Part One

THE WINE

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From Vine to Wine

The Job of a Winemaker

Tonight, as you sit at home or in a restaurant enjoying a bottle of pinot, stop and think for a moment about what it took to get this wonderful wine to your table. Winemaking is a long and difficult process that is often not fully understood. It is the winemaker who is ultimately responsible for your enjoyment of that glass after a hard day at work. The winemaker oversees the entire process, from growing the grapes to deciding when they should be harvested, figuring out the best way to blend them, and marketing the finished product.

The winemakers in *Women of the Vine* are not just businesswomen; they are also farmers. Successful winemakers make quick decisions to troubleshoot production problems and keep the process running smoothly on a day-to-day basis. Mother Nature can also interrupt the process, creating all sorts of sticky situations

and wreaking havoc on the source of all wines: the grapes. The winemakers in this book explain that grapes are "a volatile product. You don't get a second chance and you have only one harvest a year. You can't just order more widgets. This is it." For these women, there isn't such a thing as a typical day at work. Each day, each month, each year, and each harvest are different.

Winemaking also varies according to the winemaker, the winery, the region, and the country. Each different technique and recipe helps the winemaker to create her unique wine style. The responsibilities of a winemaker can change if she oversees a large winery versus a small winery, but either way it is a tough, stressful job and a true labor of love for these amazing women.

A Day in the Life of a Winemaker and the Winemaking Process

Each step of the winemaking process is extremely important because each stage affects the quality of the wine. As if the job didn't have enough pressure!

The Vineyard

The winemaker must first communicate with the viticulturist. This is the person who manages the planting of the vines and the harvesting of the grapes. Vinification is the process of making the wine, and viticulture is the growing of the grapes. The viticulturist keeps a watchful eye on the progress of the grapes as they ripen on the vine and continuously performs lab tests to determine the best time to harvest. Science doesn't tell the whole story, and viticulturists will often rely heavily on their instincts and experiences to help them make this crucial decision.

The grape quality will affect the wine more than any other factor does. It is impossible to turn bad grapes into good wine, but, unfortunately, the opposite can be true. Grapes should be processed

quickly after harvesting to avoid spoilage, and they are best handled when cool.

Once again, harvesting is such a pivotal time for decision making because the ripening process affects two of the primary compounds for making wine—sugar and organic acids. When a grape ripens, it accumulates more sugar, and this can happen rapidly. Simultaneously, the organic acids decline during the ripening process and can make the grapes shrivel and dehydrate, affecting the amount of juice and causing the clusters to lose weight. Winemakers may decide to allow the crop to hang on the vine and dehydrate a bit (this is called "hang time") so that more of the flavors can develop and also to help them determine the best time to harvest. Once the winemakers decide to harvest, however, grapes are picked as rapidly as possible and with the least amount of damage to the grapes.

Wineries use two methods of picking—manual or machine harvesting. Manual harvesting can be done quickly if you have a lot of hands on deck. Although it is a more selective and thorough process that minimally damages the grapes, it is not cheap. Machine harvesting can be much less expensive, but winemakers bear the cost in damaged vines and the number of good grapes that survive to be crushed. It can take about a hundred pounds of grapes to make between five and seven gallons of wine. The amount of juice extracted will depend on how juicy the grapes are and how efficient the pressing is. You can usually get approximately five 750-milliliter bottles of wine per gallon of juice. When you think about the scale of wine production in the United States, that requires a lot of grapes! Besides cost issues, a vineyard's topography and layout can largely determine the type of harvesting that a winery chooses. Hilly vineyards are difficult to machine harvest and are almost always harvested by hand.

The Crush

The winemaker now has to oversee the crushing and the pressing of the grapes. First, the destemming process separates the stems from

the grapes. Then the grapes are pressed, which removes the juice and leaves only the solids, such as the seeds and the skins. To make white wine, the skins have to be removed immediately to separate them from the juice. It is the skins that affect the color, the flavors, and the tannins if they stay in contact with the juice for too long. Tannins occur naturally in plants, and in wine they come from the grape skins. They are responsible for the degree of a dry, puckery sensation in red wine, and they also help to naturally preserve the wine. When winemakers make red wine, they may choose to leave the juice with the skins and the pulp (sometimes for up to eighteen days) to give the juice more of the pigment, the tannins, and the flavors. The technical term for this process is *maceration*.

