



The Balance of Terroir

Carl Helrich at Allegro Vineyards in York County is one of our most enthusiastic and talented wine makers. I recently tasted a bunch of wines in his cellar, some from estate grapes, others purchased or custom-crushed fruit. It was a remarkable experience. Those who know Allegro honor its tradition of quality dating back 30 years with John and Tim Crouch and their Cadenza, always among the top wines in Pennsylvania. What got me scratching my head after the tasting was a vineyard on a relatively modest site that produced extraordinary wines in 2008 and I wondered why?

I am pretty comfortable with the definition of terroir (at least my own!) but less so with the relative value of the components of terroir: soil, climate, plant materials and viticulture (some would add wine making, too) as they relate to one another in the construction of a fine wine. It is all way too complicated which is probably why it is not well studied and not easily subjected to reductionist scientific efforts. It's just too darn hard to measure.

While terroir exists everywhere (and not just in wine), it confounds with its variability, complexity and subtlety. There is certainly nothing formulaic about it. Essentially, each vineyard has it and the clever wine grower has to figure out what it is and how to "extract" it in the form of a unique wine that representative of that piece of the planet. It may not be an altogether ridiculous idea to run a SWOT analysis (strengths, weaknesses, opportunities and threat) on the site just to quantify the virtues and deficiencies of the terroir.

As we pursue the creation of very fine, international quality and style of wines, both red and white but particularly reds, we define our quality according to standards accepted by our peers and the wine cognoscenti in the retail, restaurant and critical wine world. So at least we have a pretty good idea of what the quality of the end product needs to be. The terroir must contribute to this final result. Red wine terms favored by RMP and WS might include: concentrated, depth, richness, opaque, hedonistic, etc. All silly terms but at least a common language we can understand... you get the message here.

We haven't been very good at site selection so far in Pennsylvania or anywhere in the Eastern U.S., although some recent vineyard projects are pointing us in the right direction. After a few years in the region and having realized that most of the current vineyard sites were not ideal I asked Jim Law at Linden Vineyards if given a choice between a great site or great viticulture which he would choose, he picked the viticulture. It's pretty important to understand that soil moisture and vine vigor are among our greatest terroir challenges and that almost everything we do is aimed at mitigating the effects of too much water and vine growth.

Critical mapping of soils and climates in areas that have fine wine potential will help define where grapes should be planted with greatest effect, such as the south slopes on the north side of Quaker Valley Road in Adams County. We have a sense of where the best wine can come from but we don't understand why or how. We should begin by trying to quantify and categorize the simplest components of terroir in a way that can help us to define which are the most suitable for fine wines. We can do the plant-and-taste (the viticulturists version of the typists hunt and peck) method that defined the great vineyard sites of the old world but that takes a lot of time. It's probably worth our while to use technology to narrow the quality gap. After we find the best sites, the best possible viticulture needs to be applied.

Until this mapping and discovery process has matured and offers significant results, we'll need to rely on other viticulture technologies to increase quality in the vineyard. New viticulture has arrived in Pennsylvania that will allow us to push red wine quality hard in the direction of those above us. Higher density vine spacing, crop regulation, new rootstocks and clones, better canopy management practices, disease and pest control, vineyard floor management and others have become international standards for fine red wine. Bordeaux is probably our best model for red wines. It is a huge wine region and the wines vary in quality from the greatest in the world to very quaffable wine values. I think we want to achieve all of those styles but the high end represents the most daunting challenge for us and the goal of our most ambitious producers. These practices are being implemented by some of our newer vineyards. They are expensive to develop and operate but they bring us in line with the best vineyards in other better known wine regions. It is important that our best vineyards look and operate like the best in Napa Valley or Bordeaux.

Of all the wine regions I know about, Bordeaux's climate is probably the most similar to ours with warm, humid summers with rainfall and the potential for rainy harvests. So there is a lot we can learn from them. They have many hundreds of years of experience behind their wines, but it has really only been in the recent decades and the advent of modern wine growing and making that their wines have reached the pinnacle of quality where they now stand. There is not much we don't know about how to grow grapes that they know so there is really no reason why we cannot close the quality gap rather quickly.

In Bordeaux, if you got to Chateau Margaux or Chateau Lafite-Rothschild, or if you visit Le Montrachet or Romanee-Conti in Burgundy you will see (and taste) the dramatic power of a great site. It is interesting to note that the viticulture, while hardly sloppy, is not as fastidious as some of our best vineyards, or those I regularly see in California or Oregon. These great vineyards simply create vines in perfect balance because the terroir is nearly in perfect balance. You can argue rootstock or clone or certain viticultural practices, but only with extraordinary effort can a careless grower tip these great vineyards out of balance (make no mistake about it, it can and has been done in the past). The other great factor in the quality of any vintage is the weather. A great terroir has correct climate, but the weather can have a dramatic influence on any vintage.

Yet there is great power for viticulture to influence the outcome of a terroir. Probably one of the most notable examples is the work of Jean-Luc Thunevin at Chateau Valandraud in St Emilion, one of the first successful garagiste wine makers. He took a very modest vineyard site, and

enforced heavy handed, extreme viticulture on it and produced great wines. This clouds the issue of the relative contribution of site and viticulture.

