

VITICULTURE

THE VINE

- A weak-stemmed climber that thrives between 30-50 degrees north latitude and 30-40 degrees south latitude.
- Is grown on all continents except Antarctica, and covers about 19.5M acres worldwide, producing 70M tons of fruit (70% which goes to wine production).
- Nutritional requirements: nitrogen, phosphorus, potassium, with secondary requirements of magnesium, manganese, iron, zinc, copper and boron.
- Vines require 10 to 30 inches of rainfall per year (or comparable irrigation)
- Reaches maturity after six years, first harvest usually begins in the third year, vigor declines after 20 years.
- Some key terms:
 - Variety - A subspecies of grape, such as Chardonnay
 - Clone - A vine produced (asexually) from a cutting of an existing vine
 - Field selection - Many cuttings taken from the same vineyard
 - Mutation - A variation through imperfect reproduction (Pinot Gris and Pinot Blanc are mutant strains of Pinot Noir, for example)
 - Cross - The offspring of two subspecies
 - Hybrid - The offspring of two species

THE GROWTH CYCLE

- **Bud break:** Requires an average air temperature of 50F. Growth begins slowly, but after four weeks, as photosynthesis increases, shoots can grow up to one inch per day.
- **Flowering:** Takes place 40-80 days after bud break. Vines are self-pollinating, and warm dry conditions are ideal.
- **Berry set:** The result of fertilization.
- **Veraison:** Begins 40-50 days after the berry set. The berries soften, sugars rise and acidity falls.

Harvest takes places, ideally, when grapes are both ripe and mature (bud break to harvest is normally 140 to 160 days, but can range from 110 to 200 days):

- Ripeness - Refers to sunshine-derived sugar levels
- Maturity - Refers to physiological changes, such as increase in pH, an increase in potassium, the softening of tannins and the lignification of seeds

THE METABOLIC PROCESSES

- **Photosynthesis:** Chlorophyll in the leaves use sunlight to convert CO₂ and H₂O into sugar and oxygen. This process occurs between 50-95F, but is optimized at 70-85F.

- **Transpiration:** Analogous to perspiration, the process in which water evaporates through the stomata on the undersides of leaves. Lack of water will cause the stomata to close, which will halt photosynthesis (CO₂ intake occurs through stomata).
- **Respiration:** The process in which sugars are used by the vine as an energy source. For every 18F increase in temperature, the rate of respiration doubles.
- **Translocation:** The process by which materials, such as sugars, are moved from one part of the plant to another.

CANOPY MANAGEMENT

- **Winter pruning:** Removal of the previous season's growth to make room for new growth
- **Shoot thinning:** Removal of excess shoot growth during the spring
- **Summer hedging:** If a vineyard proves too vigorous, removal of the cane's tips will partition carbohydrates, and guide production to fruit rather than leaves.
- **Shoot devigoration:** The natural slowing of shoot elongation, usually triggered by water stress
- **Shoot positioning:** Arranging shoot to ensure optimum sunlight exposure
- **Leaf removal:** Usually considered a band-aid fix, allowing sunlight to reach the grape clusters

THE BALANCED VINE

In 1991, Australian enologist Dr. Richard Smart published "Sunlight into Wine: A Handbook for Winegrape Canopy Management," which hypothesized that vines don't need to struggle to produce great fruit, they just need to be balanced. A few observed characteristics tend to produce good wines:

- Shoot lengths between three or four feet, without any hedging
- All leaves receive sunlight for most of the day
- Shoot girth is smaller than your little finger
- Few, if any, laterals on the shoots
- Berry size is small for that particular varietal

THE ROLE OF SOIL

Great vineyard sites typically have two things in common: low fertility and proper drainage. A soil's "structure" refers to the mix of various soil fractions:

- Clay - The finest of the inorganic soil fractions
- Silt - The intermediate-sized fraction

- Sand – The largest soil particles
- Minerals – Help to maintain friability and porosity
- Rocks – Can limit fertility and provide radiant heat
- Organic matter – Makes clay more friable and helps sandy soil retain nutrients and water

MAJOR VINE DISEASES AND PESTS

Viral diseases

- **Leaf Roll:** Can only be “treated” with vine removal. The disease is spread by propagating infected vines, or by mealy bugs.
- **Fan Leaf:** Is responsible for abnormal growth patterns within the entire plant, and shortens a vine’s life span. The disease is spread by the nematode *Xiphinema index*, and by propagating infected plants.

Fungal Diseases

- **Esca:** Also known as black measles, it is a problem in warm climates.
- **Eutypa:** Also known as dead arm, is caused by *Eutypa lata*, which enters through pruning wounds, and releases a toxin that stunts the shoots. Applying a fungicide to pruning wounds can prevent this disease.
- **Powdery mildew:** Also known as odium, is native to North America. Not dictated by humidity. Attacks with cobweb-like filaments, and depending on timing can inhibit yields. A sulfur spray is effective in eliminating this threat.
- **Downey mildew:** Also known as peronospera, and is also native to North America. Attacks the green portions of the plant, and thrives in humidity. Copper sprays, such as Bordeaux mixture, can combat these outbreaks.

Bacteriological Diseases

- **Pierce’s Disease:** Causes premature leaf fall, and the vectors are insects such as leaf hoppers and sharpshooters.
- **Crown gall:** Causes tumors at the trunk of the vine, essentially strangling the plant. The disease is initiated by cold damage.

Insects

- **Phylloxera:** Above all else, the worst pest in history.

VITICULTURAL PRACTICES

- Organics
- IPM
- BioDynamics
- Sustainability

WHITE GRAPE VARIETALS

CHARDONNAY

- Very much a winemaker's wine, since it can have a broad range of styles
- Naturally high in extract, high in sugar, and potentially low in acidity
- A canvass for malolactic fermentation or sur lie aging, which create more assertive flavors
- Indigenous to Burgundy, and the offspring of Goulais Blanc and an as-yet unknown member of the Pinot family
- Prefers limestone soils and cool-to-moderate climates, but has adapted to all sorts of soils and climates around the world
- Early-budding and early-ripening
- Although acidification will help a low-acid Chardonnay, wines with natural acidity will be longer-lived
- Regions: Burgundy and Champagne, Australia, United States, South Africa, Portugal, Germany, Austria (known as Feinburgunder or Morillion), New Zealand, Chile, Argentina, Italy, Spain.

SAUVIGNON BLANC

- Unlike Chardonnay, will vary dramatically from site to site, and with different vinification
- High in acid, aromatic, and prefers cool-to-moderate climates, with ample sunshine
- A vigorous plant that must be monitored in the vineyard, especially in terms of canopy
- Excels in the Loire Valley and the South Island of New Zealand
- In Bordeaux, is often blended with Sémillon and Muscadelle for table wines and dessert wines
- Other regions: South Africa, California, Italy and Australia
- Chilean plantings have recently been discovered to be Sauvignon Vert or Sauvignasse, a less aromatic clone
- With oak-aging, this wine is often called Fumé Blanc

RIESLING

- Styles range from dessert, to sparkling, to dry or off-dry table wines
- High acid, high sugar, long-lived
- With age, these wines will develop a characteristic “petrol” marker
- Native to Germany, where it achieves its greatest heights
- Prefers a cool growing region, and must go into winter dormancy for the health of the vine
- Often fermented in neutral vessels in order to maintain the nuances
- Regions: Germany, Austria, Alsace, New Zealand, Australia, United States, Canada
- Only White Riesling and Johannesburg Riesling are true synonyms for Riesling

CHENIN BLANC

- Styles range from dry to sweet, still and sparkling
- High acid, high extract, aromatic, long-lived (potential to age for 100 years)
- Vines are disease-resistant, high-yielding, late-ripening, and they do well in moderate-to-cool climates
- Native to France, and thrives on chalk or tufa soils, such as in the Loire Valley
- Other regions: South Africa (known as Steen), California Central Valley (as bulk white), and Australia
- In Argentina and Chile, what they thought was Pinot Blanc is actually Chenin Blanc

PINOT GRIGIO / PINOT GRIS

- Two styles: high-acid, low-extract, minimal aroma or moderate-acid, high-extract, moderate aroma
- A genetic mutation of Pinot Noir, but is not known for any overt complexity
- Low acid or high acid, high extract, faint and subtle aromas
- Traditionally fermented in stainless steel, and is often bottled cold to trap a little residual CO₂
- Regions: Trentino-Alto Adige, Friuli-Venezia Giulia, Alsace, Germany (known as Ruländer or Grau Burgunder), Oregon, California

GEWÜRZTRAMINER

- Styles run the gamut from sweet to dry, dessert to sparkling
- High sugar, high extract, low acid, aromatic
- Has origins in the Italian Tyrol or perhaps even Greece
- Ripens extremely quickly, creating the challenge developing flavors while maintaining acidity
- A few hours of skin contact will increase flavors, but shorten life span
- Regions: Alsace, Germany, Eastern Europe, United States, Germany (known as Roter), New Zealand, South Africa

VIIGNIER

- Low rich aromatic notes, in contrast to the “high” notes of Riesling, Chenin Blanc and Gewurztraminer
- Profoundly aromatic, low acid, high sugar, high extract
- Possible origins in Dalmatia, where Vugava exists on the island of Vis today
- Regions: Condrieu, Château Grillet and Côte Rôtie (where it may be co-fermented with Syrah to add aroma)
- Tends to be a shy and unreliable producer, which has affected its popularity
- Many pick Viognier too early, not realizing that high-extract and overripe flavors will compensate for lack of acidity – must be picked on flavor, above all else

MUSCAT

- Maintains a distinct profile across regions and styles
- High alcohol, high extract, highly aromatic, good acidity
- Believed to be the ancestor of all grapes
- Prefers warm-to-hot climates, and produces a small berry and low yield
- Reputed to have more than 200 clones, which tells its age

SÉMILLON

- The dry whites need time, the dessert wines need botrytis
- Subdued aromas, waxy texture, long-lived, susceptible to noble rot
- Regions: Bordeaux and Sauternes, Graves and Pèssac-Léognan, Australia (where it may be blended with Chardonnay)

RED GRAPE VARIETALS

CABERNET SAUVIGNON

- One of the four most tannic wines in commercial production
- High tannins, moderately high acidity, high pigments, high phenolics
- Retains its flavor profile across many different growing regions
- Easy to grow and adaptable, but excels in well-drained sand and gravel
- Vigorous in fertile sites, where a low-vigor rootstock is important, as well as careful canopy management
- Late-budding and late-ripening, with thick skins that prevent mold and fungal issues
- Trends: Riper grapes and shorter macerations (or extended macerations to polymerize tannins)
- As the wines age, tannins combine with other tannins and pigments to create the large polymers that fall out of solution as sediment
- Youthful wines are more purplish, while older wines become brick red
- Regions: Médoc, California, Chile, Tuscany, Australia, Washington

MERLOT

- Styles range from easy-drinking to more complex
- Moderate tannins, high alcohol, short on acid
- Like Cabernet, can be vegetal if over-cropped or grown in a cool climate
- Early-budding and early-ripening, with thin skins that are prone to rot
- Compared to Cabernet: more fruit, less acid, less tannin, less pigment – tends to fill out the mid-palate when blended with Cabernet
- The most widely planted grape in Bordeaux (apart from the Cab-heavy Médoc)
- Regions: Bordeaux; Northeast Italy and Switzerland (light and fruit-forward); California and Washington (concentrated and ripe); Chile (spice-driven); Argentina, South Africa, Australia and Spain
- Much of Chile's Merlot plantings have been found to be Carmenere

PINOT NOIR

- May have between 200 and 1,000 clones, and has produced many mutations
- Low to moderate tannins, crisp acidity, expansive aroma
- Native to France, prefers cool climates with well-drained soils containing marl (a mixture of clay and chalk) – the vines lack longevity
- Early-budding and early-ripening
- Some popular mutations: Pinot Grigio (Pinot Gris), Pinot Blanc, Pinot Meunier
- Has been farmed for at least 600 years
- Trends: cold-soaking to extract pigment and tannins prior to fermentation, although traditionalists balk at this style
- Prefers a long, warm fermentation (which is unusual)
- Regions: Burgundy, Champagne, Alsace, Loire, California, Oregon, Tasmania, New Zealand, Germany (Spatburgunder, Germany's most widely planted grape, is used for Weissherbst rosé)

ZINFANDEL

- Distinctly Californian, but native to Slovenia
- Prefers a cool site with lots of sunshine – hillside or high-elevation sites work well
- Ripens unevenly, with green berries and raisins in the same cluster
- Like Tempranillo, Zinfandel is well-suited to American oak
- Regions: California, Apulia (Primitivo)

SYRAH/SHIRAZ

- Heavy pigments, high tannins, high alcohol, needs time to mature
- Prefers a warm climate and is easy to grow
- Native to France, a cross between Dureza and Mondeuse Blanche (earlier theories placed this grape in Persia, near the city of Shiraz)
- A productive vine that needs to be held in check
- Like Grenache, is prone to oxidation
- Prefers a long, cool fermentation and requires oak aging to tame its over-fruitiness

- One of the four most tannic wines in commercial production, although these tannins are softened by warm sites
- Regions: Northern Rhone, Southern Rhone, Languedoc, Australia (often within a Cabernet blend), Argentina, California and South Africa
- James Busby brought Syrah to Australia in 1832, and named it Shiraz
- Like Cabernet and Nebbiolo, will transform dramatically with age

SANGIOVESE

- The backbone of Chianti, but more and more a varietal wine
- Low extract, low pigment, high acid, moderate tannins, moderate alcohol
- Distinctive flavors of sour cherry, spice and dried orange peel
- *Sanguis jovis* – blood of Jupiter
- Two dominant clones: Sangiovese Grosso and Sangiovese Piccolo (these names refer to flavor more than physiology)
- Two other important clones: Prugnello (for Vino Nobile de Montepulciano) and Brunello (for Brunello di Montalcino and Rosso di Montalcino)
- Prefers chalky, calcium-rich soils
- Prone to oxidation, which gives the wine its orange highlights
- Formerly, Chianti Classico was a blend of Sangiovese, Canaiolo Nero and Trebbiano, but improvements in the grape have led to 100% varietal bottlings
- Regions: Tuscany and the Italian Peninsula (Italy's most widely-planted grape)

GAMAY

- Low tannins, high acid, low pigment, aromatic
- Prefers granitic soil, like those of the best Beaujolais vineyards; chalk and sand, like those of the Beaujolais-Villages region, are less flavorful
- Trends: carbonic maceration (whole cluster fermentation) promotes and enzymatic breakdown of sugar into alcohol, though yeasts will finish the task
- Regions: Beaujolais, Loire, Switzerland
- Napa Gamay and Gamay Beaujolais are actually Valdigué and a lesser clone of Pinot Noir, respectively

GRENACHE

- Prone to oxidation, and primarily a blending grape
- Low pigment, low tannin, low acid, high alcohol
- Thrives in hot, dry windy conditions
- Buds early, but ripens late, taking full advantage of the growing season
- Indigenous to Spain (Garnacha), but maybe from Sardinia (Cannonau)
- Regions: Southern France (Chateauneuf, Cotes du Rhone, Tavel, Lirac, Gigondas, Cotes du Ventoux, Coteaux du Tricastin, Banyuls) and Spain (Rioja)
- New World plantings are negligible: Australia and California Central Valley
- Grenache can become more enticing from low-yielding old vines
- Historically, Grenache provided a foil to Syrah and Mouvedre

