
from
VINE to
WINE

Though variations—and innovations—abound, winemaking today is a remarkably consistent cycle of planting, harvest, fermentation and bottling

BY MARY K. ZAJAC

"WINEMAKING IS very, very simple," says John Williams, only slightly tongue in cheek. "You have to get the juice out of grapes and ferment it into wine."

Williams should know. As owner, founder and winemaker at Frog's Leap Winery, he's perfected a clean, crisp Sauvignon Blanc, and blended Cabernet Sauvignon and Cabernet Franc to create Rutherford, a red wine that captures the specific flavor of this portion of Napa Valley, Calif. He's experimented with a combination of stainless steel and French oak barrel fermentation in his pursuit of the perfect Chardonnay. He's even created California versions of classic German dessert wines, giving them fanciful names like Frögenbeerenauslese and Leapfrögmilch.

And after 30 years in the wine business, he'll be the first to tell you that wine is not solely the work of human hands or chemistry or the result of the crushing and de-stemming, fermenting and aging that takes place inside a winery. Williams' focus, he says, is on "grape-growing rather than winemaking" because he believes wines are made in the delicate relationship between the soil and the climate "rather than the hand of the winemaker."

"There is no word for winemaker in the French language," says Williams. Instead, the French use the word vigneron, which loosely translates as "steward of the vineyard." To Williams, this makes perfect sense. "You grow wine," he says.

MEG SMITH

John Williams is founder of Frog's Leap Winery (below) in Napa Valley, Calif.; right: the Swiss vineyards of La Cote, after the harvest.

TORI WILDER

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"It's part of the soil."

To say that Williams is a traditionalist when it comes to winemaking is an understatement. It also makes him somewhat of an anomaly in the United States, where a reliance on winery technology is more prevalent than in Old World Europe.

Williams is not alone in his convictions. Despite the rise of Ph.D. programs in oenology that stress science, and innovative companies that reduce winemaking to abstract formulas, there are winemakers around the globe who embrace vineyard health over flavor chemistry. It's all a matter of choices, Williams says. And winemaking in the 21st century is full of them.

Deep Roots in History

Wine is one of the world's oldest beverages. Dating back to biblical times in the Old Testament, it has been drank by royalty and commoner alike, celebrated in song and in the Bible, where it is the subject of Jesus' first miracle, when he transforms water into wine at the wedding feast in Cana.

The first mention of wine appeared on tablets in Mesopotamia around 2750 B.C. Archaeological digs of the region also have yielded evidence of presses and vessels. Descriptions of grape harvests and recipes for wine, preserved on clay tablets, were discovered in the tombs of ancient Egypt's elite. Even Noah, the Old Testament reports, tended a vineyard and made wine.

Early travel and trade brought winemaking to Greece, where the Greeks immortalized wine's cultural significance in epic literature such as Homer's "Odyssey." By the Middle Ages, winemaking flourished in many European countries, primarily in monasteries, where wine was a crucial component of the Catholic Mass. (It's no small coincidence that Champagne was discovered by a 17th-century French Benedictine monk, Dom Perignon.)

The 19th century saw wine grapes planted in both the Northern and Southern hemispheres, across Europe and in places in the New World such as Australia, the United States, South Africa and Argentina. It also ushered in a new era of control in winemaking after Louis Pasteur discovered the basic premise of fermentation: namely that yeast plus sugar yields alcohol and carbon dioxide. Before Pasteur's findings, winemaking was an unpredictable endeavor, with winemakers relying on spontaneous fermentation of ambient yeasts naturally present on grapes and in wineries. Post-Pasteur, the use of cul-

tured yeasts became the norm.

In the 1860s, however, wine production in Europe nearly ended after the native grapevine species, vinifera, became infected with phylloxera vastatrix. The root louse was brought over from America on cuttings from native labrusca grapevines. The solution, it turned out, was related to the cause: Scientists discovered that grafting vinifera vines onto the resistant labrusca rootstock would make vinifera resistant, too.

Today, wine is produced in 62 countries worldwide including some unexpected places like Kazakhstan, Patagonia and Madagascar. The United States, with wineries in all 50 states, ranks fourth in world wine production behind France, Italy and Spain. Argentina ranks fifth.