In our own region, some of the new technology vineyards are planted on less than what might be considered ideal sites yet the wine that appear, so far as we have been able to tell from these relatively new vineyards, have the potential to be outstanding. The quality of viticulture and wine making have pushed these wine far beyond what might be expected from an average site. As ever, the weather conditions of the vintage are critical to the end result. The really neat thing about great viticulture is that anyone can do it, on any site, to any vines. It's seeing how far you can push wine quality by cultivating the vine to the max. What's the outer limit? You can actually find out what it is. We may not know our best soils and climates yet but we have the same viticulture tools available to us as the best wine growers anywhere in the world. That is where the playing field is always level and we should be taking full advantage of it.

Even if the site doesn't have the ideal soil and-or climate there is still plenty that can be done to improve (change?) the terroir such as drain tile, irrigation, proper soil and vineyard floor management, active frost/cold protection measures, etc. Everything should be on the table if fine wine is the goal. We can argue if ameliorating the site is changing its natural terroir characteristic but that's how you leverage the viticulture component into a better wine. If you are smart enough and have the resources to do it, it's probably worth a try.

Plant materials are certainly making a contribution to this rise in quality. New clones and rootstocks have become tools in the wine growers tool chest to push quality upwards but not without hazards such as viruses, nutrition issues, and disease susceptibility. There is a tremendous need for research into these new materials and a clone/rootstock trial would provide valuable information to the wine industry.

These new vineyards are essentially large experiments in growing fine wine in the Eastern U.S. Wine growers here are taking the knowledge and practices being used in other wine regions and test-driving them under our growing conditions, in our soils and climate. The initial results look and taste very promising.

From great vinifera wines to cold hardy hybrids there is such amazing potential in the diverse terroirs of Pennsylvania. The fun and intrigue here is in the discovery process.

Here are some ideas about what components of terroir may be needed to make a great wine. Some are within our means to manipulate, others are not.

1. Site requirements:
 - a. Climate: Weather must cooperate – warm and dry harvest season. We should try to map rain shadows to as fine detail as possible
 - b. Soil: well to excessively well-drained, low to moderate nutrient values. Map these, too, with slope, aspect and elevation as secondary characteristics.

2. Viticulture: From planning to management cultivate a healthy and balanced vine. Crop load must be correctly set. Most often < 2t/a. Canopy and fruit zone management should be exceptional. Grapes are defect free.
3. Vine density: lots of debate here. Movement towards smaller vines (< 20 ft²/plant).
4. Plant: Correct variety, clone and rootstock for climate and soil. Preferably certified plant materials. Try to promote a smallish vine with small berries.

Final word: Even with a less than ideal site, rigorous viticulture can make up for site deficiencies if the weather at harvest cooperates.

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 December, 2008

How do you know if your soil is low to moderate vigor or if your vine is in balance? These are some handy but general vine balance parameters from Glenn McGourty in California. They are based in California wine growing conditions but can be applied carefully to high quality hybrids and vinifera wines in the East. If you are outside of these ranges further investigation and corrections may be necessary.

Vine Balance Parameters

Glenn McGourty, UC Viticulture Farm Advisor in Mendocino County
 From Wines and Vines, November 2008

Effect of Soil on Vigor: relationship of saturation percentage to soil texture, CEC and available water (field capacity to permanent wilting point) based on 4' of rooting depth with no chemical or physical rooting limitations. From: Daniel Roberts and Bill Peacock.

| Saturation | Soil texture (soil) | CEC (meq/100g) | Available water | Potential vine vigor |
|------------|---------------------|----------------|-----------------|-----------------------------|
| <20% | sandy or sandy loam | 2-7 | <0.6 | very low |
| 20-35% | sandy loam | 7-15 | 0.6-1.0 | low to moderate |
| 35-50% | loam or silt loam | 15-30 | 1.1-1.4 | moderate to high |
| 50-65% | clay loam | 30-40 | 1.5-2.0 | high to very high |
| >65% | clay or peat | >40 | >2.0 | very high to extremely high |

Assessing vine vigor (general parameters, not absolute)

- Ideal shoot length is normally about 36", with 16-18 leaves per shoot
- By veraison, shoots are beginning to lignify
- Few lateral shoots
- Leaves are healthy green color (turning light green after veraison)
- Canopy should appear open and well ventilated
- The vine utilizes all of its allotted space in the trellis system (but not more)
- Shade beneath the canopy should be dappled with sunlight and not solid shade
- Two clusters of fruit are present on all shoots (may be less if clusters are large)
- Basal leaves should be green and functional, not yellow and dry
- Ripening fruit has uniform color from cluster to cluster and vine to vine

Fruit:shoot relationships from R. Smart

| Mean cane weight | ratio of fruit:pruning | vine vigor |
|------------------|------------------------|---|
| >60g | <3:1 | vines are overly vigorous. Too much wood, not enough fruit. Wines often have "veggie" flavors, shading of fruit zone may cause poor flower initiation and fruit set |
| 20-40g | 4:1-6:1 | Vines are balanced, especially at 5:1. Wines have good balance of alcohol, acidity, tannins and color |
| <10g | >7:1 | Vines are over cropped, not vigorous. More canopy is needed to properly ripen fruit. Wines tend to be light in color, low tannins, high pH, low in acidity |