BARBERA

- High acid, high pigment, moderate tannin, prone to oxidation
- Often a bulk wine, Barbera can tolerate high temperatures while maintaining acidity
- Cooler sites produce a wine of more refinement
- Native to Piedmont or possibly neighboring Lombardy
- Ripens late and is densely pigmented
- In Italy, it rivals the production of Sangiovese

CABERNET FRANC

- Moderate tannins, moderate pigment, moderate to high acid, light to medium body
- Buds early and ripens early
- Some synonyms: Bouchy (Southwest France), Bretton (Loire), Bouchet (Right Bank)
- 18th Century Bordeaux produced Cabernet Sauvignon from Cab Franc and Sauv Blanc
- Regions: Right Bank (Pomerol and St.-Emilion); Southwestern Franc (Bergerac and Madiran); Loire

NEBBIOLO

- High acid, high tannin, high extract, high alcohol
- Native to Piedmont, where it ripens late (possibly derived from *nebbia*, meaning “fog”)
- Prefers moderately cool climates, but with south-facing sun-exposed slopes – cool nights are a must
- One of the four most tannic wines in commercial production
- These wines usually demand bottle aging, to soften the tannins and acidity – even aged wines should be decanted
- Its low pigment can be deceptive, considering its potency in other areas
- Synonyms: Spanna (Piedmont) and Chiavennasca (Lombardy)
- Some Piedmontese wines based upon Nebbiolo: Barolo, Barbaresco, Gattinara and Ghemme

TEMPRANILLO

- Moderate tannin, low acid, high pigment, long-lived
- Its woody characteristics make this wine seem older than it may actually be
- Native to Spain (Rioja Alta and Alavesa), where it is blended with Garnacha, Mazuelo, and Graciano – more recently, it may be blended with Cabernet Sauvignon
- Ripens early, as implied by its name
- Synonyms: Ull de Llebra (Catalonia), Cencibel (Valdepeñas), Tinto de Toro (Toro), Tinto del País or Tinto Fino (Ribera del Duero), Aragonez (Alentejo, Portugal), Tinta Roriz (Duoro, Portugal)
- Highly valued in Port production of Duoro
- Other regions: Argentina, South of France, California Central Valley

STILL WINE PRODUCTION

FERMENTATION

- Involves about 30 successive chemical reactions, each catalyzed by a specific enzyme
- Chemically: $C_6H_{12}O_6 + \text{yeast} = 2 C_2H_5OH + 2 CO_2 + \text{heat}$
- 90% of grape sugar is converted into ethanol, while the rest form other by-products, such as glycerol and various acids
- Yeast can only metabolize the six-carbon sugars, so five-carbon sugars like ribose and xylose will remain at about 0.2% RS
- Brix to alcohol = 5/9, or about 55% (divide by two for a rough estimate)
- In France: Baumé to alcohol = 1/1; in Germany or Switzerland: Oechsle is perhaps too esoteric to mention further in these notes
- Fermentation prefers temperatures between 57F and 95F – warmer fermentations are faster (and due to increased evaporation, produce lower-alcohol wines)
- Ethanol, the key waste product of yeast, is toxic to that organism
- Nutritionally, yeasts require sugar, minerals, nitrogen and vitamins – they require nitrogen to reproduce, which makes nitrogen a vital element in fermentation
- Even with cultivated yeast strains, there may be pockets of wild yeast fermentation within red wine must, especially within the cap – this is less likely with white wine
- Controlled fermentation: rapid start, predictable outcome, higher alcohol, option for cooler fermentation, less unwanted by-products, fewer off-odors
- Wild fermentation: increased acetic acid, increased ethyl acetate, increased glycerol, increased “higher” alcohols, increased phenyl alcohol, increased H_2S , increased acetaldehyde (sherry notes), less-efficient and less predictable

WHITE WINE PRODUCTION

1. **Crushing:** A gentle approach releases juice without releasing tannins from seeds and skins.
2. **SO₂ addition:** Sulfur can be added as a first step, or in some cases, just before yeast addition.
 - Inhibits wild yeast fermentation
 - Slows the growth of spoilage bacteria
 - Prevents oxidation
3. **Skin contact:** Although excess tannins are not generally beneficial, skin contact can also impart varietal aromas and flavors.
4. **Pressing:** “Free run” juice is typically rich in sugar and low in acids and tannin – one ton of grapes yields 50-170 gallons of this juice; “press juice” yields about 10-120 gallons per ton, and depending on extraction, it may be added to the “free run” or sold as bulk.
5. **Juice settling (débouillage):** Allows particles to fall out of solution overnight.
6. **Must adjustments:** Tweaks acidity (in warmer climates, with tartaric acid) or sugar level (in cooler climates, via chaptalization), as needed.
7. **Fermentation:** Whites are usually cool fermented, which may take four to six weeks

8. **Malolactic fermentation:** Can take place alongside the primary fermentation, or as a distinct step – bacteria converts malic acid to lactic acid (accordingly, the green apple profile changes to butterscotch). Most common with Chardonnay.
9. **Racking:** May occur after sur lie aging and bâtonnage, especially with Chardonnay.
10. **Sulfur adjustment:** To inhibit spoilage or oxidation.
11. **Clarification:** Refines the wines beyond simple racking.
 - Centrifuging
 - Filtering – pads, membranes, DE
 - Fining – gelatin, egg white, bentonite, casein
12. **Heat stabilization:** Prevents haze by adding fining agents.
13. **Cold stabilization:** Prevents tartaric crystals by precipitating them in the tanks before bottling – takes two to four weeks at 25-27F.
14. **Aging (élevage)**
15. **Blending**
16. **Bottling**

RED WINE PRODUCTION (key differences between white wine production)

1. **Crushing:** Creates the must, the soupy mass of juice, pulp, seeds and skins.
2. **SO₂ addition:** Less sulfur is required for reds, due to the inherent anti-microbial nature of tannins.
3. **Must adjustments:** Possible tweaking of acid or sugar levels.
4. **Maceration:** Skin contact -- can range from a few days to a few weeks. Extracted wines need more time in bottle, while shorter macerations yield wines that can be consumed earlier. With a grape like Pinot Noir, a “cold soak” can provide maceration before fermentation.
5. **Fermentation:** Typically happens between 60F and 95F – warmer fermentation yields higher extractions. Punch-downs and pump-overs.
6. **Malolactic fermentation:** Most reds undergo this process, although the toffee characteristics will not show until the youthful fruit flavors fade.
7. **Extended maceration:** If desired, the dry must can be blanketed with CO₂ – simulates aging by smoothing tannins. Yields high-impact flavors.
8. **Pressing:** The wine is racked and the must is pressed. The tannic “press wine” may be used to bolster the “free run” wine.
9. **Clarification:** Can occur before, during or after the aging process via racking, fining, or filtration. Hot and cold stabilization is not necessary.
10. **Aging/Blending:** Barrel-aging provides three benefits.
 - Softening of tannins through polymerization
 - Clarification of wine as oak tannins bind with proteins
 - Imparting an oak flavor profile to the wine
11. **Bottling**
12. **Bottle Aging:** To allow bouquet to develop

CARBONIC MACERATION

Common among Beaujolais Nouveau, this enzymatic fermentation does not require yeast, and is also known as whole-berry fermentation. This process occurs at 85-95F and runs for about three weeks. Ultimately, some juice from broken berries will undergo yeast fermentation, and the clusters will be pressed and combined, after which, the wines will finish fermentation. These wines will also undergo ML, as well as heat and cold stabilization.

SPARKLING WINE PRODUCTION

SPARKLING WINE GRAPES

- Champagne: Chardonnay, Pinot Noir, Pinot Meunier (surprisingly, the red grapes comprise 72% of the production)
- Loire: Chenin Blanc for crémant
- Germany: Riesling and Ebling for sekt
- Italy: Muscat, Brachetto and Prosecco for spumante
- Spain: Xarel-lo, Macabeo, and Parellada for cava
- United States: may employ Pinot Blanc alongside traditional Champagne grapes
- Australia: may use Shiraz

HARVEST

- High acid and moderate sugars are key, regardless of varietal, which makes cool growing regions well-suited to sparkling wine production
- Because sparkling wines traditionally undergo two fermentations, the base wine cannot achieve high alcohol

BASE WINE VINIFICATION

1. **Pressing:** Traditional basket presses are used, as well as more modern bladder presses. A traditional press holds 8800 pounds of grapes, which is known as a marc. One marc yields 674 gallons of juice, and is pressed over a four-hour span.
 - Maie** - the bottom half of the press
 - Mouton** - the top half of the press
 - Retroussage** - consolidating the grapes between pressings
 - Pelles** - the shovels used for retroussage
 - Tailles** - a phase of extraction during the pressing

Three grades of juice from each marc:

Cuvée: the majority of juice, which comes from free run and light pressings, is rich in sugars and acids. It is used for the tête de cuvee, or premium production. In

Champagne, only the first ten pièces of each marc are considered cuvee (about 542 gallons).

Taille: is richer in minerals, but lower in sugars and acids. Primarily used for demi-sec or extra-dry sparkling, since the added sweetness will mask these coarse flavors. In Champagne, after the initial 542 gallons of cuvee is pressed, then next 132 gallons is considered taille.

Rebêche: heavy press juice used for distilled spirits or vinegar

2. **Juice settling (débouillage)**
3. **Chaptalization:** Sugar is added the must, if needed, to achieve 10-11% alcohol in the base wine
4. **Fermentation:** Occurs in stainless steel for the most part, but may occur in neutral oak. The process occurs at 60-70F, resulting in a fast fermentation. Malolactic fermentation, if desired, would also be completed at this stage.
5. **Racking**

ASSEMBLAGE

The blend, which is also known as the cuvee, is determined. The wines that comprise the final blend come from different vintages, grapes, crus and vineyard sites (thus, assemblage is a horizontal and vertical blend). Up to 45% reserve wine may be added to the cuvee, and in Champagne, no more than 80% of a harvest can be bottled as vintage, thus allowing for a minimum of 20% to go into reserve. Assemblage is followed by racking, fining and cold stabilization.

CREATING THE SPARKLE

1. **Liquor de tirage:** Composed of yeast, cane or beet sugar, and a fining agent to facilitate riddling. Is added to each bottle to initiate the second fermentation
2. **Second Fermentation (prise de mousse):** Occurs over the next 20-45 days, yielding between 4.9 and 6.0 atmospheres, as well as an additional 1.5% alcohol.
3. **Aging:** Takes place sur lie, which creates a nutty, toasty bouquet as amino acids are released from the dead yeast cells. Also, CO₂ dissolves into the wine, allowing for smaller bubbles.
 - Lattes** - the thin strips of wood that separate rows of aging bottles
 - Poignitage** - the shaking of bottles to help release sediment (rarely done today)
4. **Riddling (remuage):** The sediment is jostled into the neck of the bottle over time in a pupitre, the A-shaped riddling rack, until the bottles are stored sur pointe, or neck down. These days, gyropalates may be used instead of traditional riddling, condensing a three-month process into one week.
5. **Disgorging (dégorgement):** The wine is chilled to 45F to lower the pressure, the neck of the bottle is frozen, and the bottle is opened to release the ice-plug of sediment.
6. **Dosage (liquor d'expédition):** Some additional wine, along with a designated amount of cane sugar, is added to compensate for the wine lost during disgorging.

Brut Nature or Sans dosage - no sugar added
 Extra Brut - 0.6% sugar
 Brut - 1.5% sugar (the most common style)
 Extra Dry or Extra Sec - 1.2-2.0% sugar (off-dry)
 Sec - 1.7-3.5% sugar (slightly sweet)
 Demi-sec - 3.5-5.0% sugar (sweet)
 Doux - more than 5.0% sugar (very sweet)

7. **Bottle aging:** The dosage is given three to nine months to marry with the sparkling wine. In Champagne, nonvintage cuvee must age 15 months, while vintage cuvees must age three years.
8. **Transvasage:** For the most part, sparkling wine is made in 750mL bottles, but it may be transferred to other larger or smaller formats after disgorging. However, in Champagne, transvasage is outlawed, except for bottles larger than a Jeroboam.

Split	1/4 bottle
Half or Demi	1/2 bottle
Standard	750mL
Magnum	2 bottles
Jeroboam	4 bottles
Rehoboam	6 bottles
Methuselah	8 bottles
Salmanazar	12 bottles
Balthazar	16 bottles
Nebuchadnezzar	20 bottles

NON-TRADITIONAL METHODS

- **Transfer Method:** Uses bulk clarification in lieu of riddling. With the advent of gyropalates, this method is less and less common.
- **Charmat or Cuve Close Method:** Bulk fermentation and bulk clarification. The process yields a wine with no Champagne bouquet. This method is used for German sekt or Italian Asti.
- **Carbonation:** Essentially a still wine soft drink, produced through simple CO₂ injection.

FORTIFIED WINES

TYPES OF SHERRY

- **Fino:** A fortified dry white made from the Palomino grape, derived through controlled oxidation and the biological aging action of flor (several strains of yeast consuming acid and alcohol and producing acetaldehydes).
 - Palma – the most delicate of finos
 - Entre-Finos – finos lacking in delicacy
 - Palma Cortada – a more robust fino, approaching amontillado in style
 - Pale Cream Sherry – a fino sweetened with neutral dulce de almibar
 - Fino-Amontillado/ Amontillado-Fino – the transitional phase of an aging fino. The flor dies, and the wines gains body and intensity via oxidation
- **Manzanilla:** A type of fino produced in the town of Sanlúcar de Barrameda. It gains its unique aromatic nature through *S. beticus* in the velo, the layer of yeast on the surface of the wine.
 - Manzanilla Pasada – has lost its flor and matures without the velo
 - Manzanilla Amontillado – subjected to prolonged aging without the velo, assuming the nuttier, full-bodied characteristics of amontillado
- **Amontillado:** A Sherry that began as a fino, but has developed character through oxidation.
 - Medium Sherry – amontillado that has been sweetened with vino dulce or dulce de almibar
- **Palo Cortado:** Extremely rare, with aging that is purely physiochemical – no flor. Features the aroma of amontillado, but the flavor and color of oloroso (and tends to degenerate into oloroso).
- **Oloroso:** A sherry aged purely through oxidation.
 - Cream/Milk Sherry – sweetened oloroso, originating in Bristol
 - Brown Sherry – a blend of raya, oloroso, vino de color and vino dulce
 - Pajarete – a sweet form of Brown Sherry
 - East India Sherry – a modern product reminiscent of Sherry that underwent accelerated aging on the high seas
- **Raya:** Less delicate than oloroso, but aged purely through oxidation.
 - Raya Oloroso – a more refined raya
 - Raya Fina – a lighter-style raya

SHERRY PRODUCTION

1. **Pressing:** Technology has changed over the years, but modern-day Sherry relies upon a bladder press for gentle extraction of the Palomino grape.
2. **Acidification**

3. **Racking**
4. **Fermentation:** Wild-yeast ferments for three days to one week, at temperatures between 75-84F. Malolactic follows. Stainless steel is common, but some oloroso is fermented in 130-gallon oak butts (finos would be spoiled by the oak flavor and astringency).
5. **Classification:** Tasters determine whether the Sherry is suitable for the fino or oloroso program, though some are marked as “mosto sobretablas” and will be evaluated later. The criteria for classification: color, clarity, aroma, flavor. Technology has made the process more efficient, and it is now known that the best Sherry comes from chalky albariza soil, from old vines, from free-run juice, and from carefully handled fruit.
6. **Fortification:** Finos are increased to 15.0-15.5% alcohol via a 50-50 mix of grape spirits and Sherry (any higher and the flor cannot grow); olorosos are fortified to 18% via pure grape spirits (preventing flor, as well as spoilage bacteria).
7. **Aging:** Wine is aged within the solera – finos undergo biological aging, while olorosos undergo oxidation.
 - Finos** – the flor grows in the presence of acidity, humidity and oxygen, seasoned barrels, no residual sugar, and alcohol levels lower than 16%. During the process, some ethanol and most of the acids are consumed, and there is a sharp increase in aldehydes and fusel oils.
 - Olorosos** – without the flor blanket, oxidation happens at a faster rate, and due to evaporation, the wines can rise to 24% alcohol. Wines that are classified as rayas may be aged in the sun for one or two years, allowing 15% evaporation each year.
8. **The Solera:** This term has many definitions – it may refer to a set of casks (ranging from a few to several hundred), or the fractional aging and blending system itself, or the butts that contain the oldest wine within the system.
9. **Running the Scales:** Each year, up to one-third of the solera-tier wine is removed for bottling. In turn, this wine is replaced with wine from the next-oldest tier, the criadera. Ultimately, the youngest tier is topped with current vintage wine, the añada. This system helps to achieve a house style.
10. **Blending:** After aging, the wine is optionally finished with vino de color or a sweetener. Vino de color is a Moscatel reduction that finishes East India or brown Sherry. There are a few sweetening agents:
 - Vino dulce** – made from raisined Palomino or PX grapes
 - Dulce apogado** – unfermented must or partially fermented must
 - Dulce de Almibar** – pure invert sugar, 50-50 glucose and fructose
 - Rectified must** – concentrated to 33% sugar and decolorized with deactivated charcoal
11. **Finishing:** The Sherry is clarified with egg whites, filtered and cold stabilized.