With the expansion in production, it makes sense that worldwide wine consumption has changed as well, though not necessarily in the most expected ways. Economic downturn, tougher legislation to control drunk driving and changing cultural norms for younger generations have caused wine sales to decrease in countries such as France and Italy, although these countries still rank highly in per capita wine consumption (following the Vatican City State and Luxembourg), averaging 45 liters (nearly 12 gallons) per person per year.

The U.S., however, has seen a sea change in wine consumption and production since the 1960s and '70s. According to the Wine Institute, in 1965 Americans consumed .98 gallons of wine per resident (3.7 liters), much of it inexpensive pink table wines made by Lancers or Mateus, Chianti in straw-covered bottles or mass-produced renditions of Hearty Burgundy or Chablis that bore no resemblance to their European namesakes. By 2010, buoyed by the growth and the quality of domestic wines, along with an ever-expanding selection of imported wines and reports linking red wine with heart health, Americans had more than doubled their wine consumption to 2.6 gallons (9.8 liters).

In 2009, the U.S. outranked France

THE WINE LIST

Controlled Appellation: a geographic area dedicated to growing specific varietals of grapes for wine production, for instance Chianti or Napa Valley. Appellations often have rules that govern wine-making, including how wines can be labeled or produced.

Lees: the sediment that settles at the bottom of a fermentation tank

Malolactic: the process in wine-making where tart-tasting malic acid, naturally present in grape must, is converted to softer-tasting lactic acid.

New World: includes winemaking regions in the United States, Argentina, Chile, South Africa, Australia and New Zealand

Non-Vintage: wine that is a blend of this and other years' harvests that is mixed in order to create a "house" style; a regular practice with Champagne and often in mass-produced wines like Manischewitz

Old World: includes winemaking regions in Europe such as Italy, France, Spain, Portugal, Germany and Austria

Racking: the separation of wine from sediment after fermentation and during aging

Tannin: a kind of natural compound that is often created from the fermentation of different parts of the grape; tannins act as a preservative in addition to providing color, enhanced taste and body

Terroir: a combination of soil, climate, weather and topographic conditions that affect the flavor and character of wine

Varietal: the variety of grape, Cabernet Sauvignon or Chardonnay for example

Vintage: the year in which the grapes are picked (harvested) and made into wine

for the first time ever in overall wine consumption, with Americans buying 329.7 million cases of wine in 2009. The best-selling wine in America is not homegrown, however. Australia's Yellow Tail brand is currently America's favorite with 8.3 million case sales in 2010.

Yellow Tail wine is currently America's best-selling brand.

Down to Earth

As in any industry, wineries offer a range of products. Mass-produced brand wines like Yellow Tail are made in large quantities; they are fruity, smooth, easy to drink and offer a reliable product at reasonable prices. Most fine wines, on the other hand, are designed to be expressions of *terroir* (loosely translated to "a sense of place"), a concept that addresses the interplay of grape, soil, topography and weather for each particular vineyard site. The idea is that the land from which grapes are grown imparts a quality that is unique to the particular region.

This is one of the reasons for the differences in taste of wines made from the same varietal but in different parts of the world. Fine wines vary from vintage to vintage due to annual weather variation, but each vintage should still reflect the essence of a given varietal—say the crisp grapefruit flavors of Sauvignon Blanc or the peppery tannins of Cabernet Sauvignon. Fine wines are generally more expensive because they are made in smaller quantities and require more vineyard management.

But no matter the site, winemaking itself is a remarkably consistent cycle of planting, harvest, fermentation and bottling.

The first step in winemaking is choosing the right site.

"A [vineyard] site should have potential," says David Adelsheim, owner and founder of Adelsheim Vineyard in Oregon's Willamette Valley. "If you make a bad decision when planting, you're never going to be able to correct it with what you do in winery. … If the site is very good, you should be able to make very good wine from it."

In choosing a site, winemakers must consider topography, soil components, drainage, average temperatures and the amount of sunshine and rain expected. These factors lead directly into step two: choosing the grapes that best suit the soil and climate.

In cool climate areas with fewer days of sunshine and lower temperatures, like Burgundy and the Loire Valley in France or the North Island and South Island of New Zealand, delicate Pinot Noir and crisp Sauvignon Blanc flourish. Warmer climates, like California and Argentina, where aggressive ripeness can lead to high sugar and alcohol levels, have found success with heartier grapes like Cabernet Sauvignon and Malbec.

