

# Brewing Techniques for Historical IPA

Mitch Steele

Brewmaster

Stone Brewing Co.

# India Pale Ale

- Review the 4 periods that exemplify the style
- Review brewing procedures and ingredients for each period
- Review 4 historical recipes, and how to brew them.

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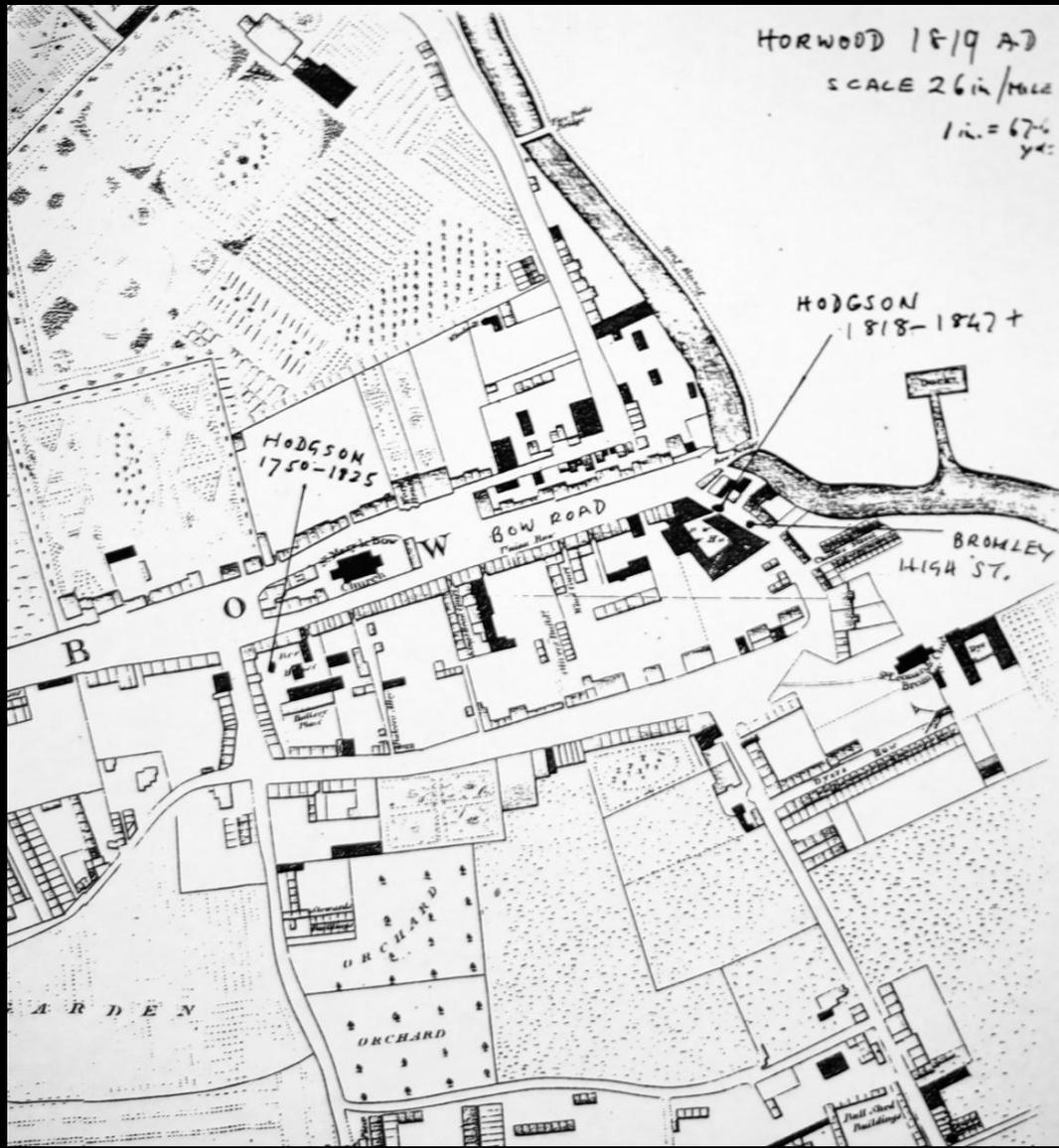
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# 4 periods of IPA brewing

- London Years (George Hodgson and Hodgson's Bow Brewery)
- Burton Years: IPA's heyday in the 1800s
- The Temperance Years: The 1900s when prohibition, temperance movements, wars, taxation, and corporate conglomeration almost killed the style
- The Craft IPA Revolution

# The London Years: 1750-1820

- Hodgson's Bow Brewery, London
- Contract with East India Company
- The "Myth"
- Hodgson's beer = ????
- Characteristics (estimated)
  - 17.5 °P (1.070 sg) OG
  - ~70 IBU
  - 100% Pale Malt