TYPES OF PORT

- **Bottle-Aged Ports:** undergo reductive aging, developing in the absence of oxygen
 - **Vintage:** Spends two winters in cask, but several decades in bottle. A “declared vintage” occurs about three out of every 10 years, and even then, only represents about 10% of the total harvest. These wine are unfinned and unfiltered.

- **Single Quinta:** In good, non-vintage years, certain lots may be designated as superior, and these properties are bottled exclusively. The production regime is identical to vintage Port.
- **Wood-Aged Ports:** age oxidatively (and thus maintain their quality longer after opening)
 - **Ruby:** Represents a large portion of overall production, but these wines do not have the longevity of some of the others. The wines are aged in oak casks for a minimum of three years.
 - **Reserve Ruby:** A blend of premium ruby Ports that is aged four to six years in oak vats. Formerly known as “vintage character” Ports, this term is now outlawed.
 - **Tawny:** Some simple versions may, like ruby Ports, be bottled three years after barrel aging. However, some may see 10, 20, or 30 years in oak (this age is an average for the blend, not a minimum).
 - **Late Bottled Vintage (LBV):** These wines are vintage-dated, but are aged in oak for four to six years, and are intended for immediate consumption. Sometimes bottled with a “T” cork.
 - **Colheita:** Represents just 1% of all Port production. Basically, it is single-vintage tawny Port, but spends at least seven years in cask, and possibly much, much longer.
 - **White Port:** Produced from grapes such as Malvasia Fina, Gouveio, and Rabigato. Usually aged three or four years in vat, these wines are typically drier than their red counterparts. “Light White Port” has a minimum alcohol level of 16.5%.

PORT PRODUCTION

- True Port originates from the Duoro Valley of Portugal. The grapes are harvested at 12 to 14 Baumé, or about 22-25 Brix.
- About 5% of Port production uses the old methods of stomping and fermenting in shallow granite lagares, although modern equipment has changed the industry throughout the 20th century. Different approaches include autovinificators, pump-over fermenters and rotary fermenters, the latter two being sealed environments.
- Port almost always ferments from native yeasts at temperatures of 80-85F, and the fermentation is halted (at the discretion of the Port house) with aguardente, a grape spirit containing 77% alcohol. Houses with a drier style will halt the fermentation at 6 Baumé, while those with a sweeter style will halt it at 7.5-8.0 Baumé. The aguardente

raises the total alcohol to 20%, killing the fermenting yeasts. Residual sugars range from 8 to 12%.

- Port traditionally spends two winters in Duoro wineries before being shipped to lodges in the town of Vila Nova da Gaia for maturation (Port can be aged anywhere within the demarcated Duoro region). Tawnies age in small barrels, called pipes, that hold 145 gallons. Ruby, LBV and vintage Ports are aged in large vats to preserve color and fruit.
- Blending typically combines several vineyards, varietals and vintages. To achieve desired sweetness, a dry Port may be added to reduce sugar levels, or a super-sweet Port, known as geropiga, may be added to increase sugar. These blends are usually finalized 12-18 months before shipping.

TYPES OF MADEIRA

These four types also represent the four noble varietals of Madeira, although the most widely planted grape is the less-regarded Tinta Negra Mole. The grapes are grown high off the ground to avoid sub-tropical moisture, and the vines are perched atop narrow terraces cut from volcanic basalt rock.

- **Sercial:** The driest of Maderias, with 0.5-1.5 RS. This sweetness is more than offset by searing acid levels. The flavor profile is that of almonds. Fermented without skins.
- **Verdelho:** Moderately sweet, with 1.5-2.5 RS. Marked by a pronounced smokiness. May or may not be fermented on the skins.
- **Bual:** Raisiny sweet, with 2.5-3.5 RS. Fermented on skins.
- **Malmsey (Malvasia):** The sweetest, with 3.5-6.5 RS. High acidity brings the wine into balance, with a nutty grapiness. Fermented on skins.

QUALITY LEVELS OF MADEIRA

- **Granel (bulk-produced Madeira):** Represents 40% of Madeira production. Spends 18 months in tank heating and bulk storage. Typically, the grape is Tinta Negra Mole.
- **Finest:** Three-year-old wine that has undergone tank heating and bulk storage.
- **Reserve:** Five-year-old wine that has undergone tank heating and bulk storage. A portion may have spent time in wood, and may contain some noble varietals.
- **Special reserve:** 10-year-old wine that has undergone cask heating in an estufa and cask aging. Normally made from one of the noble varietals.
- **Extra reserve:** similar to special reserve, but with 15 years of aging.

- **Vintage (Frasqueria):** 22-year-old wine of one particular vintage (at least 20 years in cask and two years in bottle).

MADEIRA PRODUCTION

Located 400 miles off the African coast, the Portuguese island of Madeira is the eponymous home to this particular wine. In the earliest days, Madeira was a key stop on trans-Atlantic journeys, and wines were fortified to help them survive the trip. The warm, rollicking journey “maderized” the wine. Today, this style is achieved through three different modern techniques:

1. Coil heating - Cheap and quick, the process takes only three months, and the wine is heated up to as much as 120F. These wines are sweetened and fortified after they are cooked, in order to minimize evaporation.
2. Estufagem - Heated warehouses maderize the wines in 6-12 months, at ambient temperatures of 85F to 105F.
3. Uncooled warehouses - Require years of aging, but deliver far more complex wines. The process may take 20 years.

OTHER FORTIFIED WINES

- **Marsala:** Produced in Sicily, featuring both dry and sweet styles. Key grapes include Catarratto, Grillo and Ansonica. The wines are fortified (a) with grape spirits, (b) a concentrated must called mosto cotto, or (c) sifone, a late-harvested must bolstered with grape spirits. The three types of Marsala - oro, ambra and rubino - can each be made secco (0-4% RS), semisecco (4-10% RS) or dolce (more than 10% RS). In terms of aging, Marsala Fine is aged for one year, Marsala Superiore is aged two years, Marsala Superiore Riserva is aged four or more years, and Marsala Vergine or Marsala Solera is aged a minimum of five years in a Sherry-like solera system. Marsala Vergine Stravecchio Riserva is the most esteemed of these wines, and is aged at least 10 years in cask.
- **Málaga:** Produced in the eponymous harbor city in Andalusia. The grapes include Pedro Ximénez, Airén and Moscatel de Alejandría. Traditionally, the grapes were sun-dried on mats. The wines can be made two ways: (a) fermentations can be halted with grape spirits, or (b) arropo, a grape juice concentrate, can be added either before or after fermentation. The wine uses the solera system for aging, and must be aged within Málaga itself.
- **Montilla-Moriles:** Another fortified wine from Andalusia, with similar production to Sherry and Málaga. The primary grapes are PX, Airén and Moscatel. Features both fino and oloroso styles, and can use Jerez nomenclature within Spain, but not for export.
- **Vins Doux Naturels:** French fortified wines. Muscat is the most common grape, but some, such as Banyuls, are based upon Grenache.

WINE REGIONS: AUSTRALIA

OVERVIEW

- Australia is the flattest, driest continent with the most depleted soils in the world – it is leached, acidic, and saline with high potassium content.
- Produces the sixth-largest volume of wine in the world – 375M gallons
- Wine is made in all of Australia's states and territories, although production is concentrated in the southeastern quadrant and the extreme southwest.
- Australia has no indigenous grapevines, and the Aborigines are one of the few cultures to not drink a fermented beverage.
- The vine arrived in Australia in 1788, by the first English colonists.
- The wine industry began to boom in the mid-1800s with the discovery of gold.
- A handful of large producers dominate the export market while a plethora of small producers rarely have wines that are seen abroad.
- Though traced back to the late 1800s, phylloxera has been contained to Victoria and a small portion of New South Wales.
- 75% of Australian vineyards are planted on their own rootstock, and many growers who have selected alternate rootstock have done so to combat soil salinity.
- Australia receives 6.5 inches of rain per year, making irrigation from the Murray, Darling and Murrumbidgee rivers a must.
- Over-irrigation can raise the water table, which is often saline, so there is an art and science to grape growing.
- Australia drinks more wine per capita than any other English-speaking nation.
- In 2003, Australia replaced France as the number-two exporter of wine to the U.S.

WINE LAWS

- Geographical Indications are simply geographical entities, placing no restrictions on viticultural or vinicultural procedures, except that 85% of the wine's grapes must come from the named GI.
- If no one GI accounts for 85% of the volume, then GIs must be listed in descending order, or not at all.
- The GI system was established in 1993, and is governed by the Australian Wine and Brandy Corporation.
- As of 2008, 103 GIs have been approved, with others pending.
- The wine laws regarding vintage and varietal are the same as those regarding origin, 85%.

WINEGROWING REGIONS

- **New South Wales** – The first state where vines were planted, benefiting from the ready markets of Sydney and Canberra.

Hunter Valley Zone: Winemaking in this zone dates back to 1825, and the region is known for Shiraz and Semillon. The valley is broad, with gentle hills and a

subtropical climate. Rain and hail during the growing season can be an issue. Notable regions: Hunter and the Broken Fordwich subregion.

Central Ranges Zone: A continental climate features warm summers and cool winters, with many plantings on the slope of the Great Dividing Range, where altitude can mitigate heat. Notable regions: Mudgee, Cowra and Orange.

Big Rivers Zone: The region of Riverina is one of Australia's largest growing areas, producing 55% of the NSW grape production. Riverina features a hot climate with sandy soils, made viable thanks to the Murrumbidgee Irrigation project. With misty mornings and warm afternoons the region has become famous for botrytis-affected Semillon. Other notable regions: Perricoota, and parts of Murray Darling and Swan Hill.

Southern New South Wales Zone: Features notable regions, such as the Canberra District, Gundagai, Hilltops, and Tumbarumba.

South Coast Zone: Features the regions Southern Highlands and Shoalhaven Coast.

Northern Rivers Zone: Features the Hastings River region.

Northern Slopes Zone: Features the New England Australia region.

- **Western Australia** – Because of its remote geography, this state must focus upon the export market.

Swan District (within the Greater Perth Zone): One of the hottest wine regions in the world, with a Mediterranean climate and an average of more than 9.7 hours of sunshine per day. Grape production is less than half the national average, despite irrigation. The sandy soils foster nematodes, so the vines are planted on resistant rootstock. Produces mostly fortified or bulk wine. Notable subregion: Swan Valley.

South West Australia Zone: From north to south, features the regions Geographe, Margaret River, Blackwood Valley, Manjimup, Pemberton and Great Southern. Along this route, the vineyards move from deep sandy loam to gravelly loam atop clay. Rainfall increases towards the south as well. With the exception of inland Blackwood Valley, these regions experience breezes from either the Indian or Southern Oceans.

- **Victoria** – Although states such as New South Wales, Tasmania and Western Australia had existing vineyards, this state's wine industry was jump-started by the gold rush of the mid-1800s.

Port Phillip Zone: The cool Geelong region experienced phylloxera in the 1800s and took 100 years to recover. The Macedon Ranges feature an ultra-cool climate at 3000 feet, and the vines are nestled among granite outcroppings to shield them

from wind. The Sunbury region is flat, dry and warm. The Yarra Valley region is the original home of the vine in Victoria, and Chardonnay, Riesling and Pinot Noir have been successful here.

Central Victoria Zone: The region of Bendigo has a warm continental climate, and is known for Shiraz and Cabernet. The Goullburn Valley and its Nagambie Lakes subregion are arid and hot with sandy soils, excelling with red and white Rhône varieties. The Strathbogie Ranges climb into alpine foothills, where cool-climate grapes like Riesling grow well.

North East Victoria Zone: The Rutherglen region has a continental climate, and is known for fortified wines and big reds. The King Valley region is topographically diverse, with plains to the north and mountains to the south. Beechworth is hampered by water scarcity. Other notable regions: Alpine Valleys and Glenrowan.

Gippsland Zone: Contains no regions, but temperature, humidity and sunlight hours draw comparisons to those of the Loire and Burgundy.

Western Victoria Zone: The Grampians region is home to Australia's first sparkling wine, and is peppered with old vines. The Pyrenees region is sunny, with rolling hills, featuring red production in the north and sparkling wine to the south. Like the Macedon Ranges, the Henty region is ultra-cool, although ample sunshine allows for cool climate varieties.

North West Victoria Zone: The regions of Swan Hill and Murray Darling straddle the New South Wales border, and focus on bulk wine production.

- **South Australia** – This state rose to prominence between 1884 and WWI, thanks to (a) neighboring Victoria's vineyards being devastated by phylloxera, (b) the elimination of trade barriers with the formation of the Federation of Australia in 1901, and (c) a global change in preference for table wine, which suited South Australia's climate. The Adelaide Superzone encompasses the Mount Lofty Ranges, Barossa and Fleurieu zones.

The Mount Lofty Ranges Zone: The Adelaide Plains are hot and dry, with rainfall concentrated in the winter months. Adelaide Hills is a cool, wet, marginal growing region that is ill-suited to reds, with steep slopes at elevations from 1300 to 2300 feet. The Clare Valley is famous for cool-climate grapes like Riesling, and receives an average of 8.8 hours of sunshine per day.