In Europe, most premium vineyard sites are part of a system of controlled appellations (France's appellation d'origine controlee, for example) that govern what can be grown on certain sites and how it can be labeled. For example, for French red wine to be labeled "burgundy" it must be made from Pinot Noir grown in the Burgundy region.

Once vines are planted, vineyard maintenance becomes crucial, whether you're in Italy or Oregon. "There's no winemaker in our portfolio who thinks they make wine in their cellar," says Deena Miskiel of Vias Imports, an importer of Italian fine wines. "It's 100 percent all about the vineyard."

Within the world of viticulture, however, winemakers still utilize different approaches. Frog's Leap Winery is farmed organically, one of the most important tools in the tool belt, says John Williams. Organic farming eschews the use of commercial pesticides or fertilizers and instead uses cover crops such as oats, mustard and purple vetch to balance nutrients and help retain moisture in the soil. These crops must be cared for like any other, and are as much a part of vineyard cultivation as the grapes.

Because of Napa Valley's microclimate, Frog's Leap also practices dry farming, where grapes get water only by rainfall (i.e., without irrigation). Grapes thrive on moderate "stress," says Williams, and dry farming not only encourages healthier grapevine roots to dig deep into the soil for better flavor, it also saves the winery 10 million gallons a year, or 64,000 gallons of water per acre.

Vineyard maintenance at Frog's Leap begins in January with the pruning of the vines. "Pruning is the most important thing to do in the vineyard," says Williams. "It balances the crop," he explains, and prevents small vines from carrying too many and too heavy grape clusters. Early spring sees the turning over of cover crops and planting of any new vines or rootstock. Later, vineyard workers tie branches onto trellises and remove young shoots to control growth in a process called desuckering.

Pollination occurs in May and June and by midsummer, it's time for a green harvest, where vines are thinned of both grape bunches and leaves, so that fewer grapes may receive more nutrients and light exposure. Throughout the season, the vineyard must be weeded and treated for mildew.

Harvest usually takes place in September or October, depending on the season's weather and the grapes' ripening. At Frog's Leap, as at many other small wineries, harvest is done by hand, with workers picking grape clusters over a series of days. It is tedious, back-breaking work, but results in a more careful handling of the grapes, something that David Adelsheim stresses should continue throughout the winemaking process.

Gentle winemaking, says the founder of Adelsheim Vineyard, relies on minimal handling of the grapes. "The more times you have to move the wine, the more aggressively you move it, the more is taken away from the wine," he explains, and the more tannic it can become.

Adelsheim makes Pinot Noir, a wine








The winemaking process: 1) Hand-picked grapes. 2) Grapes being poured into a de-stemmer/crusher. 3) A stainless steel auger crushes grapes and removes stems. 4) Grapes being pressed. 5) Crushed grapes being pumped into fermenter. 6) Solution made of dry yeast and water ready to be pumped into a large stainless steel tank containing fermenting wine. 7) Monitoring the fermentation process. 8) The bottling line.

in which tannin is crucial for color and longevity. At the same time, elegant Pinot Noir requires that tannins be balanced, yielding silkiness rather than bitterness. Adelsheim explains that his vineyard tries to balance the tannins in its wine by "adding a bit of water stress in vineyard rather than by having technology that grinds up the grapes. There's less chance of making a mistake and getting a wine that's too tannic."

The Wonders of the Winery

The winemaking process itself is a combination of simple chemistry, art and experience. In Oregon's Willamette Valley, Pinot Noir grapes are put into five-gallon buckets or flat bins (some bins can hold up to a half ton of grapes), before the fruit is transferred into the winery.

The fruit is then sorted either by hand or by a series of conveyors and blowers to remove unripe or diseased fruit—and even bugs—before being transferred to a de-stemmer—a perforated drum that allows the berries to pass through and the stems to remain. Grapes are then moved to the fermenter via a series of conveyors, pumps and hoses (or sometimes via vertical feed from an overhead de-stemmer).

The largest stainless steel fermenters can sit nearly 10 feet above the winery floor. At this stage, winemakers will add sulfur dioxide, yeast and sulfites, the latter to prevent the wine from oxidizing and to better control the fermentation process.

