Wine Basics
From grapes to Glass
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Definitions

Viticulture

The science and business of growing wine grapes
- Vigneron - Cultivator of grape vines / wine maker
- Vitis vinifera – wine grape (Genus/species)

Enology

- The science of wine production
  - Enologist (vintner) - wine maker
  - Enophile - someone who enjoys wine
History of wine

• Earliest wine 8000 BC in Mesopotamia
• 2500 BC - Egyptians
• Greek & Romans worshiped a god of wine
  • Bacchus – Roman
  • Dionysus - Greek
• Wine is referred to in the Bible
• Middle Ages - monks took the ancients' knowledge of winemaking and refined it
History of WA wine grapes

• First vines planted in WA state in 1825 Fort Vancouver – Hudson Bay Co.
• 1860 in Walla Walla
• Dr. Walter Clore – father of Washington wine
• 2014 statistics – WA Wine Commission
  • 50,000 acres in production
  • 40 + varieties planted
• 350 grape growers
• 227,000 tons of grapes harvested
• 890 + wineries
  • 16 million cases of wine produced
  • 4.4 billion dollar industry

53% white wines
47% red wines
Health Benefits of Wine

• Wine, *in moderation*, is a health benefit:
  • decreased incident of heart attacks & strokes (the French paradox)
  • reduce tumors
  • block formation of amyloidal plaques which contribute to Alzheimer's
  • better dental health, etc
  • Flavonoids - Anthocyanin in grape skin give red color
  • decreases cholesterol
  • Rich in antioxidants
Health Benefits of Wine

• Resveratrol – a class of antioxidants known as polyphenols
  • Found in tannins in grape skin, seeds, stems
  • Is produced by plants to ward off fungal infections and other diseases
WINE IS MADE IN THE VINEYARD

Wine grape growing primarily between 30-50 degrees latitude

- **50 degree** - cool climate wine characteristics
  - 6-7 months to ripen, ↑ acid, ↓ sugar (alcohol), lighter color, not as fruit forward, more delicate body

- **30 degree** - warm climate wine characteristics
  - 4-5 months to ripen, ↓ acid, ↑ sugar, deeper color (↑ skin to pulp ratio), fuller body, more fruit forward
Areas of the World with highest wine production

USA production
#1 – California
#2 – Washington
#3 – New York

*STATISTICS FROM 2010 – WWW.WINEINSTITUTE.ORG
Terroir

Sense of place

• French for terre – land
• Influenced by:
  • geography
  • geology (soil type)
    • Mosel region - blue slate
    • Champagne region – limestone
    • Yakima Valley – Missoula floods
  • climate (water, sunlight, temperature)
  • plant genetics
  • microclimates
Appellations

• **Unique growing regions**

  **Old World** - Europe & Mediterranean
  • can have mineral notes Burgundy, Loire, Champagne, Bordeaux in France
  • wines often labeled by region
  • Chablis = Chardonnay
  • Chianti = Sangiovese
  • Sancerre = Sauvignon Blanc

  **New World** - All other areas (green)
  • S A (Chile, Argentina), South Africa, America (CA, WA, OR, NY), Australia, NZ
  • wines often labeled by the grape varietal
  • Cabernet, Chardonnay, Riesling
Appellations

- **AVA** - American Viticulture Area
- WA state has 13 appellations
  - Yakima Valley - 1983
  - Walla Walla Valley - 1984
  - Columbia Valley 1984
  - Puget Sound - 1995
  - Red Mountain - 2001
  - Columbia Gorge 2004
  - Horse Heaven Hills - 2005
  - Wahluke Slope - 2006
  - Rattlesnake Hills - 2006
  - Snipes Mountain - 2009
  - Lake Chelan - 2009
  - Naches Heights - 2011
  - Ancient Lakes - 2012
In the Vineyard