Many people think that sulfites are the cause of the ill effects they feel after drinking wine, but, actually, the practice of keeping the juice with the skins is to blame. The term *sulfites* is often used when people talk about wine, and sulfites may be listed on the back label of most wines you enjoy, but all wines contain a small amount of sulfites from the fermentation process. Some winemakers choose to add sulfur dioxide as a preservative, but with today's technology, it is used far less than ever before. Approximately 1 percent of the general population and 5 percent of asthmatics have an allergic reaction to sulfites, according to the Food and Drug Administration. Sulfites can be found in many prepared foods in the supermarket and in convenience stores because food manufacturers also use them as a preservative. So, contrary to popular belief, sulfites don't cause those nasty headaches you get after drinking too much wine, especially if the headaches occur after you drink red wine, because white wine contains even more sulfites than red does.

So how are the grape skins the culprit causing this ill aftereffect? Fermented foods and drinks contain two naturally occurring chemicals: histamines and tyramines. Histamines are in the skins of the grape and are responsible for dilating blood vessels in the brain. Tyramines do the opposite; they constrict your blood vessels. Either one of these chemicals can cause headaches. Red wines generally have a higher concentration of histamines and tyramines than white

wines do because red wine spends more time in contact with the skins.

Alcohol and Malolactic Fermentation

There are two types of fermentation: alcohol and malolactic. Alcohol fermentation is a natural process that occurs during the conversion of sugar into alcohol. This usually begins on its own due to natural yeast found in grape skins, or sometimes winemakers will add a special yeast strain to get the process started sooner. For red wines, alcohol fermentation can take from five to ten days. White wine usually takes longer—between twelve and fifteen days—so that more of the aroma remains. Drier wines allow all of the sugar to turn into alcohol.

Malolactic fermentation is an option that a winemaker may use more often for red wine than for white. It can happen naturally during the alcohol fermentation process but is not a guarantee, so a winemaker may choose to induce it afterward. This process converts the malic acid that exists naturally in the grape juice into lactic acid. (As a basis of comparison, malic acid is a tart acid that's found in fruits such as Granny Smith apples. Lactic acid is one component of milk.) Malolactic fermentation can soften the wine's acidity, therefore making it more pleasant to drink. When this process is used in chardonnay production, the wine is often described as tasting buttery.

Blending

Before the aging process begins, the winemaker may combine wines made from different grape varieties, such as cabernet, merlot, and sangiovese, and mix them together in vats. This is how many wineries and winemakers create the desired aromas, flavors, tastes, and overall styles of their wines. Wines made in the United States are usually named after the specific variety (varietal) of grape used to make the wine (cabernet sauvignon, chardonnay, and merlot).

Kimberlee Nicholls (chapter 11) describes this in her story, and it is the simplest explanation. She uses the apple analogy: "You have different types of apples. You have Gravensteins and you have pippins and you have Yellow Delicious—and grapes are the same. They all taste a little bit different." In Europe, it is more common for wines to be named after their appellation (the region) where the vineyard, the winery, or both, are located (Bordeaux, Burgundy, Chianti).

Aging and Racking

Wine can be aged either in barrels or in steel tanks. When aged in oak barrels, the wine will take on an aroma and a flavor that are described as toasty, vanilla, or spicy. A winemaker may instead choose to age the juice in the stainless steel tanks so that it will have a crisper and more natural fruit flavor. This process can take up to two years for red wines but is much shorter for white wines, sometimes only a few months to a year. During the process, the winemaker may move the wine from one container or barrel to another. This is called racking and is basically decanting on a grand scale. This process transfers the clear wine from one barrel to another barrel, leaving behind any sediment that can spoil the wine. The result will make for a much clearer wine. The first racking usually takes place approximately two to three weeks after the fermentation process is complete. At this stage, the heavier particles will already have settled at the base of the container. The best way to implement this procedure is by using a siphon to move the clear juice away from the particles. A winemaker may rack the wine several times (sometimes three or four times) at set intervals until there isn't any more sediment. Now, the winemaker is ready for the next and final step—bottling the wine.

Bottling

Some wineries may choose to filter the wine prior to bottling. This fining or filtration is an additional and final way to remove any

sediment from the wine. It can also help to preserve the wine in the bottle. Now the final stage has arrived, but it's often the most stressful. The winemakers have tested, tasted, and blended, and the wine seems perfect and ready to go—bottling will be the last step. The wine is done. This is the last chance to include additives and to make adjustments—to create the best wine possible. If anything needs to be fixed, it can't be done after bottling.