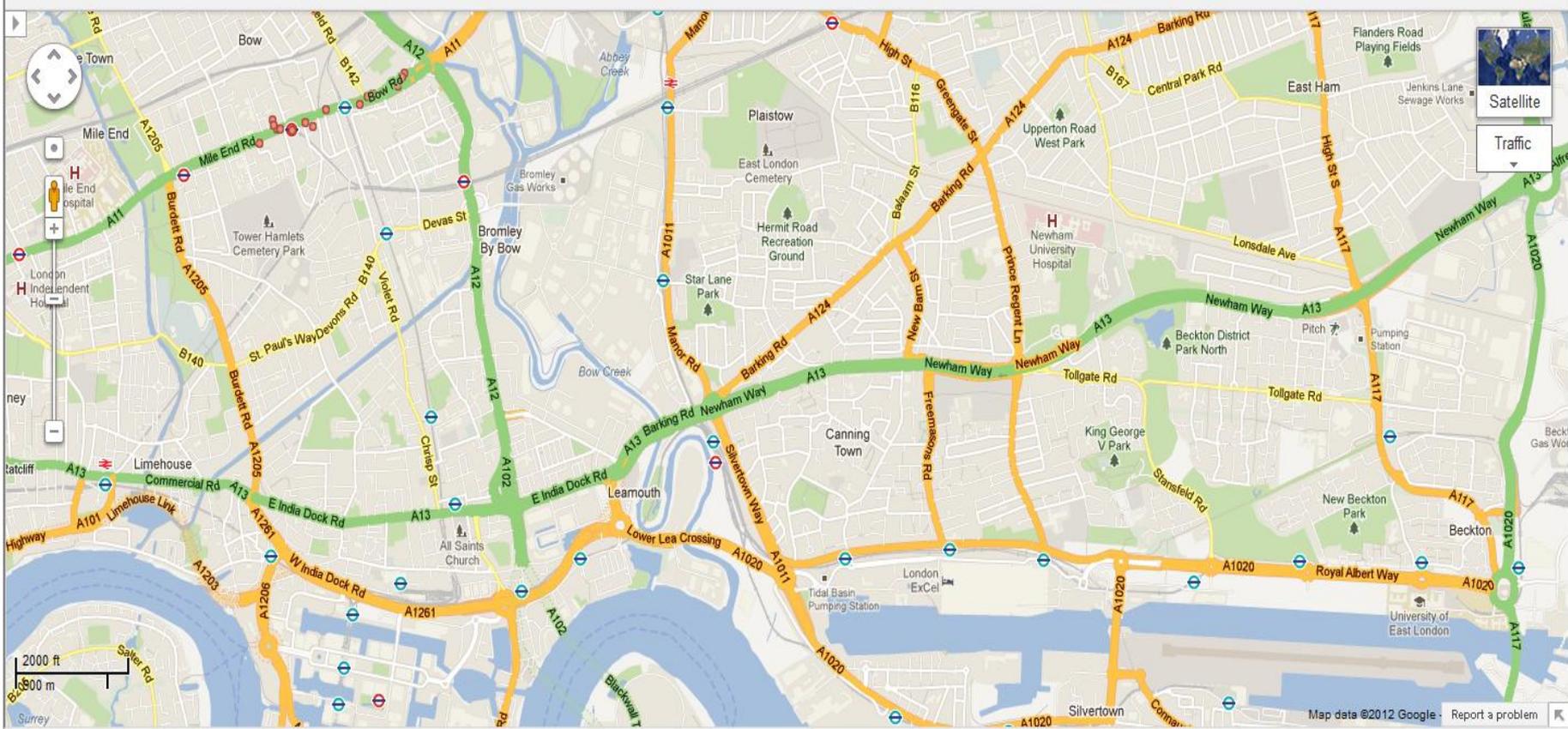




London Bow Street



Mitch Steele 0 + Share



CAPE WINE, TAYLOR'S STOUT,

AND

HODGSON'S PALE ALE

THE undersigned have remaining on hand, from the cargo of the *Leslie Ogilby*, a few pipes of superior Cape Madeira, shipped by the Wine Company, similar to that per *Leda*, so much esteemed in the Colony.

And they have now landing from the *Esther*, Taylor's Stout, and Hodgson's Pale Ale, in excellent condition.

LAMB, BUCHANAN, & CO.

Castlereagh-street, Aug. 5, 1833.

LIVERPOOL

And Lancashire



MERCURY,

General Advertiser.

No. 1239.—Vol. XXV.

FRIDAY, JANUARY 30, 1835.

PRICE SEVENPENCE

HODGSON AND CO. EAST INDIA PALE ALE  
J. WILLSON, from HODGSON and CO.'S, London, begs leave to call the attention of Merchants, Private Families, &c. to the very superior ALE brewed by this well-known House, to which he is Sole AGENT. The very desirable qualities of keeping in any climate, and not bursting the bottle, have long enabled it to maintain the high character it possesses, as peculiarly suited for Exportation. Being brewed from the finest East Kent Hop, it contains a particularly fine tonic property, and is consequently much recommended by the faculty, even to invalids.  
No. 2, Mersey Chambers, Old Churchyard, Liverpool.

RUSSELL HOUSE

# The Burton Years 1820-1900

- Burton brewers needed beer volume due to loss of Russian export trade
- EIC needed an alternate supplier
- Allsopp, Salt and Bass: The major players
- Characteristics:
  - Very pale
  - Very dry
  - 16.25-17.5°P (1.065-1.070 SG) OG
  - 70 IBU
  - Described as “sparkling, champagne-like, with a peculiar, fine flavor”

# The Burton IPA Ingredients

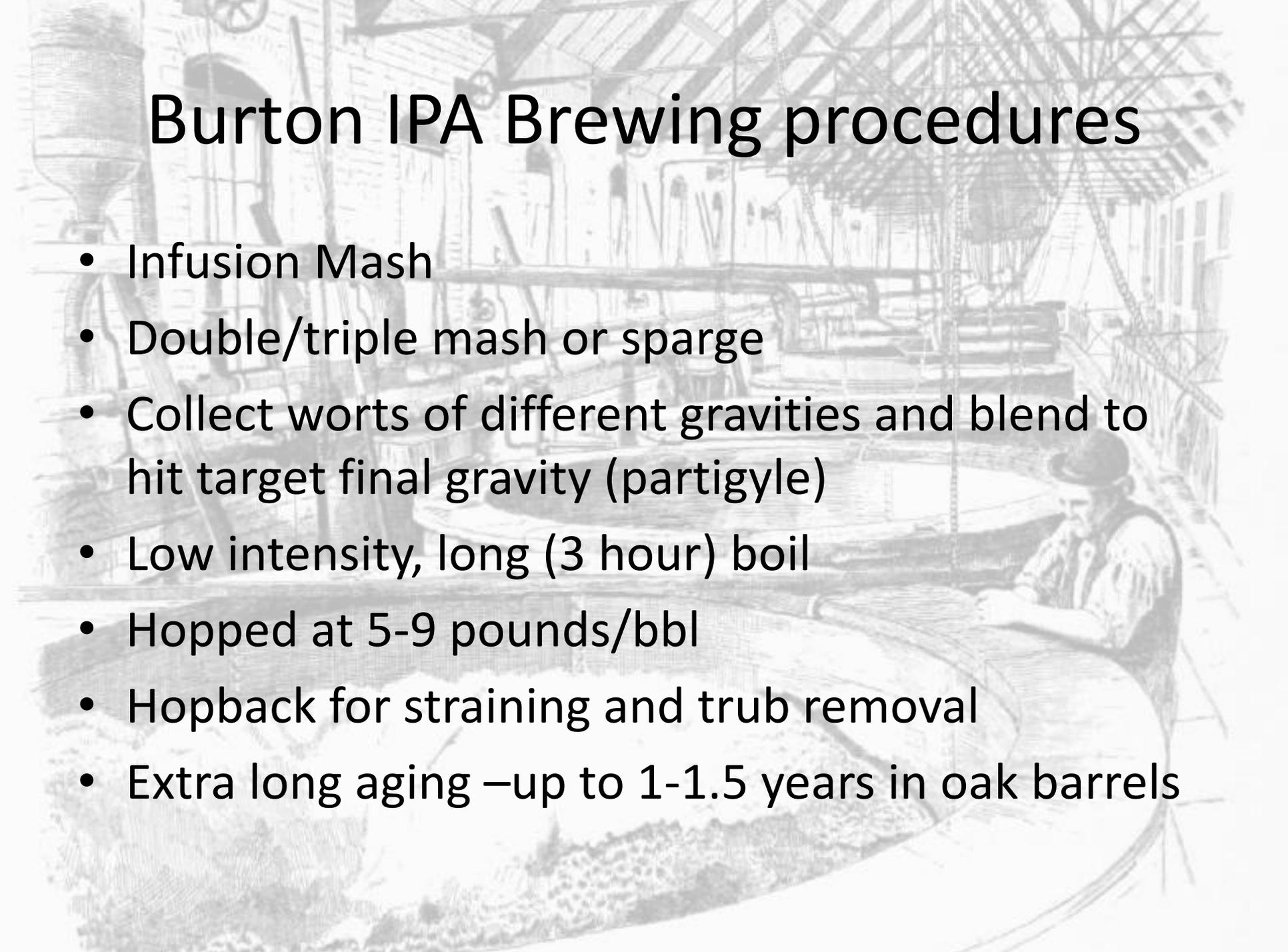
- Malt: 100% Extra Pale (or White) Malt
- Hops: 100% East Kent Goldings
- Yeast: Burton or London Ale Yeast
- Water: Very hard water



