



ASEV 2016 Extension Distinction Award

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In Vino Veritas and Jefferson's Dream

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Dr. Zoecklein is currently the research coordinator for Applied Research Cooperative (ARC), a federation of wineries in California, Oregon and Washington, conducting science-based applied research. He is the former head of the Enology-Grape Chemistry Group at Virginia Tech and editor of Winery Planning and Design and Enology Notes,

a technical brief with more than 3,500 subscribers that discusses practical grapegrowing and winemaking issues. He is a co-author of Wine Analysis and Production and a certified auditor for the Wine Institute's Sustainable Winegrower's Alliance.

Dr. Zoecklein taught enology at California State University, Fresno, and California Polytechnic State University in San Luis Obispo. As head of the Enology-Grape Chemistry Group, he conducted research, extension, classroom and graduate student education, and oversaw the creation of a commercial analytical laboratory service for the wine industry.

Dr. Zoecklein's research interests include grape-derived aroma and flavor compounds.

The ASEV Extension Distinction Award recognizes a current extension educator for outstanding contribution to an extension program or the advanced translation of novel research findings into commercially applicable tools for enologists or viticulturists.

The following is an excerpt of the Extension Distinction Award presentation given at the 67th Annual Conference of the American Society for Enology and Viticulture, Monterey, California.

"The faster the scientific advances, the greater the risk of widening the gap between what we know and what we do." Émile Peynaud

My goal today is to discuss extension and my extension philosophy while providing a brief snapshot of the Virginia wine industry. The Virginia industry and, indeed, the US wine industry began in 1619 with Act 12. This required

each head of household to plant 10 vines. Thomas Jefferson was not only the author of the Declaration of Independence and our third president, but he also ranks as Virginia's most famous vintner, even though he never produced a single bottle of wine. His first *vinifera* plantings began in 1771, but he was unsuccessful in growing grapes at Monticello, due mainly to fungal diseases. The fact that Jefferson, accomplished in so many fields from politics to architecture to music and beyond, could not grow wine in Virginia shaped the perception of the potential of the wine industry in the state for some time.

The modern era for the Virginia wine industry began in the 1970s with the general increased interest in wine in our society. My era at Virginia Tech began in 1985. They say that nothing goes faster than the future because, for most of us, it seems like only yesterday that we were calling today tomorrow. It seems like only yesterday that I began my teaching, research, and extension appointment at Virginia Tech but, indeed, it was some time ago.

For those not engaged in the wine industry in 1985, it is difficult to adequately describe how truly embryonic the Virginia industry was at that time. There were 34 wineries producing wine, and some of that wine you could even drink! Admittedly, when I arrived, I was feeling a bit apprehensive, to say the least. At that time it was widely assumed that the real wine industry stopped at the California border. To add to my already vast sense of insecurity about being in Virginia to work on wine, in late 1985 a friend sent a book authored by a leading wine expert (an expert is defined as anyone who guesses correctly more than once). Imagine my surprise when I discovered Virginia listed in the index. I quickly turned to the back of the book to locate the nearly page and a half on Virginia wines. While I cannot offer an exact quote, I certainly remember the essence. To paraphrase, this expert said something like: "Yes, they do make wine in Virginia, but one has to ask why."

This was not simply a singular commentary on quality. He went on to suggest that since it was so much easier to

produce wines in arid California, why would anyone bother to grow winegrapes in the warm, humid environment of Virginia? Fortunately for us all, this "leading authority" did not understand the soon-to-emerge interest in regionalism, including regional cuisine in which wines fit nicely. That interest is a primary reason for the growth and development of so many wine regions throughout the entire country.

Early on, our goal was to review the factors limiting the Virginia wine industry growth. We attempted to develop applied research and extension programs to mitigate constraints when possible. Constraints were numerous, although not entirely unique, and included capital, environmental issues, disease pressures, limited technical training, and the difficulties of marketing wine from an embryonic wine region.

Capital requirements are always an issue, and it is no different in Virginia. Land prices are less than say, some north coast California counties such as Napa, but they can be quite pricey. Vineyard establishment, operation, and winery construction costs are considerable, as everywhere. Therefore, the universal doctrine still applies: It doesn't matter if you are rich or poor as long as you have money!