Storing and Serving Wine

What about opened wine? What is the best way to store an opened bottle? Many people have experienced coming home after work and opening a bottle of wine just to relax and enjoy dinner, a TV show, or a chapter in a good book, but they don't want to consume the whole bottle that evening.

Wine is very delicate when it is opened because contact with air and oxygen affects the wine. Oxygen is wine's enemy; it causes fruit to fade and the balance of the wine to change. When stored properly, wine can be enjoyed another day. Remember that heat speeds up oxygenation, so keeping wine in the refrigerator after opening it will slow this process down. Recorked wine can last between two and three days in the refrigerator. Red wine can be stored this way, too, but let it warm up before it is consumed the next day. If you prefer to store opened wine longer, consider buying a stopper and a pump at a wine store or online. The key is for the pump to remove air from the bottle; then the stopper can form an airtight seal to keep any additional air from seeping in. Another option is to buy a gas preservative that comes in a canister. Simply spray the gas into the bottle and quickly replace the cork. This method is considered a bit less effective, so the wine may still spoil. If spoilage occurs, consider this little cooking tip: oxygenated wine is not bad; it will taste and smell funny, but it won't harm you. Use it in cooking your next meal so that you don't have to pour it down the drain.

If you plan to consume a newly purchased bottle within the next

six months, think about investing in a wine rack. Horizontal wine racks are best so that the wine stays in contact with the cork; otherwise, the cork can dry out and even shrink over time, causing air to leak in and oxygen to contaminate the wine. Vertical racks are often used to display wine in stores or restaurants where the wine won't sit for very long in that position.

The rack's location in the house is also essential. Wines do best if they are at a stable, cool temperature and free of vibration. Even though the nice little racks that sit on top of the refrigerator look good, they can be exposed to heat, light, and vibration, which can spoil the wine over time.

When serving wine, you may decide to let it "breathe" a little before you drink it. This practice often confuses wine drinkers because oxygen is touted as the enemy. The key is to learn which wines need time to breathe and for how long. You can allow a wine to breathe by either opening the bottle prior to serving it or by putting the wine in a decanter or a carafe. White wines and sparkling wines generally do not benefit from breathing, but some red wines that are very tannic (they have a bitter, dry, puckery effect in your mouth) can benefit a lot from breathing. The oxygen mixing with the tannins can help to soften the effect, making the wine more pleasant to drink. Keep decanting in mind for a young (consumed within six to twelve months after bottling), full-bodied red with a lot of cabernet sauvignon grape or an Italian wine like a Barolo or a Brunello that is up to six years old when first bottled. If you decant, make sure it is no more than about an hour before the wine is served. If it is left to breathe too long, the oxygenation process cannot be stopped and can affect the taste and the smell.

It's Done—This Year's Harvest!

Winemaking is a tough job and one that requires hands-on work, quick decision making, teamwork, knowledge, experience, and a whole lot of self-confidence. It is a long-term cycle each year, and

every year yields a new crop and new problems to solve. Despite this, every one of the winemakers in this book loves her job.

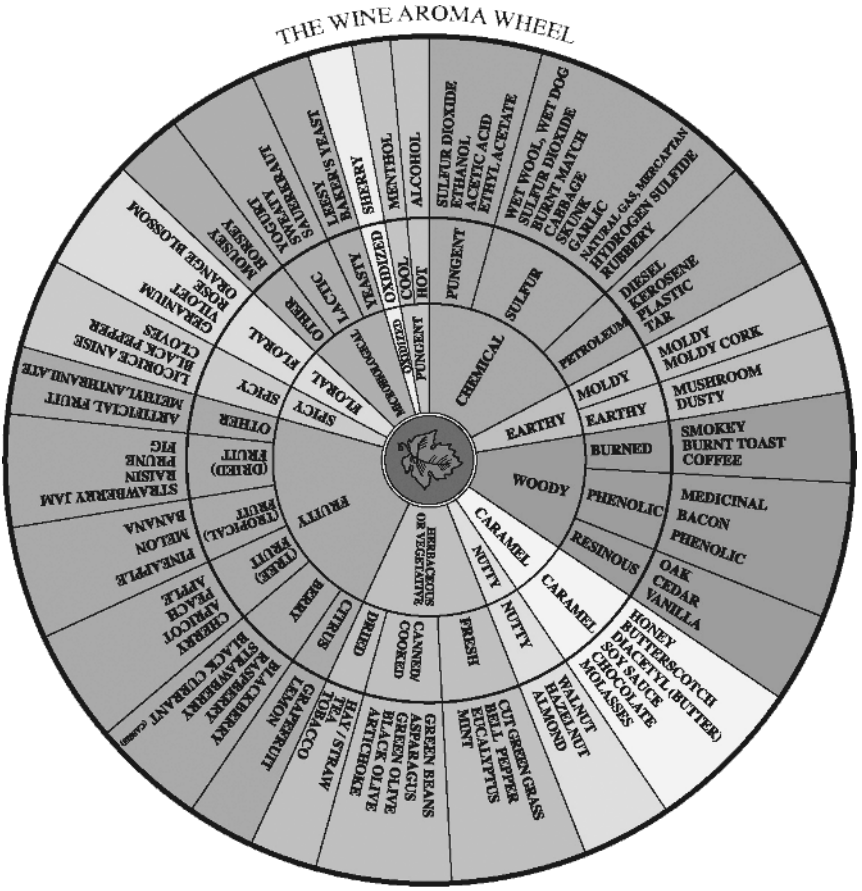
Now for the Fun Part—Selecting the Wine!

