



# BJCP Study Group

February 12<sup>th</sup>, 2014

Market Garden Brewery

Malt and the Malting Process



# Outline:

- Summary of the malting process
- Types of malt
- Beer styles associated to particular malts



# Overview of the process:

## Four basic steps (for “base” malts)

- Steeping roughly 48 hrs, raise moisture levels, begins to sprout
- Germination around 5 days until desired level of modification
- Drying at low temperatures
- Kilning to desired color, flavor
- Specialty malts handled differently



A nagging question:  
*Why* should this process work so well to  
make beer????


Answer 1: ***“Beer is proof that God  
loves us and wants us to be happy.”***

Answer 2: Evolutionary advantages of  
long-term storage.

What sort of barley?



# Poetic description of malting by Robbie Burns



There was three kings into the east,  
Three kings both great and high,  
And they hae sworn a solemn oath  
John Barleycorn should die. ....

They filled up a darksome [pit](#)  
With water to the brim;  
They heaved in John Barleycorn,  
There let him sink [or](#) swim.

They laid him out upon the floor,  
To work him farther woe;  
And still, as signs of life appear'd,  
They toss'd him to and fro.

They wasted, o'er a scorching flame,  
The marrow of his bones;  
But a miller us'd him worst of all,  
For he crush'd him between two stones.

And they [hae taen](#) his very heart's blood,  
And drank it round and round;  
And still the more and more they drank,  
Their joy did more abound.

# Steeping/Germination

- After dormancy period (months...)
- Steep at 50-60F
- Usually 40-48 hours
- Raise moisture from ~ 12% to ~ 45%
- When enough moisture, move to germination area (traditionally floor, now compartment)





# Steeping chamber





# Traditional (!) floor malting



# What happens during germination ?

- Lasts about 5 days, usually 57-70F
- Kept moist, aerated
- Acrospire grows
- Starch matrix degrades (break down of cell walls)
- Makes starches “available,” degrades into sugars (amylases...)
- Acrospire length 1.0 = “fully modified”
- Beware old texts/articles!



A close up ....



# Drying/Kilning

- Drying at 100-120F until moisture < 10%
- Increase temperature (140-160F) until moisture below 6%
- If too hot when too moist, degrade amylase enzymes (so later mash has conversion troubles)
- After drying, kiln to desired color/flavor