The wine begins to ferment at around 60 degrees Fahrenheit (15.5 C), and the temperature naturally slowly rises as fermentation continues. Fermentation times vary, but the

A row of four huge cylindrical stainless steel wine containers at a winery in Napa, Calif.; wine tasting in a winery cellar.

process is usually completed in two weeks, after which the berries are pressed. Pressing can take place in basic basket presses, set up so that juice can run through perforations while the solids stay behind; or wine can be pumped into tank presses (shaped like hot dogs) that use an inflatable bladder to press the juice through the solids.

Once pressed, the wine is pumped to stainless steel tanks or to oak barrels to age. Oak softens the wine's tannins, and each variety of oak—French, Slovenian, American—imparts a different effect to the wine. Barrels hold 60 gallons of wine (227 liters), the equivalent of 25 cases or 300 bottles. Oregon Pinot Noirs typically spend at least 11 months in barrel, with higher quality wines spending as much as 20 months or more. During this time, the wine may be "racked" (moved from one barrel to another, through gravity or pump) in order to accelerate aging, separate the wine from its "lees" (deposits of residual yeast and other participates), and to help blow off unpleasant smelling sulfides. After it is aged, wine may be "fined"—that is, strained to remove impurities, through use of common ingredients like egg whites, gelatin or even milk, at the proportion of an ounce or two per 1,000 gallons.

The final process is bottling. Some wineries own their own bottling line; others schedule appointments with mobile bottling units. First, bottles are "sparged" with inert gas like nitrogen to prevent the excess buildup of oxygen. Then the bottles pass assembly line style to be filled, corked with a vacuum seal, topped with a foil capsule, and labeled, before being hand-packed into cases and shipped off.

Uncorking a Debate

While general winemaking procedures have remained fairly consistent in the last century, change has still made its way into wineries. One of the most visible innovations: the introduction of screw cap closures. Mostly confined to New World wine producers, screw caps are slowly making their way into Old World wineries and are being embraced by most consumers. There are a few exceptions, however.

"The New York Italian [restaurant] market has to have a cork," according to Miskiel, national sales manager for Vias Imports. "They can't put their mind around red wine in a screw cap."

The success of screw caps is also confined to inexpensive wines in the $10 to $20 price range, due in part to the fact that they don't need to age and partly to consumer attitudes toward price/quality ratio. "The consumer still expects that if a wine is expensive and if wine is meant to age, it is supposed to have a cork," reports Miskiel.

Alternative packaging also is making headway into the fine wine market. Long confined to mass-produced, inexpensive wine, boxed wines are now moving into the quality wine market, changing the ways wine drinkers purchase in volume and freshness.

In 2008, Matthew Cain began selling Malbec from Argentina in 1-liter Tetrapaks under the Yellow + Blue label. "We were looking for a way to deliver high-quality, certified organic or certified sustainable wine for under $12," says Cain.

Response has been very positive, Cain reports. "There's a huge shift in the mindset of the younger wine consumer as opposed to what one thinks of as the traditional wine consumer [baby boomers and older]. The younger the person, the more apt they are to embrace this 'new world order' of wine. They don't care if the wine comes from Bordeaux in a glass bottle with a cork [or in a Tetrapak]."

The bottom line for most consumers, of course, is how a wine tastes in the glass and the degree of quality in regard to the price paid for it. But John Williams wants wine drinkers to remember something else as well. Wine is "more than just a beverage, more than something to drink with dinner," he says. "Wine is the story of the property and the people who created it," he explains—a story that is re-told with each bottle.

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FACTS AND FIGURES

Wine by the Numbers

- In 2009, 62 countries produced wine.
- The Vatican City State and Luxembourg lead the world in wine consumed per capita at 70.22 (18.5 gallons) and 54.29 liters (14.3 gallons) per capita, respectively.
- The United States leads the world in overall wine consumption, with Americans purchasing nearly 330 million cases of wine in 2009.
- France leads the world in wine production with 4.7 million liters (1.2 million gallons)—17.56 percent of all the liters produced worldwide.
- Spain leads the world in acreage dedicated to vineyards with 2,724,700 acres—15.2 percent of acreage worldwide.
- In 2010, Americans' wine consumption was 2.6 gallons (9.8 liters) per capita.
- The United States boasts 7,626 wineries with wineries in all 50 states.
- California is responsible for 90 percent of total U.S. wine production.
- In 2007, the United States had 934,750 acres devoted to wine grapes—yielding $11.4 billion in winery sales.

Autumn in the vineyards of the French Alps