## WATER ANALYSIS DIFFERENT BREWING REGIONS (all in ppm, or mg/L)

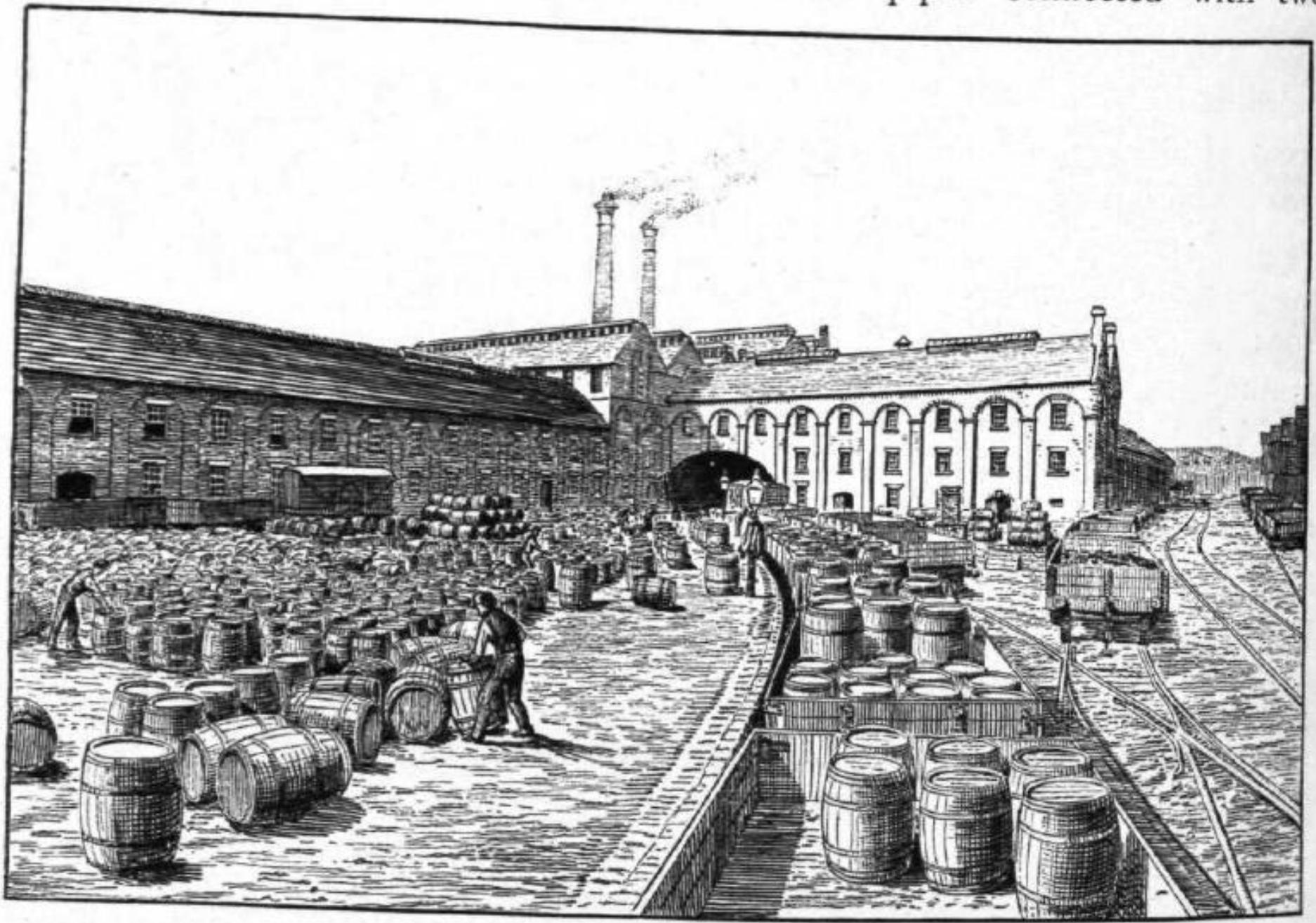
	Pilsen	Munich	Dublin	Dortmund	London	Burton- on - Trent	Milwaukee	St. Louis	Stone
Calcium	7	75	117	260	90	300	35	26	22.1
Sulfate	3	10	54	283	58	640	18	80	16.5
Magnesium	2.5	19	4	23	4	60	11	8	8.88
Sodium	32	10	12	69	24	54		19	38
Chloride	5	2	19	106	18	36	5	23	
Hardness	27.78	265.59	308.94	744.53	241.44	996.6	132.71	97.88	91.8
Alkalinity	23	253		300		236		21	43