The Fleurieu Zone: McLaren Vale features a Mediterranean climate, although breezes from the Gulf of St. Vincent delay ripening. The topography is rolling, with soils comprised of sandy loam with ironstone or limestone subsoils. Langhorne Creek is a warm, flat region with most rainfall appearing in winter months. Cool winds from the south and warm winds from the north help provide

large diurnal temperature variations. Other regions: Currency Creek, Kangaroo Island and Southern Fleurieu.

The Barossa Zone: The Barossa Valley region is home to the biggest wine producers in Australia, and boasts the largest acreage of dry-farmed vineyards in the country, despite its warm climate and abundant 8.8 daily hours of sunshine. The region's gentle slopes feature many old-vine plantings of Grenache and Shiraz. The Eden Valley, with the High Eden subregion, has greater altitude with rockier soils. Winds moderate temperature and delay ripening, although the region produces Riesling with marked minerality.

The Limestone Coast Zone: The home of the famous "terra rossa" soil, which is a red-brown mix of clay, sand and silt. The Coonawarra region is flat, with a maritime climate (despite being 60 miles inland). Padthaway, to the north, also features a maritime climate. Other regions: Mount Benson, Robe, and Wrattenbully.

Lower Murray Zone: More than one-fourth of Australia's wine production emerges from Riverland. The soils are sandy loam and temperatures are hot, with no humidity.

Peninsulas Zone: No designated GIs.

Far North Zone: Featuring the Southern Flinders Ranges.

- **Tasmania** – The island state was the second home to vines Down Under, and its vineyards supplied the nursery stock for Victoria and South Australia. The growing season is short, with frost issues, though the area is ideally suited for Chardonnay, Pinot Noir and sparkling wine production.
- **Queensland** – Most of the wine industry is located inland, on the west side of the Great Dividing Range. The vineyard occupy high altitudes with moderate heat and humidity. One of the zone's two regions, Granite Belt, earns its name from its decomposed granitic soil. The other region, South Burnett, features the famous "terra rossa" soil.

WINE REGIONS: ARGENTINA

OVERVIEW

- First grapes arrived with the Spanish, and the widely planted Criolla Grande and Cereza are descendants of those grapes (Criolla is the same as Chile's País)
- After Spanish rule ended in Argentina, a large wave of immigrants inundated the country, including many Italians.

- In 1885, the railroad link from Mendoza to Buenos Aires helped established the wine trade.
- Argentina is the fifth-largest producer of wine in the world and the eighth-largest consumer.
- Wines are grown between the Tropic of Capricorn and the 40th parallel south, though the major quality winegrowing section is in the northwest, along the lower slope of the Andes.
- Most vineyards receive less than 10 inches of rain per year, but snowmelt from the Andes provides plenty of irrigation.
- The scant rainfall, however, tends to occur during late summer and can sometimes bring hail.
- The fierce northwest “zonda” wind can sometimes cause poor berry set, reducing crop yield.
- Argentina’s wine-growing regions feature a continental climate, with large diurnal temperature swings and all four seasons.
- Phylloxera has made few inroads into Argentina, and almost all of the vines are planted on their own rootstock.
- Grape varieties grown for high yield are often trained on an overhead parral system to help them escape reflected ground heat.

WINEGROWING REGIONS

These regions are demarcated by political boundaries rather than topographical features. In most areas, alluvial soils sit atop clay, gravel or limestone subsoils.

- **Mendoza:** The largest and most important region in Argentina, over 70% of the country’s total wine production happens here. Much of the acreage is Criolla, but Malbec is important, along with Tempranillo and some Italian varieties. Cabernet and Chardonnay are also grown here.
- **San Juan:** The second-largest wine region, again with significant plantings of Criolla. This region is hotter than Mendoza, and features sherry, brandy and vermouth production.
- **La Rioja:** The original home of the vine in Argentina. Known for production of whites such as Torrontés and Moscatel de Alejandría. Lack of irrigation has limited production.
- **Catamarca, Salta and Jujuy:** Feature extreme altitude, allowing grapes to maintain their acidity due to warm days and cool nights.
- **Río Negro and Neuquén:** Situated in Patagonia, where high-acid whites, such as Torrontés and Semillon, are crafted.

THE GRAPES

- **Torrontés:** Argentina's third-most planted white grape, produces a light-bodied wine with an aroma profile similar to Muscat
- **Malbec:** Seems to be at its best in Argentina, which grows more of this grape than any other region in the world
- **Moscatel de Alejandría:** Is Argentina's second most planted white grape
- **Pedro Giménez:** Is the most widely planted white grape, but is used largely for grape concentrate - it is not the Pedro Ximénez of Jerez
- **Chenin Blanc** (also known as Pinot de la Loire) and **Ugni Blanc:** Are often used as the base wine in sparkling production

WINE REGIONS: CHILE

OVERVIEW

- Wine growing regions are in the center of the country, stretching 250 miles north and 350 miles south of Santiago.
- The Central Valley region, which is crisscrossed by rivers, is by far the largest fine wine region in Chile.
- The vines lie between 32 and 38 south latitude, and are grown mostly on deep, fertile, alluvial soils.
- Weather is dictated by the Pacific Ocean and its cold Humboldt Current, which keeps summer temperatures under 90F.
- Chile has no indigenous vines, and classic vinifera varieties were brought to the country in the mid-1800s, just before the outbreak of phylloxera and powdery mildew
- Because phylloxera and powdery mildew are still not present in Chile today, the country has a treasure trove of Old World cuttings.

THE GRAPES

- There have been two long-assumed fallacies regarding Chilean grapes: Much of their Sauvignon Blanc has turned out to be Sauvignon Vert, while much of their Merlot has been discovered to be Carmenère.

WINE LAWS

- Since 1996, Chilean wine has abided by the 75% rule for varietal, estate bottling, vintage and origin. However, many top producers have adopted the 85% rule in order to be eligible for exports to the European Union.

WINEGROWING REGIONS

- **Coquimbo Region**

Limarí Valley: A cool region due to its proximity to the Pacific Ocean. Cabernet Sauvignon is widely planted here.

- **Aconcagua Region** – The northernmost fine wine region in Chile, taking its name from the eponymous river which runs through it.

Aconcagua Valley: The hottest, driest fine wine region in Chile, located in the interior of the country.

Casablanca: A relatively new region, vines were first planted here in 1982. The cool, foggy climate had proven successful for Chardonnay, even though irrigation is a must. One quarter of all of Chile's Chardonnay is grown here, and the future may prove bright for Pinot Noir.

- **Central Valley Region**

Maipo Valley: Planted in the mid-1800s by the wealthy elite of Santiago. Like the Aconcagua to the north, the region derives its name from its river, and soils are fertile alluvial silts and sands. Red grapes dominate the production here.

Rapel Valley: Known for both Cabernet Sauvignon and Sauvignon Blanc, although red wine production dominates. Soils are sandy with patches of loam and clay, but there are few wide expanses of farmland, since the area is peppered with hills and mountains.

Curicó Valley: The Coastal Range to the west prevents cool Pacific breezes from reaching the inland vineyards, making this region quite warm. Most of Chile's Cabernet Sauvignon is planted here, among the fertile alluvial soils.

Maule Valley: With cloud cover and cooler temperatures than all the regions to the north (except Casablanca), this region features noble varietals planted alongside the more rustic País. More than 25% of Chile's vines are located in this subregion.

- **Southern Region**

Itata Valley: Dominated by País and Moscatel, which are often distilled into brandy.

Bío-Bío Valley: With the Coastal Range at lower elevations here, the Pacific has more of an influence than to the north. As with the Maule and Itata regions, País is widely planted here.

WINE REGIONS: GERMANY

OVERVIEW

- Germany's wine production is admirable considering that their northernmost winegrowing regions are well above the 50th parallel.
- Vineyards tend to be planted along river valleys and on south-facing slopes, which minimize frost and maximize sun exposure, respectively.
- With the exception of two small areas in eastern Germany, all of the winegrowing areas are in the southwest quadrant of the country.
- The majority of vineyards are found within 20 miles of the Rhine River.
- The cool climate lends itself to sparkling wine production, and Germany produces more than twice as much sekt as Champagne.
- Germany is the world's ninth-largest wine producer – 100M cases in 2006.

WINE LAWS

- **Appellation System**

Within Germany, there are five table wine regions, and within them, there are 19 Landwein districts. For quality wines, there are 13 anbauggebiete, the specified winegrowing regions for QbA wines, which mostly share common ground with the Landwein districts. The 13 anbauggebiete are further divided into 39 bereiche, which are analogous to communes. A grosslage is a "large site," and there are 167 of them.

The grosslage system is a means of grouping certain vineyards together, and with few exceptions, all vineyards are in one grosslage or another. The name of particular grosslage is always preceded by a village name – usually the most well-known village name within that grosslage (keep in mind, the grapes may not come from this particular village).

An einzellage, of which there are more than 2600, is an individual site – essentially a single vineyard. Each of them lies within a grosslage, which lies within a bereich, which lies within an anbaugebet. The names of einzellagen are also preceded by a village name, but in this case, these grapes actually do come from that particular village. However, based simply upon label nomenclature, it can be difficult to discern between einzellagen and grosslagen.

There are three designations regarding bottling: (a) Gutsabfüllung is the equivalent of estate bottled, (b) Erzeugerabfüllung includes cooperatives and means "producer bottled" and (c) Abfüller indicates a wine commercially produced from purchased fruit.

- **Wine Categories**

German wines are categorized by ripeness, which is a function of the region's marginal grape-growing climate. More advanced ripeness corresponds to a more complex flavor profile, and thus, a higher quality. Sugar content is measured in Oechsle, which determines the specific gravity of must in relation to that of water. Sugar level at harvest provides no guarantee of RS, however, since any wine up to the Auslese level can potentially be vinified to total dryness. More than one-third of German wines are trocken, with less than 0.4% RS.

At the bottom of the quality pyramid are Tafelwein and Landwein, although these only comprise 4% of Germany's output and rarely see export. Landwein is the better of the two, and must originate from one of the 19 Landwein districts and have a slightly higher alcohol level.

There are two levels of Qualitätswein, the second-highest being Qualitätswein bestimmte Anbaugebiete or QbA. German law requires that these wines, which comprise the majority of Germany's production, must originate from one of the 13 designated Anbaugebiete, must be an approved varietal, and must have reached sufficient ripeness. Beginning at this level, these wine are tasted and chemically tested to ensure quality, at which point, they receive an AP number, which must appear on the label. QbA wines may be chaptalized. The top level of German wine is Qualitätswein mit Prädikat or QmP, and chaptalization is not allowed. The Prädikat levels, in ascending order, are:

- **Kabinett:** Light-to-medium bodied wines made from fully ripe grapes. They can be finished dry, medium-dry, or sweet. Usually about 7-10% alcohol.
- **Spätlese ("late harvest"):** Made from grapes harvested after a designated picking date. Can also be finished dry, medium-dry, or sweet.
- **Auslese ("selected"):** These wines are often sweet, but can be finished dry or medium-dry, creating a wine that may have an excess of 14% alcohol.
- **Beerenauslese ("selected berries"):** Abbreviated as BA, these wines are made from individually harvested, overripe berries, creating rich sweet dessert wines.
- **Eiswein ("ice wine"):** A wine of at least a BA-level of ripeness, and harvested after they freeze in the vineyard. May or may not have botrytis.
- **Trockenbeerenauslese ("selected dried berries"):** Abbreviated as TBA, these grapes are affected by noble rot, or edelfäule. Considered among the world's greatest dessert wines.

Stylistically, German wines may have labeling that implies their level of dryness or sweetness. Off-dry wines may be labeled halbtrocken or feinherb. Dry wines may feature the word trocken on the label, or perhaps the terms Classic and Selection. These latter two categories were introduced in 2000, and will indicate region, producer and varietal.

- **Classic:** These wines must (a) be made from a traditional grape, (b) have potential alcohol at least 1% higher than the varietal and regional minimum, (c) have at least 12% alcohol by volume (11.5% in the Mosel), (d) have a maximum RS of twice the acidity, but no more than 1.5% total.
- **Selection:** These wines must (a) originate from an einzellage, (b) be hand-harvested at Auslese-levels, (c) have less than 0.9% RS (except for Riesling), and (d) for Riesling, have a maximum RS of 1.5 times the acidity, but not more than 1.2% total.

WINEGROWING REGIONS

- **Ahr:** One of Germany's northernmost and smallest regions, although it is actually known for its red wines. Spätburgunder and Portugieser both produce light, fruity wines. The twists and turns of the Ahr River provide many natural windbreaks, and the upper reaches feature steep terracing. Soils on the valley floor are loess, with slate and volcanic rock on the slopes. Bereich: Walzporheim-Ahrtal.
- **Mittelrhein:** Extends 60 miles along the Rhine, although the northerly course of the river means that many of the vineyards are planted on the less-desirable east- and west-facing slopes. Hills are slate with steep gradients; topsoils are thin. Riesling accounts for 74% of the vineyards. Bereiche: Loreley, Siebengebride.
- **Mosel:** One of Germany's most famous regions, with steep slate slopes. The Upper Mosel, near Luxembourg, features lime soils. Riesling accounts for roughly half of the region's production, although it is not planted in the Upper Mosel. These wines usually contain less than 10% alcohol, and are packaged in tall, slender, green bottles. Bereiche: Burg Cochem, Bernkastel, Saar, Ruwertal, Obermosel, Moseltor.
- **Rheingau:** This region is one long hillside that flanks the Rhine on its westerly bend, meaning that the vineyards enjoy a southern exposure and a quasi-Mediterranean climate. Mists from the river encourage botrytis and protect from frost damage. The Taunus forest to the north shields the region from cold north winds. The soils are mixed: slate, loam, loess, potter's clay, marl, gravel, and alluvial sand. The site of full-bodied Riesling and elegant Spätburgunders. Bereich: Johannisberg.
- **Nahe:** A region with much variation, soils range from slate, volcanic porphyry, sandstone, marl, and potter's clay to loam, loess, and sand. The terrain ranges from steep slopes to rolling hills. Known as "The Tasting Room of Germany" - climates are sunny, with early spring and late autumn. Bereich: Nahetal.