Environmental risks were and are substantial. The environment of Virginia and, indeed, its winemaking culture, is much more European than California-like. There are cold winters and the yearly potential of spring frost. Frost can be very destructive, just as we have seen in Burgundy this year. Virginia has warm days, warm nights, and an annual rainfall of about 42 inches. Of course, the rains often do not come at the correct time of year.

I arrived in Virginia during the 1985 harvest, which experienced 13 inches of rain in just a few days. I remember visiting a long-time grapegrower during harvest. As a means of getting acquainted, I asked him some pedestrian question such as "What are your most limiting issues in managing your vineyard?" He looked at me, looked at his Riesling clusters going to hell in a handcart due to sour rot, then, with a sigh, gave me a look suggesting that this was, indeed, the dumbest question he had ever been asked. He answered by recounting the collective grapegrowers' mantra: "All you need to know about me and this vineyard is this: my favorite time of year is midway between the flood and the drought."

I learned rapidly that fungal disease was an issue, with high disease pressure from bunch rot and downy and powdery mildew. Two other important limitations to industry growth were the few technically trained practitioners and the determination of how to market wines for the new, embryonic industry.

We attempted to impact these constraints through research and extension efforts. Growth in the number of Virginia wineries and, indeed, the wine quality, provide testimony to our success. Today the Virginia industry boasts some 275 farm wineries. Most are boutique wineries producing fewer

than 10,000 cases annually and growing most of their own fruit. The growth of the industry has certainly contributed to the economic betterment of the state, which has created a positive political climate, perhaps as important as the viticulture climate. The industry by California standards is very small; however, its growth represents a major increase in the wine culture in Virginia, providing a benefit regionally and nationally.

The rapid growth and improvement in wine quality are mainly the result of the confluence of a number of mereological features, including a progressive state government, proximity to affluent wine consumers, and research and extension programs conducted by Virginia Tech.

I have long been fascinated by how our industry acquires and uses knowledge. Émile Peynaud provided a quote some time ago that I believe is relevant today: "The faster the scientific advances, the greater the risk of widening the gap between what we know and what we do." My interest in knowledge and knowledge acquisition was enhanced by a theophany, of sorts, that I experienced during a visit to a prestigious Medoc producer 22 years ago.

While we were walking through one of their vineyards, the winery personnel stated that their greatest asset in controlling *Brettanomyces* spp. in the cellar was their biodynamic (BD) practices in the vineyard. I was intrigued. At the time, biodynamics was barely within my limited lexicon. According to winery personnel, BD practices promoted a natural balance in the fruit that aided in the control of Brett. I did know enough about the subject to question the wisdom of their statement. I simply asked for the scientific justification for BD controlling Brett. Perhaps not unexpectedly, they offered none. There is no substitute for success; I certainly understand that reality. However, the real surprise was that the lack of scientific justification was not a concern. Indeed, when I asked why certain other vineyard and cellar practices were conducted, their typical response was analogous to Aristotle's Fallacy of the Consequent: "We do it this way because we do it this way"—in other words, because they thought it worked.

This reminded me of the different attitudes towards knowledge, both what it is and how it is attained. It further reminded me of my classroom experience. As a university instructor, I have found that one of the hardest concepts for my students to fully appreciate is that human thought has a history. The way we think now, the way we understand the world, is not the way people have always understood it or thought about it, even very recently. Any change in epistemology, how we think about knowledge (what it is, how it is acquired, what its limits are, how one tests that knowledge, how one thinks about these issues), influences every particular subject we can discuss, including viticulture and enology. I believe this is particularly relevant in university extension delivery, because not everyone thinks about knowledge the same way.

In my experience, wine industry practitioners often tilt toward one of two directions with regard to acquired knowledge. Broadly outlined by the rationalism of René Descartes, who suggested that reason, and reason alone, unaided by the senses, yields knowledge of the world. This philosophy is contrasted by the empiricism proposed by John Locke, among others, who thought that true knowledge can only be acquired by our own experiences. In Locke's view, the mind begins with a blank slate, a *tabula rasa*, on which experience imprints ideas via the senses and reflection.

These dual, semi-reciprocal philosophies or attitudes are infrastructures of the wine industry's development. However, different practitioners balance and value these philosophies differently. Those with science-based underpinnings often view themselves as rational, shedding myth and superstition. They have faith in the superiority of the new, certainly not in antiquity or tradition. There is a sort of idolatry of reason. However, I find many industry practitioners rely heavily on empirical knowledge even when not supported by science, such as my friends in the Medoc. *Pour voir c'est croire*—to see is to believe.