We have all experienced the daunting task of reading a huge wine list at a restaurant or walking into a wine shop with rows and rows of wine staring at us from every corner of the store. What do we pick? How can we possibly be familiar with all the wine choices out there? It is an intimidating world, and even winemakers feel it. The choices are overwhelming, and once the marketing messages are introduced, it gets even harder to determine our likes and dislikes.

The most important thing is to know what you like. No one tells you whether you like pears or bananas, so why should chardonnay or riesling be any different? Your palate and your preferences are part of what makes exploring wine and food so enjoyable. Just as with food, there are ways to narrow down your choices and get a better idea in advance whether you will find a wine's flavors agreeable. If you don't like spicy food, you may not eat curry, but if you love peppery foods, then a good steak au poivre may be just the dish you crave. With wine, it is the same. How do you learn what you like and what flavors and smells are in each variety of wine? One tool is featured in this book. Dr. Ann Noble truly changed the face of the wine industry when she invented the Wine Aroma Wheel.

The Wine Aroma Wheel

Dr. Ann Noble is known internationally for her work as professor and sensory scientist/flavor chemist at U.C. Davis in Sacramento. Ann set out to describe the aromas of wine by compiling terms that would also allow others to do so. These words needed to be descriptive, not subjective. Ann wanted wine to be experienced by everyone; therefore, everyone should be able to talk about it comfortably, even at home. She compiled a long list of terms for white and red



Wine Aroma Wheel. Colored plastic, sparkling wine, and table wine wheels are available for purchase at www.winearomawheel.com.

wines, and she sent the lists out to a broad segment of the wine industry until she narrowed down the terms and organized them in a circle graph. The Wine Aroma Wheel was first published in 1984 and then again in 1987, this time including the recipes for making the standards to learn how to identify the aromas. Ann recently received the Merit Award of the American Society for Enology and Viticulture for her significant accomplishments in the wine industry, and *Decanter* magazine named her one of the ten outstanding

women in the California wine industry. She also taught many of our other women winemakers at U.C. Davis.

Using the Wine Aroma Wheel

The general terms are located in the center of the wheel, and the most specific ones are in the outer tier. Ann tells us that "these terms are *not* the only terms that can be used to describe wines, but represent ones that are often encountered. Novice tasters often complain that they 'cannot smell anything' or can't think of a way to describe the aroma of wine. Fortunately, it is very easy to train our noses and brains to connect and quickly link terms with odors." The easiest way is to do an exercise that Ann describes to teach yourself how to differentiate the main aromas in wine. (Also try the exercise that Merry Edwards explains in chapter 10, which is a similar test to train your taste buds.)

All you need to start may already be in your cabinet or refrigerator or is readily available at your grocery store. The one ingredient that Ann knows is not available is linalool, a naturally occurring chemical with many commercial applications such as in perfume and soap, which she uses for the aroma of riesling, gewürztraminer, or muscat wines. She has a handy trick for us to use at home. "For this distinct floral, citrus aroma get handi-wipes. Put [an] opened handi-wipe into an empty covered glass. Alternatively, bring some Froot Loops (a breakfast cereal) and put them dry into an empty wine glass. Sounds silly, but either makes a good linalool standard." Following is an excerpt from Ann's guidelines.