- **Rheinhessen:** The largest of Germany's winegrowing regions, both in terms of area and production. Surrounding forests shelter the region from storms, and the climate is warm and dry. The terrain is a low and flat plateau that was formerly an inland sea. Soils vary, and the primary grapes are Müller-Thurgau and Dornfelder. Bereiche: Bingen, Nierstein, Wonnegau.
- **Pfalz:** Heavily forested with a southern border close to Alsace. This is Germany's second-largest wine producer, and the region features other crops, such as chestnuts, figs, lemons, and almonds. Soils range from heavy loams to loess and clay, sandstone, marl, lime, granite, basalt, and schist. This region was once known for bulk wine, but less so these days. Bereiche: Mittlehaardt-Deutsche Weinstrasse, Südliche Weinstrasse.
- **Franken:** A continental climate produces frosts that bookend the growing season. Although this region is large, the vineyards are discontinuous in nature. The wine packaging is a distinct squat green flagon called the Bocksbeutel. White dominates the production, especially M-T, Silvaner, and Bacchus. Soils are limestone and variegated sandstone. Bereiche: Steigerwald, Maindreieck, Mainviereck.
- **Hessische Bergstrasse:** Consists of two small regions just east of the Rhine with a mild climate and early spring. The Oden Forest provides shelter from wind. Fig and almond trees flourish. The majority of grapes are Riesling, though most is consumed locally. Soils are fertile loess and sand, with granite outcroppings in the hills. Bereiche: Starkenburg, Umstadt..
- **Württemberg:** This region focuses on reds, with 70% planted to Trollinger, Schwartzriesling and Lemberger. Most plantings are on the slopes of the Neckar River Valley and the river's surrounding tributaries. Soils are marls and shell-lime, and this regions features more humidity and rainfall than the others. Bereiche: Remstal-Stuttgart, Württembergiosch Unterland, Kocher-Jagst-Tauber, Oberer Neckar, Württembergisch Bodensee, Bayerischer Bodensee.
- **Baden:** Although a very large territory, its acreage only places it third amongst Germany's winegrowing regions, behind Rheinhessen and Pfalz. The district of Kaiserstuhl is considered Germany's warmest growing region. Spätburgunder is by far the most widely planted varietal. Soils range from gravel and limestone to clay and volcanic rock. The climate is mild, producing the famous Pinot Noir rosé Spätburgunder Weissherbst. Bereiche: Tauberfranken, Badische Berggstrasse-Kraichgau, Ortenau, Breisgau, Kaiserstuhl, Tuniberg, Markgräflerland, Bonensee.
- **Saale-Unstrut and Sachsen:** These two small regions are located in the former East Germany, and rarely achieve Spätlese levels of ripeness. M-T and Weissburgunder (Pinot Blanc) are the most common varietals. Bereiche: Schloss Neuenburg, Thüringen, Meissenm, Dresden, Elstertal.

WINE REGIONS: AUSTRIA

OVERVIEW

- Austria has a long history of viticulture, dating all the way back to 700 BC.
- Although taxes, beer culture and the Thirty Years' War undermined winemaking, the industry received a boost in 1784 when farmers were allowed to sell their own products on their own premises.
- The rise of the Heurige culture, or ("this year") tavern culture, further popularized the sale of wine.
- Austria faced a wine scandal in 1985, after some winemakers were found to be adulterating their wines with diethylene glycol to give them more body.
- To restore its reputation, Austria has initiated some of the toughest laws in the world.
- Austria is divided into 16 distinct areas of production, which cover flatlands and subalpine hills.
- Austria's growing season can stretch up to 200 days.

WINEGROWING REGIONS

- **Niederösterreich (Lower Austria)**

Carnuntum: One-third of its production is red, including Zweigelt, Blaufränkisch, and Portugieser. Wine is often made through Gemischten Satz, or field-blending. The principal white is Grüner Veltliner. The region features deep soils, with climate tempered by Lake Neusiedl and cooling winds.

Kamptal: Home to Austria's largest wine town, the Langenlois, this region takes its name from the Kamp River. The region is famous for both Riesling and Grüner Veltliner, with both wines achieving a marked minerality. The climate is influenced equally by warm air from the Pannonian steppes and cold winds from the north.

Kremstal: Taking its name from the Krems River, this region produces Grüner Veltliner and Riesling, as well as some Pinot Noir and Zweigelt. Like the Kamptal, this area experiences warm air from the Pannonian steppes and cold wind from the north.

Thermenregion: Named after the region's thermal spas, this area produces about one-third reds, with Blauer Portugieser and Zweigelt dominant. Neuberger and Weissburgunder are the dominant whites. Spätrot-Rotgipfler, a blend of white Zierfandler and white Rotgipfler, is unique to this area. The soils are heavy and stony, with a warm dry climate.

Traisental: Viticulture dates back to the Bronze Age, before the Romans arrived. The region is known for Weissburgunder and Blauburgunder, but Grüner

Veltliner remains the dominant grape. The climate is mild and the soils are heavy. Many vineyards are terraced.

Wachau: A region known for its steeply-terraced vineyards, featuring Grüner Veltliner and Riesling. A local vintners group, Vinea Wachau, has designated its own classifications: (a) Steinfeder – light dry wines up to 11% alcohol, (b) Federspiel – medium-bodied dry wines under 12.5% alcohol, (c) Samragd – full-bodied, dry wines over 12.5% alcohol, usually only produced in top vintages.

Wagram (formerly Donauland): The home to the Federal College of Viticulture, as well as the First Association of Organic Winegrowing. Grüner Veltliner is king, but the unrelated Frühroter Veltliner is the specialty. The area, bisected by the Danube, features a mild continental climate.

Weinviertal: Austria's largest wine district, with an eastern section known for Grüner Veltliner and many grapes destined for sparkling wine production. The western section is known for GV, as well as Weissburgunder, although the town of Retz, with its warmer climate, produces reds such as Zweigelt, Blauer Portugieser and Pinot Noir.

- **Burgenland**

Neusiedlersee: Named after Central Europe's only steppe lake, Lake Neusiedl. The vineyards are distinctly flat, with some saline soil. Popular whites include Chardonnay, Welschriesling, Neuburger and Weissburgunder. Reds include Zweigelt, St. Laurent and Blaufränkisch, with some Pinot Noir, Merlot and Cabernet.

Neusiedlersee-Hügelland: Home of the Austrian Wine Academy. Produces red, dry white, and sweet wines. One wine, Ausbruch, is a botrytized wine made near Rust. Chardonnay, Sauvignon Blanc, Zweigelt and Blaufränkisch also do well.

Mittelburgenland: A hilly and wooded area devoted to 80% reds, specifically Blaufränkisch.

Südburgenland: A warm district with iron-rich soil, dominated by Blaufränkisch, Zweigelt, and Welschriesling. Uniquely, this area is famous for Uhdler, a nearly-extinct *Vitis labrusca* varietal.

- **Steiermark (Styria)**

Südsteiermark: Volcanic soils and a cool climate make Traminer the specialty, but Welschriesling, Chardonnay and Zweigelt are also grown. Most wine is sold in buschenshanke, family-owned farm outlets.

Südsteiermark: The most famous of Styria's wine districts. Known for Sturm, grape must served during harvest, and drunk with roasted chestnuts. Sauvignon Blanc and Chardonnay (known as Morillon) are popular whites.

Weststeiermark: Known for a tart, herbal rosé known as Schicher, made from Blauer Wildbacher grapes (and the only district where this grape is allowed).

- **Wein (Vienna)**

Wein: Home to Austria's Heurige culture, which refers to current-vintage wine and vintner-owned taverns. Principal varietals include Grüner Veltliner, Riesling and Chardonnay. The region also produces Gemischter Satz ("mixed set") a field blend.

WINE LAWS

- Although their wines are markedly different, Austria's wine laws are similar to those of Germany.
- Districtus Austriae Controllatus (DAC) mandates that only one or two of the most outstanding varietals can be used in production.
- The four DACs: Weinviertal (GV), Traisental and Kremstal (GV and Riesling), and Mitternberg (Blaufränkisch).
- Wines are ranked according to grape sugar levels, which are measured in Klosterneuburger Mostwaage (KMW).
- As with Germany, top-level wines must undergo chemical and sensory analysis to verify compliance.
- Austrian wine features two additional levels within the prädikatswein category: Ausbruch and Strohwein.
- The prädikatswein hierarchy, in ascending order:
 - Spätlese
 - Auslese
 - Beerenauslese/Eiswein/Strohwein
 - Ausbruch
 - Trockenbeerenauslese

As with Germany, Eiswein is made from frozen grapes of at least beerenauslese quality. Strohwein is made from grapes that are air-dried on straw mats for at least three months, then pressed and fermented. Ausbruch is made by adding the must of late-harvest grapes to botrytis-affected must from the same vineyard (then the two are co-fermented). Bergwein is a tafelwein-level wine made from grapes grown on extremely steep hills, and is considered a higher-quality wine in some respects.

WINE REGIONS: FRANCE

OVERVIEW

- Vin de table can originate from anywhere in France and has few specific regulations. It represents about one-eighth of French-produced wine, and is mostly consumed locally.
- Vin de pays is the next tier, and also features very few restrictions, but the wines must originate from one of the 152 delineated areas. Accounts for one-third of French wine.
- The newly created Vin de Pays des Vignobles allows blending across regions.
- There are six large vin de pays areas, the best known of which is Vin de Pays d'Oc, which has produced up to 40% of the wine in this category.
- The next tier, VDQS, represents just 2% of French wine production, and is generally seen as a probationary status for wines that have potential to become AOC wines.
- AOC designation mandates varietal, harvesting, yield, viticultural practices, vinification and alcohol content.
- More than half of French wine is at the AOC level.
- Some general AOCs may have the term "supérieur" added, which simply designates an alcohol level of 1% higher than standard.

BORDEAUX

- Was under British rule for 300 years, following the marriage of Eleanor of Aquitaine and Henry II.
- 297,000 acres under vine, nearly all of which carry an AOC designate, and which produce about 66M cases annually.
- 89% of Bordeaux is planted to red grapes.
- Merlot is the most widely planted varietal in Bordeaux, with 170,000 acres under vine, most of which is on the Right Bank and Entre-Deux-Mers.
- Cabernet is concentrated on the Left Bank, and represents 69,000 acres.
- Almost all of Bordeaux's white grapes are planted on the Left Bank and in Entre-Deux-Mers.
- The Bordeaux wine trade is a relationship between producers and brokers, creating a disconnect between production and sales.
- The dry white wines of Graves contain more Sauvignon Blanc than Sémillon or Muscadelle.
- The sweet wines are primarily Sémillon, with a smaller elements of Sauvignon Blanc and Muscadelle.
- On the **Left Bank**, the six communes of the Haut Médoc, from north to south are: St.-Estéphe, Pauillac, St.-Julien, Listrac, Moulis, Margaux.
- In Graves, communes produce both red and dry white wines; Pessac-Léognan is considered the best appellation for Bordeaux's dry whites.
- Sauternes, Barsac and Cérons are Bordeaux's premier sources of sweet white wine.
- Left Bank soils are primarily gravel of varying depths, mixed with sand and pebbles from the Pyrenees.
- **Entre-Deux-Mers** is mainly a dry white appellation; most of the Merlot grown there is simply Bordeaux AC.

- Within Entre-Deux-Mers, Premières Côtes de Bordeaux is a red and sweet white appellation, while Loupiac, Ste.-Croix-du-Mont and Cadillac are sweet white appellations.
- On the **Right Bank**, Côtes de Bourg, Blaye and Premières Côtes de Blaye are red and dry white appellations.
- Canon-Fronsac, Fronsac, Lalande-de-Pomerol, Pomerol, and St.-Émilion are red wine appellations.
- Other red wine appellations on the Right Bank include Côtes du Castillon and Bordeaux-Côtes de Francs, as well as the satellites of St.-Émilion: Montage-St-Emilion, Lussac-St-Emilion, St. Georges-St-Emilion, Puisseguin-St-Emilion.
- Right Bank soils are complex, with clay, chalk, sand, and some gravel.
- “Côtes de Bordeaux” is used for labeling, but is not an appellation.

BORDEAUX CLASSIFICATIONS

- **The 1855 Classification** – Established by the request of Napoleon III, and includes only Left Bank estates. It ranks 87 properties (61 red, and 26 sweet white). With the exception of the upgrade of Mouton-Rothschild in 1973, the list has never been revised, even though many properties have changed hands.
- **The Cru Bourgeois Classification** – In 1932, a list was first devised to cover all of the Médoc estates not mentioned in the 1855 Classification. It was made official in 2003, and includes nine Cru Bourgeois Exceptionnel, 87 Cru Bourgeois Supérieur, and 151 Cru Bourgeois.
- **The Cru Artisans Classification** – Made official in 2006, this classification lists the 44 small producers from within the Médoc – farming 12.5 acres or less – that have been actively selling their own wines (and thus by-passing the broker system).
- **The Graves Classification** – Names 16 châteaux, some ranked for their red wine, some ranked for their whites, and some ranked for both. The list features no hierarchy, and all estates label their wines as Cru Classé – Château Haut-Brion is included on this list.
- **The St.-Émilion Classification** – Two châteaux, Ausone and Cheval Blanc, earn the top-rank of Premier Grand Cru classé A, while 13 earn the rank of Premier Grand Cru classé B. There are 46 châteaux ranked as Grand Cru classé.

BURGUNDY

- The beginning of Burgundian wine production is believed to have been during the Roman period, around 200 AD.
- Over the centuries, the vineyards were built by the Benedictine and Cisterian monks, but Catholic ownership of property ended with the French Revolution in 1789.
- The Côte d’Or soils are based upon Jurassic limestone and marl that was created when the area was covered by a shallow sea.
- In **Chablis**, the soil is Kimmeridgian, a mixture of limestone, clay and tiny fossilized oyster shells.

- Chablis contains one 254-acre grand cru vineyard which is divided into seven parcels (from largest to smallest): Les Clos, Vaudésir, Valmur, Blanchot, Bougros, Les Preuses and Grenouilles.
- Among the most famous of the premier cru vineyards of Chablis are: Fourchaume, Montée de Tonnerre, Mont de Milieu, Montmains and Vaillons.
- Aside from Burgundy's one grand cru vineyard in Chablis, the **Côte d'Or** contains 32 of Burgundy's 33 grand cru vineyards (24 in Côte de Nuits, eight in Côte de Beaune).
- All grand cru vineyards in Côte de Nuits produce red wines, except for Musigny, which is designated for red and white wines.
- Among the Côte de Beaune, seven produce only whites, while Corton produces mostly red, with a few whites.
- Although Côte de Beaune is famous for its whites, there is five times as much red wine production there.
- **Côte Chalonnaise** produces mostly regional wine, such as Aligoté. The five communal AOCs are: Rully (white, sparkling), Bouzeron (Aligoté), Mercurey (mainly red), Givry (mainly red) and Montagny (white).
- The most important and well-known commune of the **Mâconnais** is Pouilly-Fuissé.
- The best soil of **Beaujolais** is located to the north, and is composed of granite and schist.
- The premium production of Beaujolais is located in 10 communes: St-Amour, Juliéas, Chénas, Moulin-à-Vent, Fleurie, Chiroubles, Morgon, Régnié, Côte de Brouilly and Brouilly.
- "Bourgogne Passe-Tout-Grains" is a Pinot Noir-Gamay blend.

LOIRE VALLEY

- The Loire is the longest river in France, and most of it is flanked by vineyards.
- The **Pays Nantais** is the region closest to the Atlantic, and whites are predominantly white, with most of those being made from Muscadet (also known as Melon de Bourgogne).
- Muscadet de Sèvre-et-Maine is the largest and most important AOC in the Loire.
- "Muscadet sur Lie" is an appellation based upon winemaking technique, in which the wine is allowed to age on its lees, is raked only once, and is bottled directly from its finer lees after wintering.
- **Anjou-Saumur** produces wines of varying styles – red, white, rosé, sweet and sparkling.
- The main red grapes of Anjou-Saumur are Cabernet Franc and Gamay, with some Cabernet Sauvignon, Grolleau and Malbec (known locally as Cot).
- The primary white grape of Anjou-Saumur is Chenin Blanc (sometimes called Pineau de la Loire), with lesser plantings of Sauvignon Blanc and Chardonnay.
- The soils of Anjou-Saumur are varied: gravel terraces, chalk, schist, slate, and volcanic spilite; along with deep granitic loams, similar to neighboring Pays Nantais.
- Anjou-Saumur's red wine appellations include Anjou and Saumur (the two Cabernets), Anjou-Gamay (Gamay), and Saumur-Champigny (the two Cabernets).
- The AOCs for dry whites include Anjou and Saumur (80% Chenin Blanc by law) and Savennières (100% Chenin Blanc).