# Burton IPA Brewing procedures

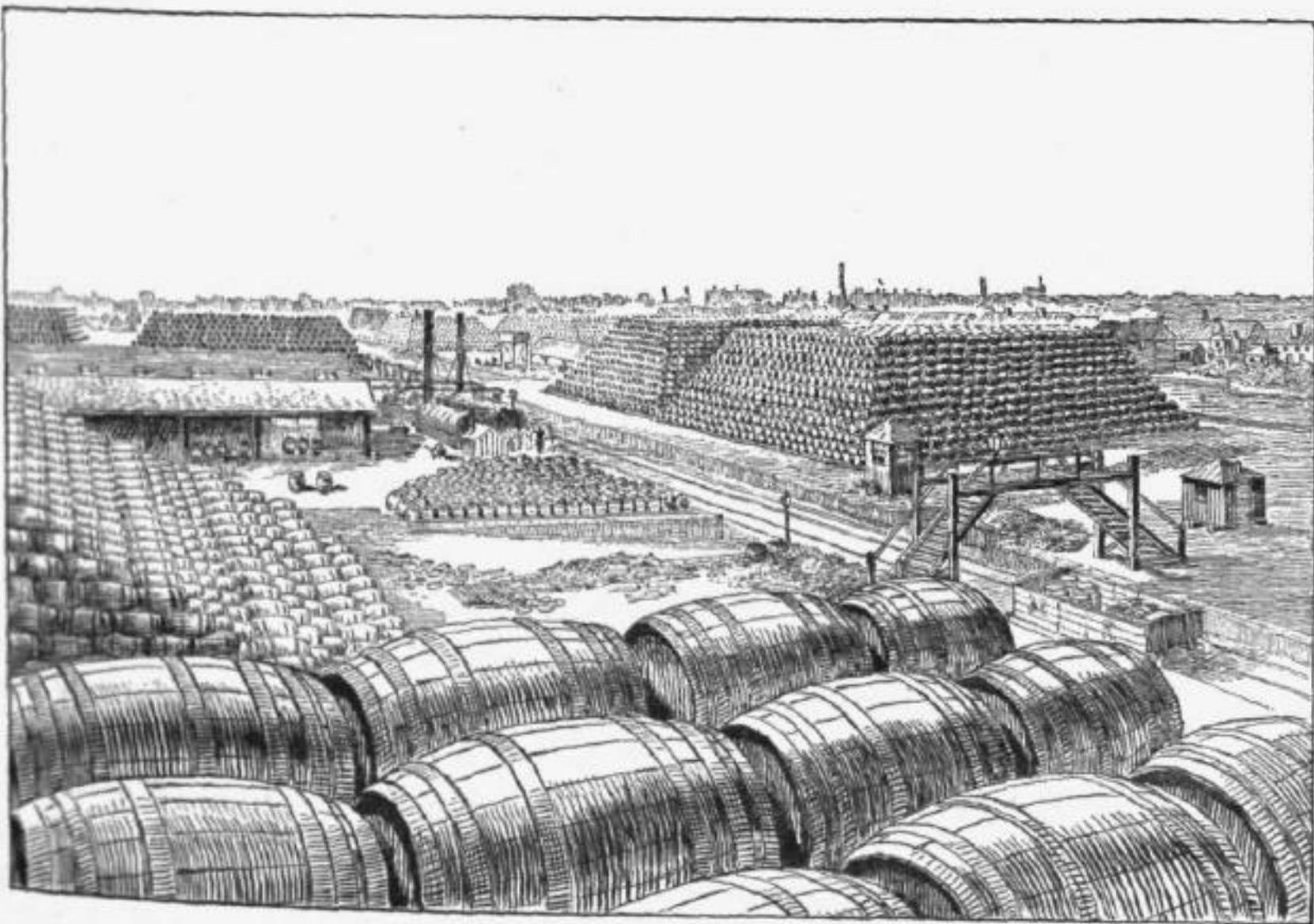


- Infusion Mash
- Double/triple mash or sparge
- Collect worts of different gravities and blend to hit target final gravity (partigyle)
- Low intensity, long (3 hour) boil
- Hopped at 5-9 pounds/bbl
- Hopback for straining and trub removal
- Extra long aging –up to 1-1.5 years in oak barrels

2500 feet of hot water pipes connected with two



MIDDLE BREWERY, FROM NEAR ENGINEERS' OFFICES.



HAWKINS' LANE PREMISES.