White Wines

> If you are just beginning, then it is easier to evaluate white wines; start by selecting some wines with large differences in flavor. For example, include an oaky, buttery Chardonnay (most Australian, or California ones will do), for a "vegetative" (bell pepper, asparagus) Sauvignon blanc,

wines from Sancerre or a Sauvignon blanc from New Zealand or cool parts of California will suffice. A floral Riesling or Gewürztraminer from cooler parts of California (North or Central Coast), Oregon, Germany, Alsace (France) will provide a further contrast. If you wish to use a fourth wine, you could try an unoaked Chardonnay (IF you can find it), non-vegetative Sauvignon blanc or include another variety such as Viognier.

Make some standards in a neutral white wine (usually an inexpensive jug white wine will work well). . . . [Combining them with the following foods.]

White wine aroma standards
(in 1 oz neutral white wine)

Asparagus (several drops of brine of canned asparagus)
Bell Pepper (tiny piece of bell pepper; don't leave in too long)
Vanilla (Drop of vanilla extract)
Butter (drop of butter extract)
Clove (One clove, don't leave in long)
Citrus (~1 teaspoon of *fresh* orange and grapefruit juice)
Peach (several teaspoons of peach or apricot puree or juice)
Pineapple (1 teaspoon juice)
Honey (1–2 Tablespoons)

From this point on, anything goes; smell the wines first, smell the standards, start to see which terms describe which wine. If you come up with NEW terms such as lichee/lychee—make the standard! Smelling the BASE WINE makes it really easy to identify the spiked aromas by contrast.

Red Wines

For the first red wine tasting, choose wines with very different aromas, such as a pinot noir (Carneros or very cool central coast area of CA, Oregon, or red Burgundy), a Cabernet Sauvignon (for vegetative, get a wine from a cooler CA region), for less vegetative, try Napa, Sonoma, or Washington (CA) a black peppery Zinfandel. The standard "recipes" for most frequently encountered red wine aromas are below. [Use a jug red wine to add the flavors to, as you did with the white wine.]

Red wine aroma standards
(in 1 oz neutral red wine)

Asparagus (several drops of brine of canned asparagus)
Bell Pepper (tiny piece of bell pepper; don't leave in too long)
Vanilla (Drop of vanilla extract)
Butter (drop of butter extract)
Clove (One clove, don't leave in long)
Soy sauce (few drops, great for older reds)
Berry (Mix of fresh/frozen berries and/or berry jams)
Berry jam (1–3 tablespoons OLD straw-berry jam) (for older Pinot noirs)
Artificial fruit (add few crystals of red [Kool-Aid] powder)
Black pepper (few grains black pepper)
Anise, black licorice (use few drops of anise extract)

Sparkling Wines

Sparkling wines need different terms than those on the wine aroma wheel. In addition to citrus and berry

standards, here are some of the most relevant ones, especially those with long aging on the yeast lees before being disgorged.

Sparkling wine aroma standards
(In 1 oz of neutral white still wine)

Lime (A few drops of Rose's [L]ime Juice or squeezed lime juice)
Apple (Sniff freshly cut apple)
Toasted hazelnuts (Crushed nuts alone)
Sour cream/yogurt (1 Tbsp. in empty glass or wine)
Vegemite (tiny amount of Vegemite)
Cherry/strawberry (Few drops of flavored juices or extracts)
Nutmeg (few grains)
Caramel (crush one Kraft caramel)
Vanilla (as above for table wines).

[Don't be afraid to add more "stuff" if the aroma is not identifiable; dilute it with the base wine if it is too strong. Put the standards in wine glasses, and cover them with plastic wrap to increase the intensity of the aromas and to prevent the odors from permeating the entire room.]

Defects
[This is another good test to try. Sometimes we question our own sense of smell and can't tell whether something has gone bad. Here is a good way to identify whether the wine is oxygenated or turning bad.]

Some of the commonly encountered wine defects can also be illustrated by making standards.

Moldy Cork the BEST standard is the actual example of the defect. The cause, TCA, trichloroanisole will leave a lingering odor in your home!
Volatile acidity (VA) Few drops of Ethyl Acetate or nail polish remover

Acetic acid A few drops vinegar

Oxidation

Acetaldehyde few drops of sherry

Sulfur

H_2S Hydrogen sulfide boiled egg or black sand from Japanese food store

Ethyl mercaptan Smell of natural gas (tell people to experiment on their own carefully)

$S0_2$ Sulfur dioxide Dried apricots (which were treated with sulfite)

Brettanomyces (A wild yeast) Drop of creosote or piece of old fashioned Band-Aid (a horsey, barnyard smell)