- There are three rosé appellations: Rosé d'Anjou (mostly from Grolleau, slightly sweet), Cabernet de Saumur and Cabernet d'Anjou (the two Cabernets, slightly sweet).
- Rosé de Loire is a dry rosé that can be produced anywhere in the Loire, but which must contain at least 30% Cabernet.
- The sweet wines of Anjou-Saumur come from Coteaux du Layon and its subregions, Bonnezeaux and Quarts-de-Chaume (all three, 100% Chenin Blanc, and may feature botrytis).
- Saumur Mousseux is a sparkling Chenin Blanc which may contain some of the other grapes in the region (styles can range from white to rosé, dry to semisweet). Anjou Mousseux is similar.
- **Touraine** has a distinct continental climate due to its distance from the Atlantic, with soft yellow-white iron- and magnesium-rich limestone known as tuf or tuffeau (tufa).
- Vouvray and Montlouis-sur-Loire yield wines that are 100% Chenin Blanc, and that cover many styles.
- Three of the Loire's four principal reds are produced in Touraine: Chinon, Bourgeil, and St-Nicholas-de-Bourgeil (all three, at least 90% Cabernet Franc, with optional Cabernet Sauvignon)
- Other notable appellations of Touraine include Cheverny and Jasnières.
- **The Upper Loire** is home to two classic Sauvignon Blancs, Sancerre and Pouilly-Fumé, which are both grown on Kimmeridgian soil.
- Sancerre, in particular, has three different distinct types of subsoil: terres blanches (with Chablis-like fossils), caillottes (little stones) and silex (flint).

CHAMPAGNE

- The 77,000 acres of Champagne are divided into four districts: Vallée de la Marne (PN and PM), Montagne de Reims (Chard and PN), Côte des Blancs (Chard) and Côte des Bar (PN).
- Kimmeridgian chalk underlies the entire Champagne regions, aside from the Côtes des Bar, which features Jurassic marl.
- Romans had mined the chalk for building materials, and many of these former quarries were expanded into wine cellars.
- There is only one sparkling wine appellation for the entire region: Champagne AOC.
- Classification: 17 grand cru, 44 premier cru, 296 cru. Only grapes that come entirely from grand cru or premier cru vineyards can use those terms on the label, but since most wines are blends from different areas, this labeling is rarely seen.

ALSACE

- Given its geography, wines show elements of both French and German styles (and is the only region in France permitted to grow Riesling).
- The soils of Alsace vary from granite, limestone, gneiss, schist and sandstone.
- Alsace features a cold continental climate, and is one of the driest regions of France, due to the rain shadow created by the Vosges Mountains.
- Alsace technically contains several AOCs, but they each feature the same boundaries as the blanket Alsace AOC (different varietals and styles account for these coterminous AOCs).

- In France, only Alsace can designate its wines by varietal, with eight options: Auxerrois, Chasselas, Gewurztraminer, Muscat, Pinot Gris (formerly Tokay d'Alsace), Pinot Noir, Riesling and Sylvaner.
- Varietally labeled Alsatian wines must contain 100% of the varietal.
- Alsace "Pinot" can be any blend of Auxerrois, Pinot Noir (vinified white) or Pinot Gris.
- Alsace Edelzweicker AOC is a white wine blend of any of the two grape varietals listed above.
- "Selections de Grains Nobles" is designated for sweet, Sauternes-style wine affected by noble rot.
- "Vendagne Tardive" designates late-harvest grapes, which may or may not feature botrytis.
- "Crémant d'Alsace" accounts for 20% of Alsatian wine, and can be produced from Auxerrois, Chardonnay, Pinot Blanc, Pinot Gris, Pinot Noir or Riesling.
- Classification: 51 grand cru vineyards are permitted to grow Gewurztraminer, Muscat, Pinot Gris or Riesling at low yields.

THE RHÔNE VALLEY

- Wine production in this area dates back for millennia, possibly as early as 600BC with the Romans in Massalia (present-day Marseille).
- The French AOC system was born in the Rhône in 1923, with regulations specified for Châteauneuf-du-Pape.
- The valley is divided into two regions, which are 32 miles apart, with distinct differences in climate, topography and varietals emphasized.
- The mistral wind from the north has a drying effect, especially in the south, that mandates training vines "en gobelet," as small bush vines.
- **The Northern Rhône** features a continental climate with soils ranging from granite sands, stony clay, limestone atop granite, and some fertile loess soils near the river.
- The Côte Rôtie produces Syrah that may be vinified with up to 20% Viognier, although less than 10% is more typical.
- Mechanization in the Côte Rôtie is impossible due to steep gradients – soils are acidic and based upon mica-schists with sandy topsoils.
- The northern section of the Côte Rôtie is the Côte Brune, which produces powerful, tannic wines from iron-rich clay.
- The Côte Blonde, in the southern section of the Côte Rotie, produces wines with more finesse from light, sandy soil mixed with limestone.
- Condrieu and Château Grillet are white wine appellations focusing upon Viognier.
- St. Joseph produces 90% Syrah, with up to 10% Marsanne or Roussane. The white wines are based upon Marsanne, with a fraction of Roussane for blending.
- Crozes-Hermitage is the largest AOC in the northern Rhône, and allows up to 15% white grapes in its Syrah blends.
- The heralded Hermitage region produces Syrah with up to 15% Marsanne or Roussane, although up to 25% of its production is white (again, from Marsanne or Roussane).
- The soils of Hermitage vary from sandy clays, alluvial terraces, sandy gravel over granite bedrock and composite "puddingstone" to isolated calcareous substrata.
- Cornas produces 100% Syrah upon soils of granite, alluvial deposits and limestone.

- **The Southern Rhône** features flat terrain with gradual slopes, a Mediterranean climate, with a sizeable area eligible to make wine under the Côtes du Rhône appellation.
- The Côtes du Rhône is 95% red, although white and rosé can also be produced from any of the Rhône varietals.
- The Côtes du Rhône-Villages, producing 99% red wine, contains 16 communes, including Rasteau, Cairanne and Seguret.
- Châteauneuf-du-Pape makes 95% red and 5% white from any of its specified 13 grape varieties.
- The famed stony soils of Châteauneuf – with its football-sized “galets” – are actually only found in parts of the AOC.
- Most Châteauneuf contains about two-thirds Grenache in the blend.
- Gigondas is a former Côtes du Rhône-Villages commune that was the first to achieve cru status. It produces mostly reds, with a little rosé.
- Vacqueyras was elevated from Villages to cru in 2000, produces 95% red, and is often considered a great value wine.
- “Muscat de Beaumes-de-Venise” is a vin doux naturel produced from Muscat and fortified with grape spirits.
- Rasteau makes a sweet red, white, or rosé vin doux naturel, mostly from Grenache.
- Tavel is a rosé AOC, producing wines from Grenache and Cinsault.

THE SOUTH OF FRANCE

- The **Languedoc-Roussillon** is the world’s largest vineyard area, with 700,000 acres under vine.
- The Languedoc AOC was created in 2007, giving all growers in the region the opportunity to move up from Vin de Pays d’Oc to AOC status, as long as they use traditional grapes, such as Grenache, Syrah, Mourvèdre, Cinsault, Carignan, or various white grapes.
- Located in the western Languedoc, Fitou makes red wines only (primarily from Carignan, Grenache, Mourvèdre and Syrah), while Minervois and St. Chinian produce reds from similar varietals, along with some white and rosé.
- Côtes du Roussillon produces red, white or rosé, while Côtes du Roussillon-Villages produces only reds (Carignan, with Syrah, Mourvèdre or Grenache)
- Banyuls, Rivesaltes and Maury produce red or white vin doux naturels from Grenache Noir.
- Blanquette de Limoux (Mauzac-based) and Crémant de Limoux (80% Chardonnay and Chenin Blanc) are two AOCs for sparkling wine.
- **Provence** has made a significant industry from rosé wines, which represent half of the region’s production.
- Bandol AOC produces rosé and the finest red wines of Provence, made from Mourvèdre with Grenache and Cinsault.
- In the **Southwest**, Bergerac is the largest AOC, making wine from many of the red and white Bordeaux varietals. Within this region, Montbazillac and Saussignac make Sauternes-style wines.
- Cahors is known for its “black wines” made from Malbec (known locally as Cot), while neighboring Gaillac produces many styles from Duras, Syrah, Fer, Len de l’El and Sauvignon Blanc.

- Along the Basque border, Madiran produces reds from Tannat and Bordeaux varietals, while Jurançon produces dry and sweet whites, and Irouléguay produces red, white and rosé.

WINE REGIONS: GREECE

OVERVIEW

- Greece has a 2,000-year history of wine production, although it has definitely had long extended periods of disrepute.
- Europe's oldest vineyards are found in eastern Crete.
- The Mediterranean climate with alkaline and volcanic soils lends itself to viticulture.
- Most Greek vineyards are planted on hillsides to escape the heat, with just 20% planted on flatlands.
- In contrast to most other winegrowing regions, Greek vineyards have north-facing orientation in order to avoid over-ripening.
- Native Greek varietals continue to dominate, although more commercially viable grapes are becoming more common.

WINEGROWING REGIONS

- In northern Greece, Macedonia is noted for heavy reds and crisp whites, while Eastern Macedonia features a new generation of winemakers focused upon international varietals.
- Ipiros is a rugged mountain region that produces uniquely rare wines, while Thessaly produces mainly bulk wines, with some boutique producers emerging at the base of Mount Olympus.
- Central Greece is the home of soft whites and retsina, while Peloponnesus offers warm reds and flowery whites.
- The regions of Nemea and Patras feature international varietals, some of which are blended with ancient Greek varietals. Mavrodaphne of Patras is a dark, sweet dessert wine, and perhaps Greece's best-kept secret.
- The Greek islands, led by Crete, produce many wines that are consumed by the tourist trade.

WINE LAWS AND CLASSIFICATION

- **Quality Wines** fall into two categories: sweet fortified wines (OPE) and non-fortified wines (OPAP). There are 25 OPAP appellations and eight OPE appellations. These wines account for 15% of Greece's production.
- **Topikos Oinos (Regional Wines)** are unencumbered by appellation rules and many of these upstarts have actually eclipsed their OPAP and OPE counterparts. These wines are leading Greece into the international arena.

- **Epitrapézios Oinos (Table Wines)** are produced without restriction or geographic designation, and total about 50% of the country's production. Offers the best and the worst.
- **Retsina** is Greece's best-known wine product, and a bad idea overall.

THE GRAPES

- **Whites:** Asyrtiko (Santorini), Roditis (Patra), Savatiano (Attica), with Athiri (Santorini), Moschofilero (Pelo), Debina (Ipiros), Robola (Cephalonia) and Vilana (Crete).
- **Reds:** Agiorgitko (Nemea), Xynomavro (the north), Mandilaria (Aegean islands) and Limnio.
- **Sweet wine:** Mavrodaphne (Patra), Muscat (Samos-Limnos) and Asyrtiko (Santorini)
- **International:** Chardonnay, Sauvignon Blanc, Cabernet Sauvignon, Merlot, Syrah

WINE REGIONS: ITALY

OVERVIEW

- Italy has been second to France in terms of wine production, but in 2006 took the lead, perhaps for good.
- In the Northwest there are six sections: Valle d'Aosta, Piedmont, Liguria, Lombardy, Emilia-Romagna, and Tuscany.
- The Northeast contains three sections: Veneto, Trentino-Alto Adige, and Friuli-Venezia Giulia.
- In Central Italy: Latium, Molise, Umbria, Abruzzo, and the Marches.
- In Southern Italy, including the islands: Campania, Apulia, Basilicata, Calabria, Sicily and Sardinia.

WINE LAWS

- Italy was the first country to enact wine laws, though its modern system was modeled in 1963 after the French system.
- In 1980, five areas were awarded DOCG status: Barolo, Barbaresco, Chianti, Brunello di Montalcino and Vino Nobile de Montepulciano. There are now 36 DOCG wines.
- Wines that are considered for DOCG status must be DOC for at least five years, and a subzone or specific style of wine can earn DOCG status independently of the rest of the region.
- DOCG wines bear a government seal and may not be sold in formats larger than 5L.
- About 320 DOC zones have been established, and these wines represent the bulk of Italy's classified wine production.

- Like the DOCG wines, Piedmont's DOCs are subjected to chemical and taste evaluation, but the other DOCs are not.
- The rigidity of the DOC system spawned the "Super Tuscan" movement in the 1970s, which now features more than 600 wines.
- IGT wines are the equivalent of the French vin de pays, which allows the Super Tuscan to be classified above simple table wines.
- Vino da tavola forms the base of Italy's quality pyramid, and these wines represent the bulk of the country's wine production.
- In order to encourage winemakers to elevate their status to IGT, vino di tavola cannot carry a vintage, varietal designation, or any geographical indications.

WINEGROWING REGIONS

- **Valle d'Aosta** – The smallest of Italy's 20 regions, the valley is formed by the Alps to the north and the Gran Paradiso to the south. The mountains deflect the cold winds, but also keep the rainfall at the lowest levels in Europe. The vines thrive in this dry, protected climate, often planted in terraces that place the vineyards at the highest elevations in Europe. The vines are buried in snow from autumn to spring. Twenty varieties are authorized for cultivation. Reds: Nebbiolo (known as Picoutener), Vien de Nus, Fumin, Mayolet, Petit Rouge, Pinot Nero (Pinot Noir), Gamay and Syrah. Whites: Moscato (Muscat de Chambave), Pinot Grigio (Malvoisie), Blanc de Morgex, Prié Blanc, Müller-Thurgau, Chardonnay and Petit Arvine.
- **Piedmont** – A prolific source of high-quality wines, the region's name literally means "foot of the mountains." It is the second-largest region in Italy and features the most DOCs (45) and DOCGs (9). The fertile Langhe and Monferato hills, where most of the DOCG wines are grown, are comprised of rocky volcanic soil and clay marls. Barolo is produced with 100% Nebbiolo, and requires three years of aging (two in cask). To be designated as a riserva, the wine must be aged for at least five years. Barbaresco is also 100% Nebbiolo, although the wine only requires two years of aging (one in cask), and just four years for the riserva level. Gattinara must be at least 90% Nebbiolo (known as Spanna in the north), with the addition of Bonarda and Vespolina. The wine must age at least three years (one in oak or chestnut casks), while a riserva must age four years (two in cask). Ghemme is produced with at least 75% Nebbiolo, with Vespolina and Bonarda. The wine requires three years of age (four for riserva).

Roero is also based upon Nebbiolo, although there is a white Roero made from Arneis. Dolcetto Superiore de Dogliani uses Dolcetto, while Asti is made from Muscat. Brachetto d'Acqui is a sweet sparkling red made from Brachetto. Gavi, the most popular white, is made from Cortese. Other native red grapes include Freisa and Grignolino.