Empirical knowledge has value, of course, particularly in an industry such as ours. However, it also has obvious limitations. Empirical knowledge is derived from the senses and our senses can be errant. For example, a stick in a bucket of water appears bent, but it is not. An additional problem with relying too heavily upon empirical observations is that, if two outcomes are similar, we have a tendency to assume they must have a similar cause. This may or may not be correct. This problem goes even further back than Francis Bacon, who reminded us, "Genius is like fleet of foot, method is the right path. Fleetness of foot on the wrong path never leads to knowledge."

However, the problem I see is not the dichotomy between rationalism and empiricism. Some in our industry rely not on their own empirical data, but on observations of others. Instant communication allows us to know what is happening everywhere in the wine world. Some industry personnel read or hear about a technique or process and simply attempt to emulate that practice or procedure as is, assuming that it will convey the same result for their situation.

Likely, we should suggest the Socratic method that tests every assumption for its grounding and implications. We should make distinctions highlighting the importance of relativism by asking the following questions: What information is true, universally correct under all circumstances, and what information is specific to time, place, and local conditions? These are important traits to be highlighted.

Science appeals to our rational brain, but many of our beliefs are based on emotion. According to social scientists, the biggest influence is our association with our peers, providing what is termed tribal or conformational bias. This suggests that inducing industry leaders to be "on board" may be

the most important feature in adapting change. As Blaise Pascal wrote,

"The heart has reasons that reason does not know."

Additionally, as a university member, I have been forced to field comments such as "You academics strongly discouraged industry from employing uninoculated fermentations, sulfite-free wines," or whatever the hot topic of the day that may not be well supported by science. "Yet," they say, "some of the better products in our region are so made."

The implication is that we in the university community are not very progressive or, at the very least, are somewhat out of phase. I think it serves us well to continually remind industry clients of several things. First, we in the academic community recognize that wine is an art form. We further appreciate that science does not have all the answers. Indeed, Werner Heisenberg taught us that science can never provide all the answers. However, industry needs to be reminded that university extension is charged with the responsibility of providing science-based recommendations.

Additionally, it serves the industry well to recap what science is and what it is not. Science is not a body of facts but a method for deciding what to believe based on the laws of nature and a validation scheme. Results are always provisional, always susceptible to being overturned by future experimentation and observation.

The enology extension program at Virginia Tech has a number of elements, each geared to the delivery of science-based information. Information relayed is based on the highest educational level of the clients, not the lowest common denominator. Perhaps the capstone effort is the Enology Notes, an electronic technical brief which, at its zenith, was sent to more than 3500 subscribers world-wide and is available at www.vtwines.info.

The philosophical canons behind the enology extension program and specifically the Enology Notes are as follows: First, with regard to science and the wealth of information available which overwhelms us all, industry members' attitudes can often be summarized: There is so much to learn and most of it is not worth learning. As such, we attempt to put issues in very practical terms, discussing ways of increasing quality, lowering cost of production, or both.

The second canon is directly related to the first. We attempt to keep things as simple as possible, but not simpler. That is, we try to distill information down to the essence, but not further. But we certainly do not want to go to the other extreme. If industry members ask what time it is, we do not attempt to explain how watches are made!

All wine regions have their share of rock-star winemakers who have read their own self-generated press clippings and presume to know the ultimate truth about winegrowing.

Some of these folks truly suffer from what can be described as hardening of the attitudes and see little need for either assistance or change. In our extension efforts, we attempt to convey a philosophy that may serve us all well: It is what you learn after you know it all that really counts.

Finally, it is important to remind the industry that we are not in a static environment, and we need continued advancement. I remember reading the now famous article about Wayne Gretzky, the hockey player. He was asked the reasons for his success. Instead of listing the attributes

of innate, intrinsic athletic ability, Malcolm Gladwell's theory of 10,000 hours of practice, his team members, etc., he offered a very simple explanation that serves as an important analogy for all looking to advance. He said, "I skate to where the puck is going, not to where it has been."

The teleological goal of my extension programs from the beginning was to provide science-based information to supplement the artistry. An understanding of how we acquire and use knowledge is key to both extension delivery and industry advancement.