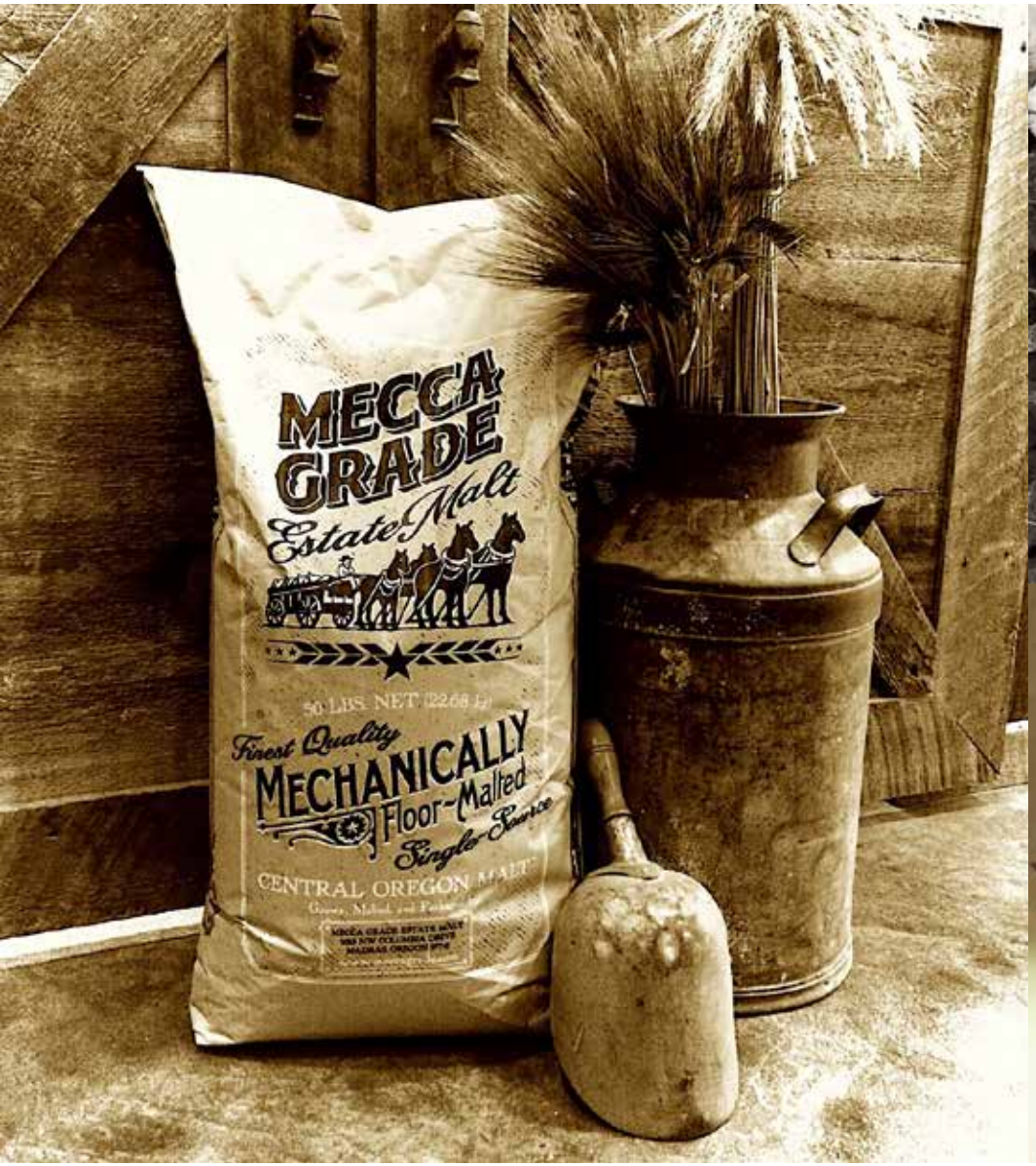
Kiln B - 8 hours @ 140˚F

Kiln C - 4 hours @ 160˚F

Kiln D - 1 hour @ 180˚F

Other Kilning Considerations

- The majority of the schedule is kept at low temperatures to preserve enzymes. Heat above 140˚F in the presence of moisture denatures enzymes (beta, alpha-amylase)
- Most flavor and color development happen in Kiln C and D
- The difference between a Pilsner and a Pale malt is longer Kiln D (2-3 hours) at a higher temperature (200)
- Pilsner malt should retain some grassiness
- When done, turn off heat and let fan cool grain to at least 80˚F
- **As always, your mileage may vary**
- Remove rootlets (culms) by rubbing malt against screen drawers, other cleaning screens or sieves, or a colander-style setup


MECCA
GRADE
Estate Malt
50 LBS. NET (22.68 kg)
Finest Quality
MECHANICALLY
Floor-Malted
Single-Source
CENTRAL OREGON MALT


MECCA GRADE ESTATE MALT
KEEP LEFT, ENTRANCE NEXT RIGHT
Guests Please Check in at Main Office

ADDITIONAL RESOURCES

Mecca Grade Estate Malt - www.meccagrade.com
North American Craft Maltsters Guild - www.craftmalting.com
Oregon State University Barley World - www.barleyworld.org
Brewing Beer the Hard Way - https://brewingbeerthehardway.wordpress.com/
The Homebrewer's Garden (Second Edition) by Joe Fisher and Dennis Fisher
The Craft Maltster's Handbook by Dave Thomas
Malt - A Practical Guide from Field to Brewhouse by John Mallett
Malts and Malting by Dennis E. Briggs

QUESTIONS?







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