**CLIFTON BOTTLED ALE AND PORTER STORES,  
RICHMOND TERRACE ROAD,  
OPPOSITE BUCKINGHAM PLACE.**

~~~~~  
**S. BLOXSOME & COMPANY,**  
BOTTLERS OF  
**ALES AND PORTER,**

*At the following Prices per Dozen, for Cash on Delivery.*

|                                                     | Imperial Pints. |           | Quarts.   |           |
|-----------------------------------------------------|-----------------|-----------|-----------|-----------|
|                                                     | <i>s.</i>       | <i>d.</i> | <i>s.</i> | <i>d.</i> |
| Bloxsome's Dursley Pale Ale .....                   | 2               | 6         | 4         | 0         |
| „ East India Pale Ale .....                         | 3               | 0         | 5         | 3         |
| „ Strong October Beer .....                         | 4               | 6         | 7         | 6         |
| „ Alloa Scotch Dinner Ale ....                      | 2               | 6         | 4         | 0         |
| Bass's East India Pale Ale .....                    | 4               | 0         | 6         | 0         |
| Hodgson & Abbott's India Ale .....                  | 4               | 6         | 6         | 6         |
| London Brown Stout Porter .....                     | 2               | 9         | 4         | 0         |
| London Double Extra Brown Stout .....               | 4               | 0         | 6         | 0         |
| Dublin Extra Stout .....                            | 3               | 4         | 5         | 0         |
| Georges' & Ricketts' Strong Old Porter ..           | 4               | 0         | 6         | 0         |
| Dublin Extra Stout, in Wine Pints, 2s 6d per Dozen. |                 |           |           |           |
| Dursley Pale Ale, in Wine Pints, 1s 10d per Dozen.  |                 |           |           |           |

S. BLOXSOME & COMPANY beg to observe that the above, being Bottled from the Wood, under their own personal superintendence, are sent out from their Cellars in Prime Condition, and Warranted Genuine.

*Bottles and Hampers will be charged, and allowed for when returned.*

**DURSLEY PALE ALES IN CASKS.**

*Terms, Cash on Delivery.*

|                                    | Firkins,<br>9 Gallons. |           | Kilderkins,<br>18 Gallons. |           |
|------------------------------------|------------------------|-----------|----------------------------|-----------|
|                                    | <i>s.</i>              | <i>d.</i> | <i>s.</i>                  | <i>d.</i> |
| Bloxsome's Dursley Pale Ales ..... | 9                      | 0         | 18                         | 0         |
| „ East India Pale Ale .....        | 11                     | 6         | 23                         | 0         |
| „ XXX Strong Beer .....            | 11                     | 6         | 23                         | 0         |
| „ XXXX Old October Beer ..         | 14                     | 0         | 27                         | 0         |
| Georges' Brown Stout Porter .....  | 11                     | 0         | 22                         | 0         |
| „ Strong Old Double Stout ....     | 14                     | 0         | 28                         | 0         |

# AMSINCK'S INDIA PALE ALE 1851

- **Brewing liquor:** hard Burton Water, boil for 15 minutes and let cool to strike temperature
- **Malt Bill:** 100% Pale Malt
- **Mashing:**
  - Double mash system
  - No sparging
  - 1<sup>st</sup> mash:
    - 165-168°F (74-75.5°C) water.
    - 1.3 qts water/pound malt (2.7:1)
    - Hold 2 hours. Expected temp drop to 148-150°F
  - 2<sup>nd</sup> mash
    - 1.3 qts 180°F (82°C) water/pound malt
    - Hold 1 hr, Expected temp drop to 165°F

# AMSINCK'S INDIA PALE ALE 1851

- **Hopping:** 4.5 oz/gallon (~9 lbs/bbl) EKG split evenly among the 2 boils
- **Boil:**
  - 1<sup>st</sup> wort: boil 2 hours with 50% of hops. Transfer through a hop back and leave the hops in the hopback.
  - 2<sup>nd</sup> wort: Boil 2 hours with the rest of the hops. Run wort over 1<sup>st</sup> hops in hopback.
- **Fermentation:**
  - Combine worts
  - Pitch at 59-60°F and allow free rise to 72°F over 2-3 days
  - Rack at about 7°P. Cask at 7 days.

# AMSINCK'S INDIA PALE ALE 1851

- Age extended time on dry hops
- Analytical targets:
  - OG 16.5°P (1.067 SG)
  - TG 4.9°P (1.019 SG)
  - ADF 70.3%
  - IBU ~70-80
  - ABV 6.1%

# AMSINCK'S No 25 EAST INDIA PALE ALE

- **Brewing liquor:** hard Burton Water, boil for 15 minutes and let cool to strike temperature
- **Malt Bill:** 100% New Burton White Malt
- **Mashing:**
  - Double mash system
  - No sparging
  - 1<sup>st</sup> mash:
    - 165°F (74°C) strike temperature
    - 1.3 qts water/pound malt (2.7:1)
    - Hold 2 hours. Expected temp drop to 150°F
  - 2<sup>nd</sup> mash
    - 1.3 qts 180°F (82°C) water/pound malt
    - Hold 1 hr, Expected temp drop to 165°F (74°C)

# AMSINCK'S No 25 EAST INDIA PALE ALE

- **Hopping:** East and Mid Kent Goldings split evenly among the 2 boils: 2.5 oz/gallon (5 lbs/bbl)
- **Boil:**
  - 1<sup>st</sup> wort: boil 2 hours with 50% of hops. Transfer through a hop back and leave the hops in the hopback.
  - 2<sup>nd</sup> wort: Boil 2 hours with the rest of the hops. Run wort over 1<sup>st</sup> hops in hopback.
- **Fermentation:**
  - Combine worts
  - Pitch at 58°F and allow free rise to 72°F over 4 days
  - Rack at about 7°P. Cask at 7 days.

# AMSINCK'S No 25 EAST INDIA PALE ALE

- Dry-Hop: 0.77 oz/gallon (1.5 lbs/bbl) EKG
- Age extended time on dry hops
- Analytical targets:
  - OG      16.8°P (1.067 SG)
  - TG      3°P (1.012 SG)
  - IBU      ~159 Calculated
  - ABV      ~7%

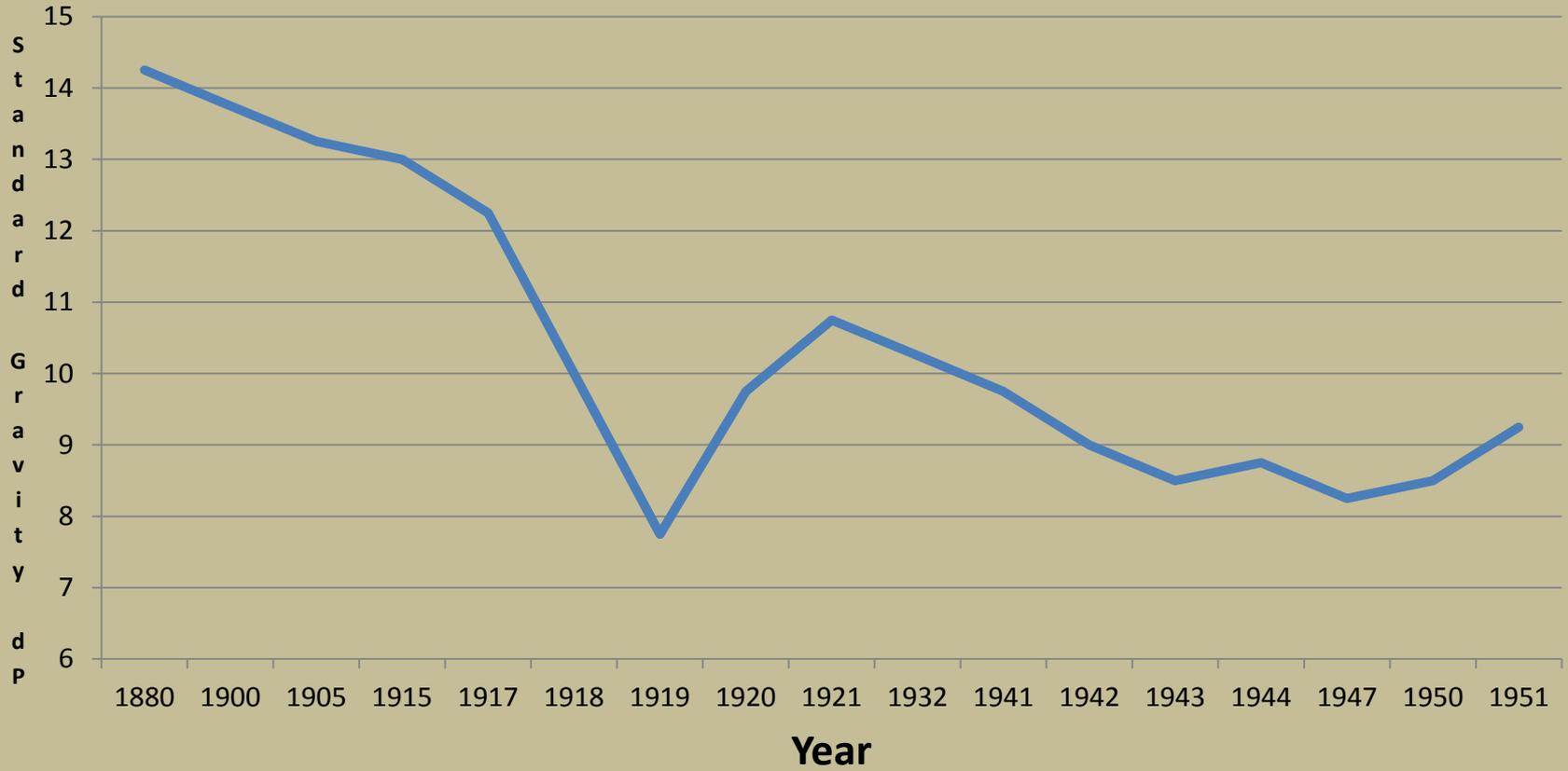
# The Temperance Years-1900-1985

- Alcohol consumption frowned upon
- Tax changes in England
- Prohibition in the United States and Canada
- Energy and ingredient shortages in WWI and WWII
- Characteristics:
  - Lowering of original gravity and alcohol contents
  - Sugars used
  - 8-14°P (1.032-1.056 SG) OG
  - 30-50 IBU

# 1900s IPA Ingredients

- Malt: 100% Pale Malt. Barley sourced from multiple locations around the world.
- Sugars or corn grits
- Hops: 100% East Kent Goldings still preferred, but Fuggles and California hops used
- Hopping rates-1-4 lbs/bbl
- Yeast: Burton or London Ale Yeast
- Water: Burtonized water

## English Beer Standard Gravity Values



# ANALYSIS OF ALLSOPP IPA

| Year        | 1901    | 1921   |
|-------------|---------|--------|