- Grape harvest
  - Picked when grapes ripe approximately 24 brix of **sugar**
  - Read in refractometer (hydrometer) measures total solids in a solution
    Glucose or fructose plus yeast converts to ethanol plus carbon dioxide during fermentation
    \[
    \text{C}_6\text{H}_{12}\text{O}_6 + \text{yeast} = 2 \text{CH}_3\text{CH}_2\text{OH} + 2 \text{CO}_2
    \]
  - 2 brix = 1% sugar = 1% alcohol
In the Vineyard

• Acids
  Picked when grape pH is approximately 3.2 - 3.4 found in the grape berry pulp

• Other indicators of ripeness
  • Leaves turn brown and photosynthesis slows or stops
  • Seeds inside go from green tinge to brown
  • Squeeze berry, pulp is juicy & tastes good!
Lab report on “must”

**Acids** - gives wine body and structure

- Titratable acidity (TA)
- pH
- L - Malic acid - harsher acid
- Tartaric acid - the principal acid in grapes promotes flavor and aging in wine
- Lactic acid - softer acid
Harvesting the grapes

- Can be hand picked or machine picked
- Snips remove grape cluster to bucket
- Place full buckets into bins
At the Winery

- Bins transported to the winery
- Grapes loaded into stemmer / crusher
  - Stems are removed and discarded

- White wine
  - Juice is pressed away from the skin & seeds
  - Juice goes into stainless steel fermentation tanks

- Rose' wine
  - Often use red grapes
  - Juice is pressed away from the skin & seeds
  - Imparts a pink color and then treated like white wine
At the Winery

Juice with skin and seeds is called "must"

- **Red wine**
  - Must goes into large vats for initial fermentation
  - Yeast (*Saccharomyces cerevisiae*) is added
  - Cover with cloth (to keep out fruit flies)
  - Punch down cap daily (skins float - seeds (pips) go to the bottom)
  - Smell is wonderful!
Types of Wine

- **Still**
  - Cabernet – King of wine
  - Chardonnay – Queen of wine

- **Sparkling**
  - Champagne - France
  - Cava - Spain
  - Proseco - Italy

- **Fortified** (brandy)
  - Port – Ruby, Vintage, Tawny
  - Sherry
Wine grape Varieties

Noble grapes – most popular, grown worldwide

• Whites
  • Riesling
  • Sauvignon blanc
  • Chardonnay

• Reds
  • Pinot Noir
  • Merlot
  • Cabernet Sauvignon
  • Syrah (Shiraz)

• Many other varieties
Wine Production

• **Red wine**
  - After initial fermentation the wine is pressed off skin & seeds
  - Can have secondary malolactic (ML) fermentation (Lactobacillus bacteria)
  - The harsher malic acid is changed to the softer lactic acid
  - One bi-product is Diacetyl which gives a buttery flavor and enhances complexity
  - Placed into Oak barrels or maturation tanks
Wine Production

• **White or Rose wine**
  • Continue fermentation in cooled stainless steel tanks

• **Fermentation changes sugar to alcohol**
  • White/Rose wines - can stop fermentation process if residual sugar desired or zero if dry
  • Red wines often fermented to zero sugar
Maturation Process

- Racking over
  - Take wine off the top and place into another vessel
  - leaving the "lees" or sediment (dead yeast, seeds, grape solids)
  - Most reds (some whites) put into Oak barrels for barrel maturation
- Coopers cut oak staves and construct barrel
Barrels are toasted

• Toasting (carmelization) of the wood imparts flavors to the wine
• Barrel flavors only lasts 2-3 years
  • Vanillin (phenolic aldehyde) $C_8H_8O_3$
  • Lactones (coconut)
  • Phenols a perceived sweetness
  • Spice notes, Leather, few tannins

• Can choose degree of toasting
  • Light - LT
  • Med – MT
  • Heavy – HT
• Now can get oak chips to add to wine in neutral barrels
Maturation Process