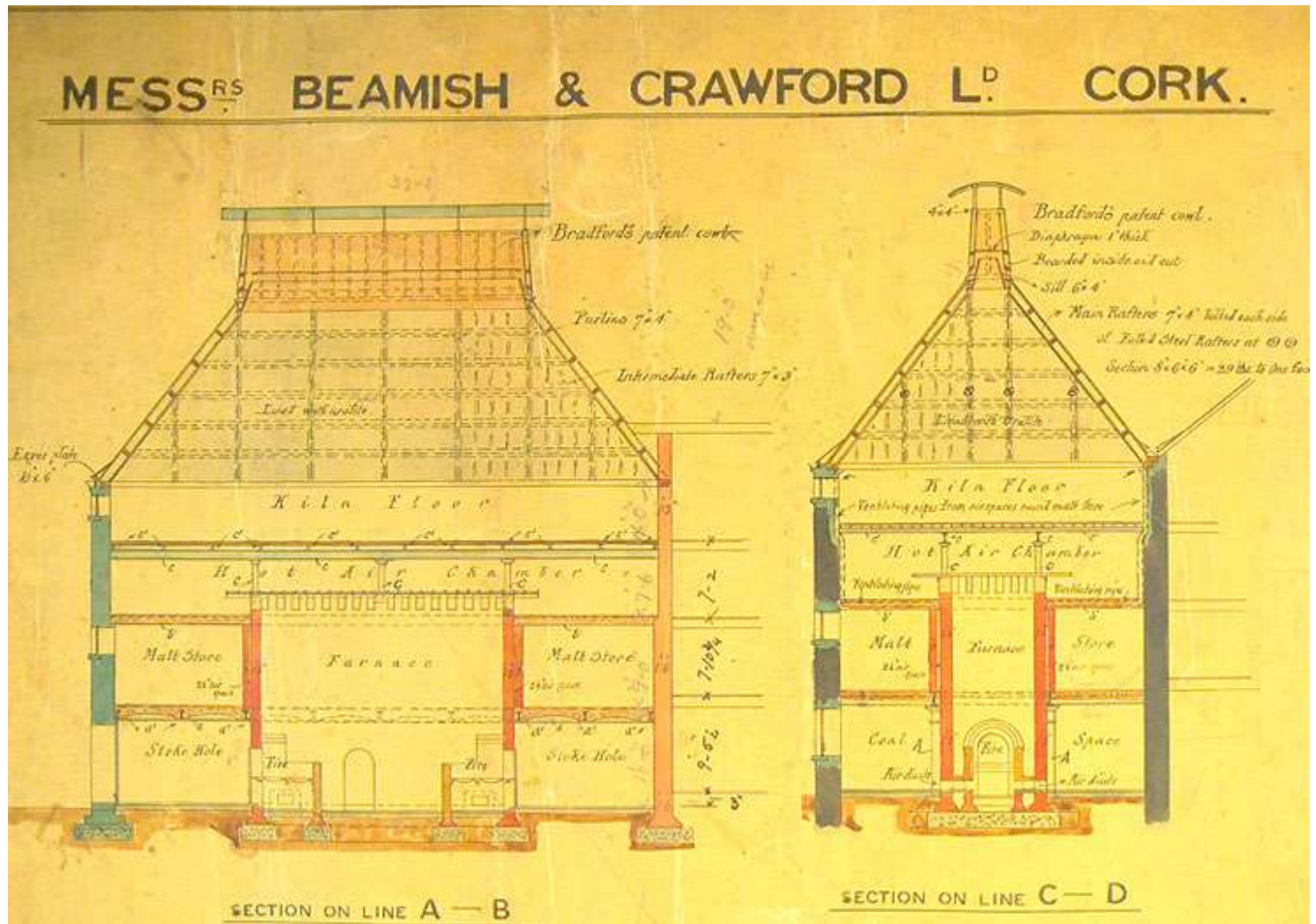




# Traditional malt kiln (Rodenbach)

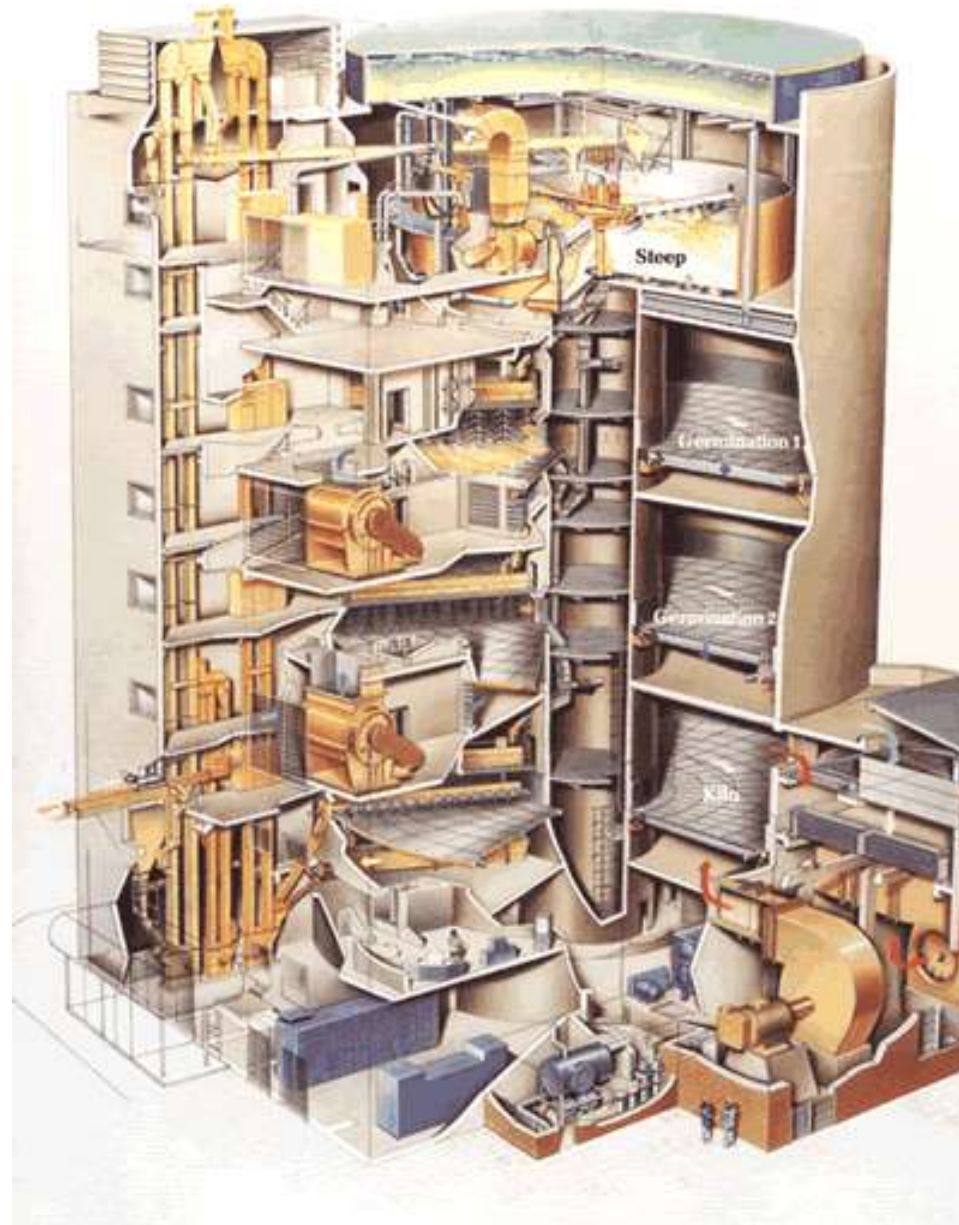


# Beamish Kiln (1870)





# Modern malting (UKMalt)





# Types of malt and their production

## Pale malt/Pils:

- Drying phase for pale malts: low temp (40-45C) and very high vent until ~10% moisture content, then raise temp for “curing phase.” (If raise temp at high moisture, kill enzymes.)
- Curing phase for pale malts: 80-95C for 5 hrs.
- Full diastatic power. (About 140 deg Linter for American pale, 80 (?) for British pale, ~100 for Pils)



# Types of malt and their production

“High-kilned” malts (Munich, Vienna, Aromatic, Melanoidin)

- Drying phase: Higher temp (50C) but lower vent until ~20% moisture content (about twice as long as pale) then raise temp for “curing phase.”
- Curing phase:
  - Vienna ~ 90C
  - Munich ~ 105C
  - Aromatic and Melanoidin ~ 115C

Diastatic Power for Vienna/Munich ~ 30 deg Lintner



# Types of malt and their production



## Crystal/caramel:

- NO Drying phase!
- 60-70C while “green malt,” plus added water, until conversion.”
- ... the vent and cure ...
- Curing phase for crystal/caramel: 150C for 1-2 hrs, until desired color.
- No diastatic power at all.
- Can be steeped since fully converted.

# Types of malt and their production



Roasted malt (Biscuit/Victory/Chocolate/Black Patent):

- Usual drying phase for pale malt. (Often start with actual pale malt.)
- Roasting barrel at desired temp to desired color.
- No diastatic power at all.
- Can be steeped since all starches roasted into “nonedible” form.

## Want more?

- Beer Judge Certification Program (bjcp.org)
- SNOBs (Society of Northeast Ohio Brewers) [www.beersnobs.org](http://www.beersnobs.org) (NOT snobs.org!)