| OG dP       | 15.14   | 13.46  |
| OG (SG)     | 1061.57 | 1054.4 |
| FG Plato    | 2.23    | 1.14   |
| FG SG       | 1008.62 | 1004.4 |
| Attenuation | 85.27%  | 91.91% |
| Real FG     | 4.7     | 3.37   |
| ABV         | 6.8     | 6.56   |
| ABW         | 5.44    | 5.25   |

# Barclay Perkins 1928 IPA (recipe supplied by Ron Pattinson and Kristen England)

- **Brewing liquor:** London soft with salts added
- **Malt Bill:**
  - British Pale Ale Malt 57.4%
  - American 6-Row 17.6%
  - Flaked Maize 13.2%
  - Invert #3 Sugar 11.8% Added to boil
- **Mashing:**
  - Traditional infusion mash
  - 1.68 qts water/pound grain (3.5:1)
  - 90 minute rest at 152°F

# Barclay Perkins 1928 IPA (recipe supplied by Ron Pattinson and Kristen England)

- **Boil:**
  - 135 minute boil
- **Hopping:** Target 41 IBU in finished beer
  - 120 minutes: Cluster 16.3%
  - 60 minutes Fuggles 54.7%
  - 30 minutes Fuggles 29%
- **Fermentation:**
  - Ferment at 63°F (17.2°C)
  - Nottingham Ale Yeast, London ESB yeast, or English Ale yeast

# Barclay Perkins 1928 IPA (recipe supplied by Ron Pattinson and Kristen England)

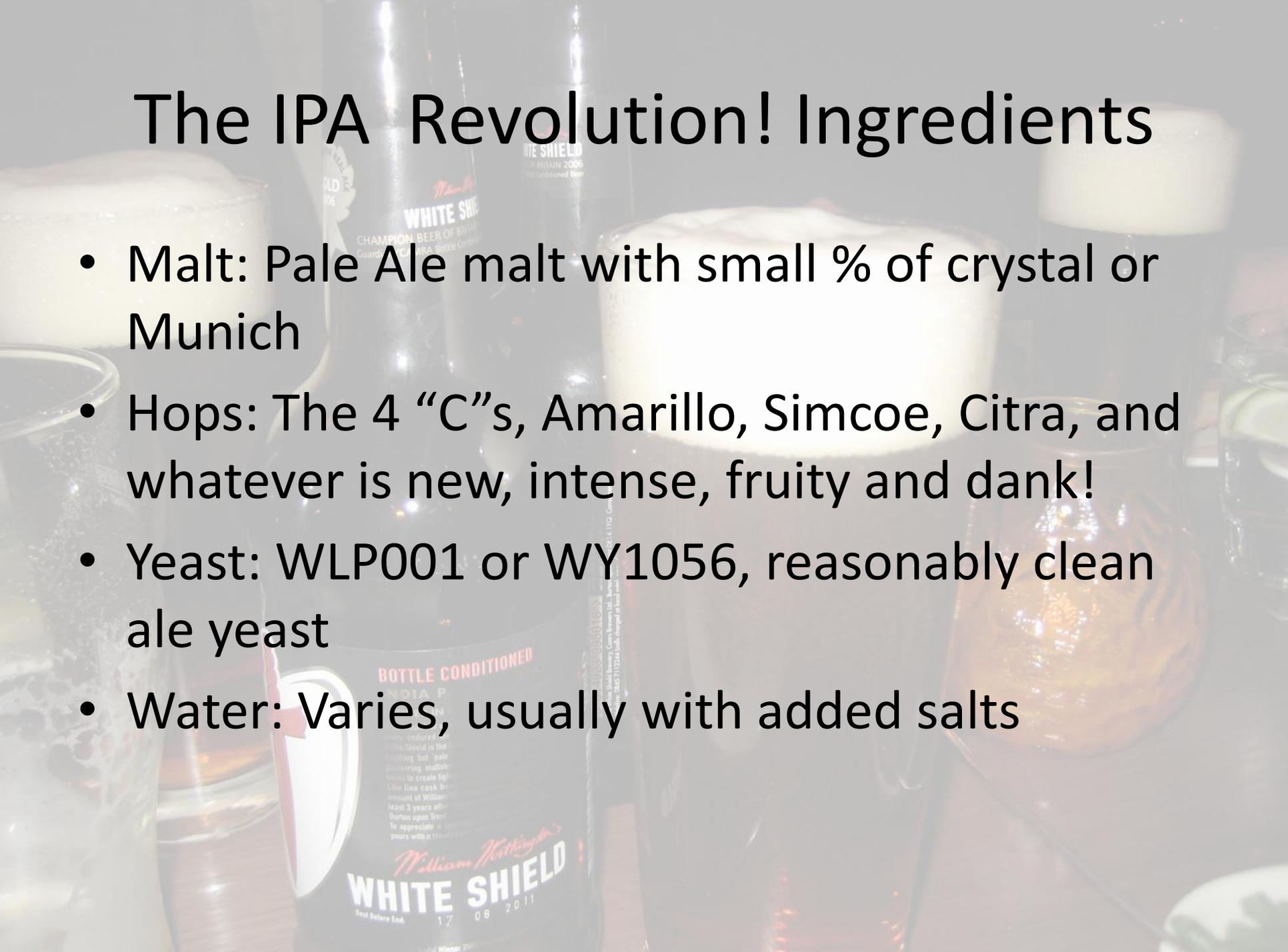
- Dry-Hop: EKG 0.042 oz/gallon (0.08 lbs/bbl)
- Analytical targets:
  - OG 11.5°P (1.046 SG)
  - TG 2.5°P (1.010 SG)
  - ADF 78.27%
  - IBU 41.2
  - ABV 4.8%
  - Color 10°L (20 EBC)

# The IPA Revolution

- Early craft brewers inspired by Ballantine's IPA
- Later craft brewers inspired by Anchor Liberty Ale, Sierra Nevada Celebration Ale, and Grants IPA
- American IPA now consistently the highest entered category at both GABF and WBC
- IPA Siblings:
  - Double/Imperial IPA
  - Black IPA
  - Belgian IPA
  - White IPA

# The IPA Revolution! Ingredients

- Malt: Pale Ale malt with small % of crystal or Munich
- Hops: The 4 “C”s, Amarillo, Simcoe, Citra, and whatever is new, intense, fruity and dank!
- Yeast: WLP001 or WY1056, reasonably clean ale yeast
- Water: Varies, usually with added salts



# The IPA Revolution! Brewing

- Single Infusion Mash
- Sparge
- 60-90 minute boil
- Multiple/variable hopping regimes
  - Target 50-75 IBU
  - 0.5-1.5 lbs/bbl
- Dry-hop at 0.25-1.5 lbs/bbl

# Steelhead Bombay Bomber (recipe supplied by Teri Fahrendorf)

- **Brewing liquor:** Cascade mountain runoff (very soft) with added gypsum
- **Malt Bill:**
  - American 2-Row Ale Malt 71%
  - American Munich (10°L) 22%
  - American Vienna (4°L) 7%
- **Mashing:**
  - Traditional infusion mash
  - 60 minute rest at 153°F (67.2°C)

# Steelhead Bombay Bomber (recipe supplied by Teri Fahrendorf)

- **Boil:**
  - 90 minute boil, with a 5 minute whirlpool and 25 minute rest
- **Hopping:** Target 57 IBU in finished beer
  - SOB: Chinook
  - 20 minutes: Crystal
  - EOB: Chinook and Crystal
- **Fermentation:**
  - Ferment and age at 67°F (19.4°C) for 18 days
  - Dry-hop at day 3, when tank is bunged.
  - Dry-Hop with 100% Chinook hops
  - Chill to 32°F (0°C) at day 18 and hold 3 days prior to filter

# Steelhead Bombay Bomber (recipe supplied by Teri Fahrendorf)

- Analytical targets:
  - OG 14.2°P (1.057 SG)
  - TG 3.2°P (1.013 SG)
  - ADF 77.5%
  - IBU 57
  - ABV 6%

## 2012 IPA ANALYSIS

| <i>Region</i>     | <i>ABV</i> | <i>Color (SRM)</i> | <i>Final Gravity (SG)</i> | <i>Final Gravity (°P)</i> | <i>OG (SG)</i> | <i>OG (°P)</i> | <i>ADF</i> | <i>IBU</i> |
|-------------------|------------|--------------------|---------------------------|---------------------------|----------------|----------------|------------|------------|
| California        | 6.65       | 7.3                | 1.00919                   | 2.4                       | 59.87          | 15.0           | 83.92      | 60.5       |
| California        | 7.44       | 8.7                | 1.01432                   | 3.7                       | 70.7           | 17.7           | 78.68      | 61.8       |
| California        | 7.99       | 10.8               | 1.00741                   | 1.9                       | 67.8           | 17.0           | 88.5       | 68.1       |
| California        | 7.25       | 7.7                | 1.0086                    | 2.2                       | 63.63          | 15.9           | 85.81      | 75.3       |
| California        | 7.53       | 15.9               | 1.01172                   | 3                         | 58.77          | 14.7           | 82.07      | 78.1       |
| California        | 6.7        | 14.1               | 1.01123                   | 2.9                       | 62.33          | 15.6           | 81.1       | 45.6       |
| California        | 7.66       | 10.6               | 1.00803                   | 2.1                       | 66.04          | 16.5           | 87.21      | 65.9       |
| California        | 6.5        | 8.7                | 1.01188                   | 3                         | 61.51          | 15.4           | 79.76      | 48.6       |
| California        | 7.82       | 7.9                | 1.01028                   | 2.6                       | 69.45          | 17.4           | 84.41      | 65.5       |
| California        | 6.9        | 9                  | 1.0116                    | 2.9                       | 64             | 16.0           | 81.88      | 75         |
| West Coast        | 6.25       | 8.6                | 1.01007                   | 2.6                       | 57.87          | 14.5           | 81.78      | 60.5       |
| Pacific Northwest | 6.04       | 7.1                | 1.01057                   | 2.7                       | 56.84          | 14.2           | 80.54      | 45.65      |
| Pacific Northwest | 6          | 10                 | 1.0168                    | 4.2                       | 61             | 15.3           | 72.4       | 50         |
| Pacific Northwest | 6.8        | 12                 | 1.0176                    | 4.4                       | 67             | 16.8           | 73.8       | 80         |
| Rocky Mountain    | 6.71       | 7.9                | 1.00861                   | 2.2                       | 59.71          | 14.9           | 84.89      | 63.45      |
| Rocky Mountain    | 7.5        | 12.1               | 1.01236                   | 3.2                       | 69.2           | 17.3           | 81.21      | 60.4       |
| Rocky Mountain    | 6.81       | 7.1                | 1.00559                   | 1.4                       | 57.43          | 14.4           | 89.82      | 65.6       |