• Types of Oak
  • American Oak - $$ stronger flavors
  • French Oak - $$$$$ tighter grain, better quality
  • Hungarian Oak - $ not as strong flavors as American
  • Neutral Oak – used in primary fermentation or maturation where little oak is required

• Topping off
  • Oak is porous and water evaporates
  • need to add wine to head space to discourage oxidation
Wine ready for bottling

- Filtering in order to clarify wine
- Fining done with White wine
  - egg whites capture solids
- White/Rose often consumed
  - within 2-3 years (exceptions - Chardonnay, Sauvignon blanc, etc)
- Reds often aged before consuming
- Controversy to fine Reds
  - red wine is often opaque,
  - especially in thick skin grapes (Cabernet, Merlot)
  - many feel it will remove texture & structure
Types of bottles

- Bordeaux - shoulders
- Burgandy - slopped sides
- Rhine (hock) - tapered
- Others – bocksbeutel
- Specialty bottles
  - Champagne - thick glass/special stopper
  - Dessert wines - sweet often in splits
  - Fortified wines - Port
Colors of glass

• Glass colors varies
  • **White/Rose**’ wines in clear, light green, yellow green, blue
  • **Reds** in dark green, brown
  • Important to shield from the light

• Why is there a Punt at the bottom of the bottle?
  • Necessary when they were hand blown
  • Traps the sediment
  • Provides a more stable base
  • No need - some bottles have no punt
Types of closures

• Cork
  • industry standard BUT
  • decreased supply of cork trees from Portugal - increased cost
  • composite cork often used
  • cork taint from low quality cork
  • oxidized wine from cork failure

• Synthetic cork
  • seems to not have any issues

• Twist top - screw cap
  • primarily used for whites/rose that are consumed young, fruit forward
  • Also now for reds - important to keep oxygen out of the bottle
How do you know a bottle has been oxidized?

- **White wines** take on deeper yellow color
  - Can smell volatile acidity (acetone) – VA
- **Red wines** take on brownish color
  - Cork taint - dirty socks/wet dog smell
  - Cork tree pesticides or chlorine bleach residue (so now use peroxide)
  - Corky mildew – TCA trichloroanisole fungi + chlorophenol compounds
  - Wine can taste like vinegar (acetic acid)

  **Life is too short to drink bad wine!**

- **Foil** placed around top of bottle
  - Helps to keep cork sealed
  - Color is choice of winemaker
Wine Labels

• Label placed on bottle is winemaker’s choice as to design BUT some mandatory requirements:
  • Must get approval from ATF
    • Vintage Date - Year grapes were picked
    • Name of the winery/contact information
    • Name of the wine varietal
      • Pure varietal - must be 80% by volume to be labeled as such
      • Blended wine – nice to state blend percentages
      • Can also make up name of wine
    • Estate Bottled – grapes from winery
    • Reserve designation – extra aging occurs
  • Net Content – 750 ml
Wine Labels

- Any oak information – kind, length, toast
- Appellation of Origin - AVA
- Vineyard designation (always nice)
- Mission statement / statement about the wine or winemaker
- Percentage of residual sugar
- Percentage of alcohol
- Government Warning requirement
- Declaration of sulfites if over a certain percent
Wine Tasting Event

• Showcase their selection of wines to the public
  • Need to assure no strong aromas in the area – cigars, strong perfume

• Before YOU go wine tasting
  • Assure you have eaten recently
  • Assure you keep hydrated
  • Cleanse pallet between wines with a cracker or sip of water

• Many offer tasting notes
  • Information on their wine selections
Wine Tasting Event

- Rule of thumb for serving
  - White before Rose’
  - Rose’ before Red
  - Dry before sweet
  - Softer before more tannic
Temperature of Wine

Correct temperature enhances the flavor of wine

Wine cellar for long term storage 60 degrees

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Temperature of wine

- Before serving
  - Whites and Rose’ often chilled (35-40 degrees)
  - Reds served at room temperature (55-65 degrees)
  - OK to slightly chill light bodied reds before serving