- **Lombardy** – Bisected by the river Po, this area has been a crossroads of trade since ancient times. The northern portion is mountainous, while the southern portion is the wide, flat river valley. The Valtellina Superiore district includes the subzones of Grumello, Inferno, Maroggia, Sassella, Stagafassli and Valgella. The wines must be 90% Nebbiolo (known locally as Chiavenesca), and aged for at least two years (one in oak).

Wines with three years of aging can be labeled riserva. Sforzato di Valtellina is a DOCG wine made from late-harvest Nebbiolo.

The Oltrepò Pavese is noted for its fine white wine, many of which serve as the base for its fantastic sparkling wines. The area also features some full-bodied reds, and is a center for Pinot Nero, which is used mostly for sparkling.

Franciacorta produces spumante that undergoes a Champagne-style second fermentation. These wines must be produced with Chardonnay, Pinot Bianco or Pinot Nero. A Franciacorta rosato may be produced with at least 15% Pinot Nero. A crémant version of Franciacorta is also permitted, but no Pinot Nero may be used. Franciacorta wines may be vintage dated, but must spend at least 30 months on the lees, and cannot be released until 37 months after harvest. Nonvintage versions must remain a minimum of 18 months on the lees, and cannot be released until 25 months after harvest.

- **Trentino-Alto Adige** – The northernmost region of Italy, Alto Adige and Trentino comprise two distinct parts of the region. In Alto Adige, German is actually the dominant language, and the wine styles reflect this heritage. To the south, Trentino is primarily Italian-speaking. The region is known mostly for its whites, such as Pinot Grigio, Chardonnay, Pinot Bianco and Sauvignon Blanc, but does produce some red, most notably Teroldego. The vines in this region are terraced upon alluvial soils of gravel and sandy clay. The climate is variable.
- **Friuli-Venezia Giulia** – Has recently become a bastion of modern winemaking, after languishing in obscurity. Following a chain of various infestations, international varietals such as Cabernet Sauvignon, Chardonnay, Pinot Noir, Riesling and Sauvignon Blanc have become most important. Ancient varietals, such as the red Refosco, and the white Verduzzo, Tocai and Picolit are experiencing renewed popularity. The region features two DOCGs: Ramandolo for Verduzzo and Colli Orientali del Friuli Picolit (for Picolit).
- **Veneto** – Italy's largest source of DOC-level wine, the region can be divided into two distinct sections: A flat, delta-like lagoon area formed by alluvial deposits, and a mountainous region that includes Alpine foothills and slopes. Although the climate is varied, the terrain contains features that mitigate any extremes. The Veneto contains three DOCG wines: Recioto di Soave, Soave Superiore, and Bardolino Superiore. Soave is a white wine based upon the indigenous Garganega varietal, while the Recioto version of this wine mirrors the techniques described with Valpolicella below. Bardolino is made from the same grapes as Valpolicella, but in different proportions. When vinified as a rosé, this wine is known as Chiaretto.

Among the 25 DOC wines, Valpolicella is the most celebrated, and contains a blend of 40-80% Corvina Veronese (or Corvinone) and 5-30% Rondinella, plus up to 15% other varietals, such as Molinara, Barbera or Sangiovese. Although a dozen communes can produce within this appellation, only the original five can feature the term classico on the designation. Superiore on the Valpolicella label means the wine has been aged at

least one year and is at least 12% alcohol. Amarone della Valpolicella and Recioto della Valpolicella also hail from this district. Both wines feature grapes that are air-dried before pressing. Wines fermented to dryness become Amarone; those with some residual sugar (as well as some carbonation) become Recioto. An IGT wine, Ripasso involves the traditional technique of fermenting a basic Valpolicella wine on Amarone lees.

Bianco di Custoza and Laguna are delicate whites based upon the Trebbiano grape, while Gambellara is produced with Garganega and is made in both dry and sweet versions. Prosecco di Conegliano-Valdobbiadene can be dry, still, sparkling or sweet.

- **Liguria** – Also known as the Italian Riviera, mountains descend to the sea throughout, leaving very few flatlands with unfertile soils. About 100 different vines are cultivated in Liguria, with the most widely planted reds being Ciliegolo, Dolcetto, Barbera, Sangiovese, Canaiolo, Merlot, Cabernet Franc, Rossese and Alicante. Whites include Albarolo, Bianchetta, Bosco, Pigato, Vermentino, Moscato Bianco, Albana, Greco Malvasia and Trebbiano. Cinque Terre is a white wine that is produced in the remote province of La Spezia – workers must harvest by boat in some area, and lower themselves to vineyards via ropes or ladders in other areas.
- **Emilia-Romagna** – A large wine-producing area that is divided among Emilia to the west and Romagna to the east. Emilia is home to three Lambrusco DOCs, which are light sparkling red wines made in either dry or sweet styles from the Lambrusco grape. White wines are made from Malvasia, Trebbiano and Ortugo. Romagna boasts Italy's first white DOGC, Albana di Romagna, made from the Albana grape. Another notable white is Pagadebit, while reds include Sangiovese and Cagnina.
- **Tuscany** – Between the tradition of Chianti and the emergence of the Super Tuscans in the 1980s, Italy owes much of its reputation to Tuscany. Sangiovese is prevalent in Tuscany, with many clones exhibiting many unique and diverse traits. Chianti DOCG is Italy's most widely sold wine, and Chianti Classico (the original zone of production) qualifies as its own smaller DOGC. Originally, Chianti represented a mandatory blend of Sangiovese with Canaiolo Nero and the white Malvasia and Trebbiano grapes, but now Chianti can be 100% Sangiovese, but must at least comprise 75% of the blend (with no other grape comprising more than 10%). Permissible blending grapes include Canaiolo, Malvasia, Trebbiano, or even Cabernet Sauvignon. Chianti Classico must be at least 80% Sangiovese, with no white grapes in the blend. The seven other Chianti zones: Colli Arentini, Colli Fiorentini, Colli Senesi, Colline Pisane, Montalbano, Montespertoli and Rufina.

Brunello di Montalcino DOCG is made with 100% Brunello grapes, a Sangiovese clone with a propensity to develop brown skins when ripe. The wines must be aged at least four years (three in barrel, followed by at least four months in bottle). Riservas require an extra year of age, followed by at least six months in bottle. Vino Nobile di Montepulciano is also a Sangiovese, made from at least 70% Prugnello Gentile (yet another clone). Varietals such as Canaiolo may finish the blend, with no more than 20% of one varietal present. The wine requires two years in wood; three years for riserva.

Carmignano DOCG contains at least 70% Sangiovese, up to 20% Canaiolo, and up to 15% Cabernet Franc or Cabernet Sauvignon. A maximum of 5% of other varieties may also be added. Carmignano must be aged two years (at least one in oak or chestnut), with riserva requiring another year in wood.

Maremma, the coastal region of Tuscany, was the birthplace of the Super Tuscan movement, beginning with Sassicaia in 1968. The Bolgheri DOC allows red with up to 80% Cabernet or Merlot or 70% Sangiovese, along with white varieties such as Vermentino or Sauvignon Blanc. Morellino di Scansano DOCG requires 85% Morellino (another Sangiovese clone). Tuscany's best known white is Vernaccia di San Gimignano, produced from the Vernaccia grape. It was the first wine awarded a DOC (1966), earning its DOGC in 1993. Vin Santo is a maderized dessert wine made in many places, but renowned in Tuscany. Malvasia, Grechetto and Trebbiano grapes are aged in rafters to concentrate, and a later aged in extreme temperatures for two to six years.

- **The Marches** – The region features mountains among rolling hills. Conero DOCG is made primarily from the Montepulciano grape, with up to 15% Sangiovese in the blend. The other DOGC in the region, Vernaccia di Serrapetrona, is a red sparkling wine from Vernaccia, produced either sweet or dry. Among DOCs, Verdicchio dei Castelli di Jesi and Verdicchio di Matelica are made from the white Verdicchio grape, and are available in sparkling versions. Rosso Piceno is a Montepulciano-Sangiovese blend requiring 35-70% of the former and 30-50% of the latter.
- **Umbria** – The region is perhaps best known for Orvieto, a white DOC made from Grechetto and Trebbiano grapes, with up to 40% of other whites, such as Malvasia, Drupreggio, and Verdello. The two DOCG wines are Sagrantino di Montefalco (made from Sagrantino) and Torgiano Riserva (70% Sangiovese).
- **Latium** – This volcanic region is most famous for Frascati – the prince of Castelli Romani wines – and Est! Est!! Est!!! di Montefiascone. Both wines blend Trebbiano and Malvasia. Red wines are primarily Montepulciano.
- **Abruzzo** – A recent revival has made this mountainous region Italy's sixth-largest producer. Its primary wines are the white Trebbiano d'Abruzzo and the red Montepulciano d'Abruzzo (although the Colline Teramane area has actually been elevated to DOCG level). Trebbiano d'Abruzzo allows for 15% other grapes, such as Malvasia, Cocociola, and Passerina. Montepulciano d'Abruzzo permits 15% other grapes, while the Colline Teramane DOCG requires at least 90% Montepulciano, with the balance being Sangiovese only.
- **Molise** – The region is largely mountainous and hilly, with some plains along the sea. The coastal strip features a Mediterranean climate, while inland areas are more continental. The three DOCs: Biferno, Pentro di Isernia, and the nearly region-wide Molise.
- **Apulia** – Rivals Emilia-Romagna as Italy's largest wine-producing region, and has produced wine since 2000BC. The traditional reds are made from Primitivo, among

many others. Highly regarded DOCs include Salice Salentino, Castel del Monte Rosso, Primitivo di Manduria, San Severo, Locorotondo, Martina and Castel del Monte Bianco.

- **Campania** – A rich and fertile region in the shadow of Vesuvius. The best-known wine is Taurasi, made from at least 85% Aglianico, and dubbed “The Barolo of the South” for its great aging potential. Taurasi may also feature Piediroso, Sangiovese and Barbera in the blend. It must age three years (one in wood), while riservas are aged for four years (18 months in barrel). Modeled after Falernian, a Roman favorite of 3500 years ago, Falerno del Massico is a red blend of Aglianico, Piediroso, Primitivo, and Barbera. The volcanic tufa soil yields noteworthy whites, as well: Fiano d’Avellino, Greco di Tufo, and several Falanghinas.
- **Basilicata** – Features volcanic, mineral-rich soils, and is one of Italy’s most mountainous regions. Just three DOCs: Agliano del Vulture, Matera, and Terre dell’Alta Val d’Agri.
- **Calabria** – Almost entirely mountainous or hilly, with varying climates, though vines tend to do well. Wines are principally red or rosé, from grapes such as Gaglioppo, Greco Nero, Magliocco Canino, Nerello Mascalese and Sangiovese. The famous DOC Cirò is produced from the Gaglioppo grape, and has been for thousands of years.
- **Sicily** – A large wine-producing region, although only 2% qualifies as DOC. Its first DOCG, Cerasuolo di Vittoria, is produced from Nero d’Avola. Many Sicilian vintners disdain the DOC system, and a “Q” on the label will often signify the wine has met regional standards. Marsala DOC for fortified wine.
- **Sardinia** – Rocky, granitic soils are not conducive to agriculture, and vines are trained low to the ground to avoid wind exposure. Some theorize that Phoenicians may have produced wine here 5,000 years ago. The region’s one DOCG, Vermentino di Gallura, is produced with Vermentino grapes and up to 5% of other authorized varieties. There are no minimum aging requirements. Important reds include Cannonau (Grenache), Monica and Carignan.

WINE REGIONS: NEW ZEALAND

OVERVIEW

- New Zealand is actually comprised of two islands, the North Island and the South Island.
- Viticulture dates back to 1819, when grapes were first planted by the Reverend Samuel Marsden.
- Commercial plantings began in Marlborough in 1973 with many of the classic French varieties.

- From 1997 to 2007, the number of wineries doubles and the numbers of acres devoted to vineyard tripled. The top three varietals are Sauvignon Blanc, Pinot Noir and Chardonnay.
- **Sauvignon Blanc** tends to fall into two styles: Northern (Hawkes Bay and farther north) and Southern (the South Island and Wellington regions).
- The Northern style of Sauvignon Blanc tends to be more ripe, while the long cool growing condition in the southern region produce vibrant fruit flavors with crisp acidity.
- Nearly 85% of Sauvignon Blanc is planted in Marlborough, with most of the remainder in Hawkes Bay.
- **Pinot Noir** has become the most widely planted grape in the country, due to overall demand and as a sparkling wine component.
- In Martinborough, the deep stony and silt loams over gravel help to produce the country's most noteworthy Pinot Noir.
- Marlborough and Nelson also produce vibrant Pinot Noir, however, from silty alluvial soils (though much goes to this regions sparkling wine production).
- **Chardonnay** does well throughout the country, from Auckland and Northland (rich, ripe profile), to Gisborne (soft and lush), to Hawkes Bay (concentrated).
- The direct importation of clones from Burgundy has resulted in a proliferation of new material.
- Cabernet and Merlot are also present, with 75% of these vineyards planted in Hawkes Bay. Pinot Gris and Riesling have also been on the rise.

WINEGROWING REGIONS

- **Northland** – The smallest of New Zealand's 10 regions. The vineyards are concentrated in the main areas: Kaitaia in the northwest, the Bay of Islands in the northeast, and near Whangarei, Northland's largest city. Northland is one of the country's warmest areas, which is conducive for Cabernet Sauvignon, Merlot and Chardonnay. Soils vary from clay over sandy-clay to free-draining volcanic structures.
- **Auckland** – Henderson, Kumeu and Huapai are the three main winegrowing districts. Chardonnay, Merlot, and Cabernet Sauvignon are the most popular varietals, with Sauvignon Blanc and Semillon represented, as well. Auckland's soils are mainly shallow clays over hard silty-clay subsoils or sandy loam. Other notable districts are Waiheke Island, Matakana and Clevedon.
- **Waikato / Bay of Plenty** – These are small, but steadily expanding regions, with vineyards dotted among farmland. Main varietals are Chardonnay, Cabernet, and Sauvignon Blanc. The climate is moderately warm, with soils of heavy loam over clay.
- **Gisborne** – This region boasts the world's most easterly vineyards, and is dubbed the "Chardonnay capital of New Zealand." Red grapes comprise just 12% of the total acreage. Long sunshine hours combine with alluvial loams over sandy or volcanic subsoil. Gisborne produces a significant amount of sparkling wine.

- **Hawkes Bay** – New Zealand’s second-largest wine region, with a varied topography. Ripening times can vary as much as three weeks, whether grapes are grown on the hot shingle soils of Gimblett Road, or in the cool higher-altitude vineyards in the center of the region. Chardonnay is the most widely-planted grape, but reds are well represented, with Merlot, Cabernet Sauvignon, Cab Franc, Syrah and Pinot Noir. Like Gisborne, sparkling wine is a key production.
- **Wellington** – Home of just one wine district, Wairarapa, which features the subdistrict (and town) of Martinborough. Pinot Noir receives the most acclaim here, with Sauvignon Blanc planted as well. Its reputation certainly eclipses its small production.
- **Marlborough** – Although the first vines were only planted in 1973, the region has become New Zealand’s largest and best-known winegrowing region. In the Wairau and Awatere valleys, Sauvignon Blanc thrives on free-draining alluvial loams over gravelly subsoils. The region receives abundant sunshine with cool nights. Pinot Noir planting represent a distant second, followed by Chardonnay and Riesling. Marlborough is the country’s most acclaimed sparkling wine producer as well.
- **Nelson** – The eighth-largest wine region, with pockets of vineyards on the Waimea Plains and the rolling hills. The region is unusually situated on the western side of New Zealand, although mountains to the west provide a rain shadow. Cool grapes do well, such as Sauvignon Blanc, Pinot Noir, Chardonnay, Pinot Gris, and Riesling.
- **Central Otago** – New Zealand’s highest and the world’s most southerly wine region, and the country’s only true continental climate. Soils also differ greatly, with heavy mica and schist within silt loams. The fourth-largest winegrowing region, producing mostly Pinot Noir, with some Pinot Gris and Chardonnay.