| Rocky Mountain    | 7          | 9.5                | 1.0128                    | 3.2                       | 66             | 16.5           | 80.5       | 60         |
| Midwest           | 7.5        | 8.5                | 1.0136                    | 2.5                       | 68             | 17.0           | 80         | 87         |
| Midwest           | 5.95       | 10                 | 1.0184                    | 4.6                       | 62             | 15.5           | 70.3       | 55         |
| East Coast        | 7.3        | 10                 | 1.0108                    | 2.7                       | 66             | 16.5           | 83.6       | 48         |
| Northeast         | 5.9        | 8.6                | 1.0116                    | 2.9                       | 62             | 15.5           | 81.29      | 42         |
| Northeast         | 6.74       | 8.4                | 1.01091                   | 2.8                       | 62.29          | 15.6           | 81.64      | 69.45      |
| Northeast         | 6.65       | 10.9               | 1.01343                   | 3.4                       | 64.15          | 16.0           | 78.03      | 57.3       |
| Northeast         | 6.84       | 17.3               | 1.01278                   | 3.3                       | 64.87          | 16.2           | 79.32      | 47.3       |
| Northeast         | 7.3        | 10                 | 1.0083                    | 2.1                       | 63.66          | 15.9           | 86.32      | 70.7       |
| Northeast         | 5.73       | 10.3               | 1.00827                   | 2.1                       | 52.3           | 13.1           | 83.49      | 49.1       |
| Northeast         | 6.87       | 7.4                | 1.01126                   | 2.9                       | 63.82          | 16.0           | 81.05      | 53.9       |
| Northeast         | 7          | 14                 | 1.014                     | 3.5                       | 64.8           | 16.2           | 78.4       | 70         |
| England           | 7.4        | 7                  | 1.012                     | 3                         | 67             | 16.8           | 82         | 75         |
| England           | 5.3        | 10.7               | 1.012                     | 3                         | 53             | 13.3           | 77.4       | 50         |
| England           | 5.6        | 13.2               | 1.009                     | 2.25                      | 52.5           | 13.1           | 82.9       | 40         |
| England           | 5.59       | 13.9               | 1.01091                   | 2.8                       | 53.94          | 13.5           | 78.86      | 59.65      |
| England           | 5.31       | 10.7               | 1.00986                   | 2.5                       | 50.79          | 12.7           | 79.74      | 46.25      |

# Summary of IPA Brewing Parameters

| IPA RECIPES       |                                           |                              |                                                                   |                                                               |                                                  |                                              |                                                             |                                         |
|-------------------|-------------------------------------------|------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|-------------------------------------------------------------|-----------------------------------------|
| Recipe Guidelines |                                           |                              |                                                                   |                                                               |                                                  |                                              |                                                             |                                         |
|                   |                                           | Historical Burton IPA        | Scottish IPA                                                      | Early 1900's English IPA                                      | Contemporary English IPA                         | American IPA                                 | Double IPA                                                  | Black IPA                               |
| Malts             | Pale Malt %                               | 100%                         | 100%                                                              | 85-95%                                                        | 85-100%                                          | 85-97%                                       | 95-100%                                                     | 88-95%                                  |
|                   | Crystal Malts used                        | no                           | no                                                                | none                                                          | 15-40L                                           | 10 to 60L                                    | 10 to 20 L                                                  | 10 to 20 L                              |
|                   | Typical crystal %'s                       | na                           | na                                                                | na                                                            | 0-10%                                            | 3-15%                                        | 0-5%                                                        | 5-10%                                   |
|                   | Adjuncts %'s                              | none                         | none                                                              | Maize, sugar                                                  | maize, sugar                                     | none                                         | Dextrose, Candi Sugar                                       | none typically                          |
|                   | Roasted Malts                             | none                         | none                                                              | none                                                          | Munich                                           | Munich                                       | none                                                        | Dehusked Black Malt, Black Malt Extract |