- Store all bottles
  - horizontal or up side down position so oxygen does not get into the bottle
Opening the bottle of wine

- Use foil cutter to remove foil over the cork
- Use wine key to remove cork
  - Winged cork screw
  - Ah -So cork puller
  - Waiters cork screw
  - Rabbit - easiest
Saving the bottle of wine

- **Wine diamonds**
  - crystals of tartaric acid (tartrates)
  - seen on bottom of cork
  - does not affect the quality of the wine (cold stabilization)

- **Any unconsumed wine**
  Does that exist?!?!
  - Can use fancy stopper
  - Best to use vacuum sealer
  - Removes oxygen from the bottle
  - Store white wine in refrigerator
Wine glass selection

• Many to choose from
  • Stemmed / glass
  • Stemless / plastic

• Riedel
  • Cadillac of wine glasses
  • Hand blown
  • Thin glass
  • Shape is important

• White/Rose
  • Riesling glass

• Reds
  • Pinot glass
  • Bordeaux glass
  • Balloon glass
Pouring the wine into the glass

- For all wine
  - Host fills his glass first to remove any cork pieces
  - Tilt the glass and pour wine down the side
  - Fill only ¼ cup if tasting
  - Fill glass half full if drinking (need room to swirl)

- For Red
  - Allow bottle to “breathe”
  - Pour gently as to not disturb any sediment
  - Pour through aerator or decant into another vessel
The Actual Wine tasting
The 5 S's

1. See
   color and clarity
   • Tilt the glass over a white background
   • Look at core of the glass and note color and intensity
   • Look at rim of the glass and note color
   • Note opacity
     • can you read text through the core?

1. young cabernet, 2. old cabernet/merlot 3. young merlot 4. young syrah, 5. young pinot noir, 6. old pinot noir
The Actual Wine tasting
The 5 S’s

2. **Swirl**
   • Place glass on flat surface
   • Move glass in circular motion
     • Causes aromas to be released
     • Can see the sheets or legs of glycerol that run down the glass
The Actual Wine tasting
The 5 S's

3. Sniff

• hold glass in the middle of your chest / smell
  • very aromatic wine
• hold glass at your chin
  • moderately aromatic
• put nose inside of glass
  • neutral or muted
• note what you smell
  • fruits, citrus, stone fruits, blackberry, green pepper, leather, etc

• LeNez Du Vin set
  • 54 wine aromas for students
The Actual Wine tasting
The 5 S's

4. Sip
   - Take about a tablespoon - roll it around on your tongue
   - 1\textsuperscript{st} sip - cleanse the pallet only - don't judge the wine at this point
   - 2\textsuperscript{nd} sip - note the reaction on your tongue
     - sweet at tip – residual sugar
     - sour on sides - acidity
     - bitter at the back - tannins
     - mouth feel - texture - viscosity (skim milk, whole milk, cream)
       - it is light, medium or full bodied
     - thermo reaction - warmth is from increased alcohol
The Actual Wine tasting
The 5 S's

5. Savor

- Judge the quality of the wine
  - **Balance** - the relationship between fruit, acid, residual sugar, alcohol and tannin (velvety/drying sensation)
  - No one of these components should stand out significantly from the rest
- **Finish**
  - how long flavor lasts
  - how did it leave your mouth
- **Complexity** - layers of flavor

- Long list of descriptors
- In the end taste is very personal
Wine is considered a food

- Wine is best paired with food
  - Basic idea
    - Whites with fish
    - Reds with meat
  - But Much More!
    - Pairing charts available
- Wine is best enjoyed with family and friends
The Joys of drinking a Good glass of wine!

• Any Questions?

If I ever go missing, I want my picture on a wine bottle instead of a milk carton. That way, my friends will know I’m missing.
Thank You
It’s Wine o’clock somewhere!