WINE REGIONS: PORTUGAL

OVERVIEW

- Although Portugal is known for its fortified wines, Port and Madeira, the country also produces many table wines, which are sold by large négociant-style firms.
- Most of Portugal features a maritime climate, although it becomes more Mediterranean towards the inland and the south.
- The Portugese quality pyramid, from least- to most-heralded: Vinho de Mesa, Vinho Regional (VR), IPR, and DOC.

WINEGROWING REGIONS

- **The North**

Vinho Verde – One of the few regions in Portugal that produce more white than red (70-30). The Vinho Verde DOC is Portugal's largest DOC, covering the same territory as the Minho VR. Vines are usually trained in a high pergola fashion to alleviate the effects of humidity. White Vinho Verde is made from Alvarinho, Arinto (Perdernã), Loureiro and Trajadura. These wines are high in acidity and can be slightly effervescent. Red Vinho Verde is made primarily from Espedreiro and Vinhão.

Porto – Located within the Douro Valley, the region has three subregions: Baixo Corgo, Cima Corgo and the Douro Superior. Much of the 95,000 acres under vine are terraced, though only 64,000 acres are authorized for Port. One-third of this total is located within the Cima Corgo. "Patamares" are terraces just wide enough for mechanization. "Vinhas ao alto" are vertical plantings. The soil in the Douro is primarily Pre-Cambrian schist, which is acidic and low in magnesium, phosphorous and potassium, requiring correction with lime and fertilizers. Because of the terrain, rainfall averages 40 inches in the lower Douro, but only 20 inches in the upper Douro. Temperatures increase from west to east, as well.

The Douro Valley – Demarcated back in 1756, this valley is one of the oldest DOCs in the world. Only about half of the wine made in the Douro is destined for Port (some are declassified grapes, while others are expressly grown for unfortified wine). Wines made from nontraditional varieties cannot qualify for the DOC, but instead use the Duriense VR for labeling. Whether for Port or unfortified wines, the classified grapes are the same (there are 80), but the five most recommended reds are: Touriga Nacional, Touriga Franca, Tinta Barroca, Tinta Roriz (Tempranillo) and Tinta Cão. For whites: Gouveio (Verdelho), Malvasia Fina, and Viosinho.

Trás-os-Montes – One of Portugal's smallest regions, this DOC produces mostly red wines from the arid, granitic terrain.

- **The Center**

Beiras – The Bairrada DOC produces 70% red or rosé, with reds made from at least 50% of the tannic grape, Baga. Whites are made from Maria Gomes, Bical, Cercial and Arinto, among others. The region is comprised of gently sloping hills with clay soils and limestone subsoils. The Dão DOC is surrounded by mountains and features granitic and sandy soils. Here, 90% of production is red, based upon Touriga Nacional. The principal white grape is Encruzado.

Estremadura – This is Portugal's second-largest producer after the Douro. The climate is maritime and Mediterranean. The Bucelas DOC is a small white wine region, with an eponymous wine popularized by Shakespeare, made with Arinto and some Esgana Cão (Sercial). Colares DOC is planted upon sand dunes with the vines anchored in clay subsoil. Ramisco is the dominant red grape, Malvasia the dominant white. Carcavelos

is a small fortified wine region with DOC status. The wine has red and white versions. The reds are produced with Castelão and Preto Martinho, while the whites are produced with Galego Dourado, Ratinho and Arinto. The wine is sweetened with abafado, an unfermented fortified grape juice.

Ribatejo – This large DOC produces red, white, sparkling and fortified wines. The climate is mild and the soils are rich and alluvial. Whites: Fernão Pires, Arinto and Talia (Ugni Blanc). Reds: Castelão.

- **The South**

Setúbal – This DOC region is known for fortified Muscat, though blends may contain up to 33% other varieties. If the wine contains at least 85% Muscat, then EU labeling permits the wine to be called Moscatel de Setúbal. Three types of Muscat are permitted: Moscatel Graúdo, Moscatel do Douro, and Moscatel Roxo (for reds). The wine is fermented, fortified, then macerated for five or six months, aged at least two years, then bottled.

Terras do Sado – This region features a warm maritime climate. As a VR, many grapes are permitted, with indigenous varieties alongside international varieties. Production is 75% red.

Alentejo – This large DOC, with accompanying VR Alentejano, encompasses one-fourth of Portugal. Half of the world's cork supply comes from here. Reds outnumber white significantly, due to the extremely hot weather.

- **Madeira** – Please see the “Fortified Wine” section.

PORT WINE LAWS

- **The Cadastro** – Regarding Port, this system assesses 12 factors for each vineyard, giving each a final ranking of A through F. This ranking, along with harvest conditions, determines the “benefício” or volume of Port a vineyard is allowed to produce. The 12 criteria are: Soil composition, production, slope, stoniness, locality, altitude, shelter, sun exposure, varieties, training method, age of vines, and density.
- **Porto's Governing Bodies** – The Casa do Douro and the CIRDD are the regulatory bodies of the region. All growers are members of the Casa, while the CIRDD represents the controlling growers and shippers. The Port Wine Institute (IVP) has overall control over Port production, with inspectors that can assess any lodge at any time.

WINE REGIONS: SOUTH AFRICA

OVERVIEW

- Although cooperatives handle nearly 85% of South Africa's wine production, those numbers are shifting to estate-bottled wines.
- The Benguela Current keeps coastal vineyard cooler than might be expected for that latitude, although inland plantings can be hot and arid.
- In 1679, about 20 years after the country was settled, thousands of non-indigenous oaks were planted to buffet the gale Cape Doctor winds.
- In the 18th century Vin de Constance or "Constantia" became one of the most sought-after wines in the world (a sweet Muscat).
- South Africa's cooperative movement began in 1905, eventually leading to the KWV, a price cartel, just a few years later. In 1997, the KWV was converted from cooperative to a company, establishing the South African Wine Industry Trust.
- White grapes account for 55% total acreage: Chenin Blanc (Steen), Colombard, Chardonnay, Palomino, Henepoot (Muscat d' Alexandria), Care Riesling, Semillon and Weisser Riesling (true Riesling).
- Reds: Cabernet Sauvignon, Shiraz, Merlot, Pinotage (Pinot Noir x Cinsault), Cinsault, Ruby Cabernet, Cab Franc, Pinot Noir.
- South Africa has begun to focus on five international varieties: Chardonnay, Sauvignon Blanc, Merlot, Shiraz and Cabernet Sauvignon.
- Wine of Origin (WO) laws began in 1973, although participation is voluntary. The 100% rule applies for place, the 85% rule applies for vintage and varietal.

WINEGROWING REGIONS

- **Coastal Region** – Constantia is the original home of the vine in South Africa, and the neighbor to Durbanville. Both areas are sandwiched between the Atlantic and False Bay, and are impacted by weather patterns from both. Soil is sandstone and decomposed granite, and both wards are rich and fertile. Most growers opt not to irrigate. Both wards focus upon international red varieties and Sauvignon Blanc.

Stellenbosch is the second-oldest winegrowing region in South Africa, and home to the only Viticulture and Oenology university program in the country. The region is flanked by a cluster of tall mountain ranges, and soils are varied: granite, sandstone, and alluvial types. This area is arguably South Africa's most important for wine, particularly for reds.

Paarl is a warmer inland district, with a Mediterranean climate impacted by the Atlantic's strong winds. Soils range from granite to sandstone. This region is home to the KWV, and is also home to a small but noteworthy ward, Franschoek, which was settled by French Huguenots in the 17th century.

Swartland means “black land” and features fertile Malmesbury shale with outcroppings of Table Mountain sandstone. Wheat is the dominant crop. Tulbagh is surrounded by mountains on three sides, and features a continental climate and rocky soils.

- **Boberg Region** – Encompasses the catchment areas of the Berg and Klein Berg rivers. Paarl and Tulbagh belong to this region in terms of their fortified wines only.
- **Olifants River Region** – The northernmost wine region in South Africa. The climate is hot and dry, although it borders the Atlantic. Brandy was the mainstay of this region for 70 years, but viticulture, citrus crops and rooibos tea have made inroads.
- **Breede River Valley Region** – This region features a hot and arid continental climate that is beyond the influence of the Indian and Atlantic oceans. Vineyards may need drainage in some sections or irrigation in others. About 40% of the nation’s grape crop is grown in the Worcester and Robertson districts, most of which is distilled or fortified. Robertson is hot, arid and flat, with lime-rich and sandy soils.
- **Klein Karoo Region** – Sandwiched between two large mountain ranges, this region is hot and arid, and without ample water for irrigation, vineyards are restrained to deep alluvial soils and clays. Many former vineyards were Ostrich ranges, supplying features to the pre-WWI fashion industry.
- **Southern Districts** – No wine region covers the entire southernmost region of South Africa, but there are a few isolated regions: Bot River, Cape Agulhas, Overberg, and Walker Bay. These districts produce cool-climate wines. Walker Bay, with a maritime climate, has experienced success with Pinot Noir and Chardonnay, while the ward of Elgin, high in the mountains of Overberg, does well with Sauvignon Blanc.

WINE REGIONS: SPAIN

OVERVIEW

- Spain is the third-largest producer of wine, with almost 3M acres under vine, by far, the most in the world.
- Nearly half of Spain’s vineyards are located in Castile-La Mancha, in the center of the country.
- Phoenicians planted grapes in the Sherry region as far back as 1100BC.
- Spain enjoyed a boon in know-how when French winemakers left their phylloxera-ravaged soils in the second half of the 19th century.
- Spain’s INDO closely mirrors the French AOC format, although Spanish wine law actually has barrel and bottle aging regimens specified.

WINE LAWS

- In compliance with the EU, Spain divides its wines into three categories: vinos de mesa, vinos de la tierra, Vinos de Calidad Producidos en una Región Determinada (VCPRD). Among the VCPRD wines, there are four classifications, in ascending order:
 - **Vinos de Calidad con Indicación Geográfica** – Similar to the French VDQS, there are just four of these wines presently, which may soon be elevated to DO status.
 - **Denominaciones de Origin (DO)** – Similar to the French AOC, there are about 60 DOs in Spain (including eight in the Canary Islands and two on Majorca), with prescribed varietals, yields, methods, and aging regimens.
 - **Denominaciones de Origin Calificada (DOCa)** – These wines have held DO status for at least 10 years. The only two current DOCa wines are Rioja and Priorat (with Ribera del Duero to have been elevated in 2008).
 - **Vinos de Pagos** – “Estate wines” produced at a single vineyard with minimum compliance with DO/DOCa regulations. There are currently five pagos, all in La Mancha.
- About one-third of Spanish wine fits into one of the quality categories, with the remaining two-thirds being table wine. Although vino de mesa has no restrictions, vino de la tierra must show local typicity. Country wines and VCPRD wines can use the following terms to define their aging regimen:
 - **Vino Noble** – Has spent at least 18 months in wood or bottle.
 - **Vino Añejo** – Has spent 24 months in wood or bottle.
 - **Vino Viejo** – Has spent 36 months in strongly oxidative environment.
 - **Vino de Crainza** – Red wines that have aged 24 months (six months in wood), or rosé that has aged 18 months.
 - **Reserva** – Red wines that have aged 36 months (12 months in wood), or whites and rosé that has aged 18 months (six months in wood).
 - **Gran Reserva** – Red wines that have aged 60 months (18 months in wood), or white and rosé that have aged 48 months (six months in wood), or Cava that has aged 30 months on its lees.

WINEGROWING REGIONS

- **Rioja** – The name “Rioja” had been in common use by the 15th century, and production within the region at least dates back to Roman times. The region’s first commercial bodega was founded in 1850. The French brought barrel-aging techniques (among others), although most Rioja uses American oak today. Most of Rioja lies in the Ebro River Valley, with parts extending into the Basque Country and Navarra.

Rioja Alta and Rioja Alavesa are high-altitude subregions that enjoy a relatively mild climate. Rioja Baja, a flatland, experiences much hotter temperatures. Although the best grapes tend to originate from the higher-altitude regions, Rioja is often a blend of subregions, which helps with overall consistency.

In Rioja, 92% of wine is red, based upon Tempranillo, but bolstered by Garnacha, Mazuelo and Graciano. The most important white grape, by far, is Viura (known as Macabeo elsewhere in Spain), which is cold-fermented and released early. A handful of oak-aged and barrel-fermented whites may incorporate Malvasia in the blend. Rioja may be subject to slightly longer aging regimens than what is typical for labeling.

- **Cava** – Produced mainly in the Penedés region in northeastern Spain, this is a traditional-method sparkling wine. Bottles must be cellared for nine months of lees aging. Cavas are usually blanc de blancs, but may feature red varieties. Cava is classified as brut nature, extra brut, brut, dry, semi-dry, or sweet. Cava does not have a DO, although it might as well, for all intents and purposes. Most production takes place in Catalonia, but about 5% may exist in Rioja. The spiritual center of Cava production is San Sadurn de Noya.

The classic grape varieties for Cava are Macabeo, Xarel-lo and Parallada, although permissible grapes include Chardonnay, Pinot Noir, and Trepât (the latter two, only for rosé). Red Garnacha and Monastrell are also authorized for rosé, but are used less and less.

- **Sherry** – The Sherry Triangle is formed by Jerez de la Frontera, Sanlúcar de Barrameda and Puerto de Santa Maria. The three authorized grapes are: Palomino, PX and Moscatel. Each thrives on a particular soil type in the region, respectively: albariza (chalk with clay and sand), barro (red clay) and arena (sandy soil).

- **Other regions** – Rías Baixas is known for dry fragrant whites made from Albariño. Along the Duero River, there are three noteworthy regions: Rueda, Toro, and Ribiera del Deuro. Until 2008, Rueda was a DO for whites only (Verdejo), but now allows reds (Tempranillo, Cabernet, Garnacha, Merlot, and other local reds). Ribiera del Deuro is on par with Rioja in terms of quality. Here, Tempranillo takes the name Tinta del País, and may be blended with Cabernet, Merlot, Malbec, red Garnacha, or white Albillo. At extreme elevation, and despite summer heat, frost is an issue.

Navarra and Priorat are traditional regions that have begun to experiment with new varieties, although DO regulations relegate many of these as table wines. Navarra focuses upon Tempranillo, along with Graciano and Mazuelo in its portion of the Rioja DOCa. The region is known for its rosados. Priorat focuses upon Garnacha, with Cabernet permitted. Castilla-La Mancha is home to 52% of Spain's production and the world's most widely planted grape, Airén. Valdepeñas DO is a well-known region, with a slightly better reputation, that is nearly surrounded by La Mancha DO.