|                   | Typical %'s                               | na                           | na                                                                | na                                                            | 0-10%                                            | 0-10%                                        | none                                                        | 3-7%                                    |
| Mashing           | Mash conversion Temperature               | 148-150                      | 150-154                                                           | 152-154                                                       | 150-155°F                                        | 148-153°F                                    | 148-150°F                                                   | 148-153°F                               |
|                   | Mash Conversion Time                      | 120 minutes                  | 120-180 minutes                                                   | 90 minutes                                                    | 15-30 minutes                                    | 15-60 minutes                                | 60-120 minutes                                              | 15-120 minutes                          |
|                   | OG °P (SG)                                | 15.0-18.75 (1.060-1.075)     | 14.0-17.5 (1.056-1.070)                                           | 12.5-15 (1.050-1.060)                                         | 12.5-18.75 (1.050-1.075)                         | 12.5-18.75 (1.050-1.075)                     | 18.75-22.5 (1.075-1.090)                                    | 14.0-18.0 (1.056-1.072)                 |
|                   | Fermentability                            | High!                        | High!                                                             | High!                                                         | 70-80%                                           | 75-82%                                       | 80-86%                                                      | 75-82%                                  |
|                   | Target TG °P(SG) abv target               | 0.75-5 (1.003-1.020)<br>5-7% | 0.75-3.0 (1.003-1.012)<br>5-7%                                    | 2.5-4.0 (1.010-1.016)<br>4-6.5%                               | 3.0-4.5 (1.012-1.018)<br>5-7%                    | 2.5-4.0 (1.010-1.016)<br>6.3-7.5%            | 2.0-3.75 (1.008-1.015)<br>7.5-10.5%                         | 3.0-4.5 (1.012-1.018)<br>6-7.5%         |
| Hopping           | Typical Hopping Rates                     |                              |                                                                   |                                                               |                                                  |                                              |                                                             |                                         |
|                   | Pounds per barrel                         | 5.0-6.0                      | 1.25-3.0                                                          | 1.0-2.0                                                       | .75-2.5                                          | .75-2                                        | 3.5-8                                                       | 1.5-4                                   |
|                   | Ounces per gallon                         | 2.6-3.2                      | 0.65-1.6                                                          | 0.5-1.1                                                       | .4-1.3                                           | .4-1.1                                       | 1.8-4.2                                                     | 0.8-2.1                                 |
|                   | Recommended hop varieties                 | East kent Goldings           | East Kent Goldings                                                | East Kent Goldings, Fuggle                                    | EKG, Fuggle, Target, Sovereign, Styrian Golding  | The 4 C's, Citra, Simcoe, Amarillo, Sterling | The 4 C's, Citra, Simcoe, Amarillo, Sterling, Nelson Sauvin | The 4 C's, Citra, Simcoe, Amarillo      |
|                   | Dry Hop (lbs/bbl)                         | 1                            | 1                                                                 | .25-.5                                                        | 1                                                | .4-1                                         | .75-3                                                       | 1-2                                     |
|                   | Multiple Dry-hops IBU in finished beer    | occasionally in casks<br>~70 | not typical<br>~70                                                | not typical<br>~50                                            | not typical<br>40-60                             | not typical<br>50-80                         | Common<br>70-100+                                           | TBD<br>50-90                            |
| Comments          | Long, low intensity wort boil, 2-3 hours. | Ferment cool!                | most gravities dropped to 10-12 °P after WWI, below 10 after WWII | Based on GABF guidelines. Real examples are all over the map. | More recent versions moving to less crystal malt |                                              |                                                             |                                         |
|                   | Age 12 months or more                     |                              |                                                                   |                                                               |                                                  |                                              |                                                             |                                         |

# For more information

- Check out:
  - Shut Up About Barclay Perkins blog by Ron Pattinson
  - Zythophile blog by Martyn Cornell
  - Hops and Glory (2008), by Pete Brown
- Look for my book: IPA: Brewing Techniques, Recipes and the Evolution of India Pale Ale, due later this fall from Brewers Publications.
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