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Wine by the Numbers

by David Darlington

Has Leo McCloskey, the founder of Enologix, discovered the scientific formula for making great wines?

Of the various places he's lived and worked in the course of his 54 years, Leo McCloskey - founder and president of Enologix, the controversial wine-quality-management service based in Sonoma - seems to remember Santa Cruz with particular fondness.

"I was living the life," he recalls. "I had a house on the ocean; I had my surfboard and my tennis racket. But if I wanted to play in the big leagues, I had to move to the 'walled city of wine.'"

By "the walled city," McCloskey actually means Napa Valley. He considers Sonoma, where he moved in 1994, to be on the "outskirts" of Napa - close enough for professional credibility but not quite in the belly of the beast. In any case, since making the move, Enologix has become increasingly notorious - in both senses of the word.

McCloskey's company analyzes chemical compounds that contribute to a wine's flavor and aroma. After comparing the results with 70,000 other wines in its computer database, Enologix predicts how the wine will score upon release. (The official motto, as published in the company's magazine *Global Vintage Quarterly*, is "Tomorrow's ratings. Today.") McCloskey thus claims he can enable wineries to target and achieve a commercially successful style. But he goes even further than that, insisting that it isn't merely a matter of taste. Based on scientific analysis, he says, high-scoring wines are - verifiably and inarguably - the best wines.

This notion has won McCloskey as many detractors as admirers. "Leo is saying that the consumer value chain is legitimate," McCloskey says of himself. "But winemakers who don't accept the future tend to resist the media [i.e., the

scores in magazines]. Whenever new technology is introduced, there are early adopters, and there are laggards; my customers are the early adopters - and what's happening? They're running away with the scores."

Terroir in scientific form

McCloskey grew up in San Francisco and Cupertino. As a freshman at San Jose State in the late 1960s, he intended to major in fine arts; when his parents nixed that plan, he transferred to Oregon State and majored in general science instead.

After graduation, Leo came back to Cupertino and got a job painting barrels at nearby Ridge Vineyards. Within a year, he was running - and improving upon - significant portions of the lab. In 1976 he became half-owner of the nearby Smothers Winery in the Santa Cruz Mountains, and a year later, he helped found and design Felton Empire Vineyards. Finding himself "bored" with winemaking, however, he enrolled in UC Santa Cruz's graduate department of chemical ecology.

"Chemical ecology is the idea of terroir in scientific form," McCloskey explains. "My group worked with forest products and essential oils, which happen to be the same chemistry that drives white Burgundy. According to chemical ecology, those wines are under the genetic control of the Chardonnay grape and the environmental control of Burgundy's ecosystem, or terroir. A third, much looser control, is the winemaker."

Before going back to school, McCloskey learned of a study that found the same polymeric red pigment in every member of a group of wines that rated highly in the '73 Australian vintage - and in Chateau Lafite-Rothschild. He began to formulate a theory that linked the chemical composition of wine to its quality and price. After receiving his Ph.D., he hired himself out as a freelance consultant. "The U.S. wine industry was changing from an entrepreneurial enterprise onto a more businesslike footing," McCloskey says. "Critics were starting to control the value chain that went from the winery to the distributor to the retailer and restaurateur to the consumer.

"In 1980, no appellation was as powerful as, say, the Robert Mondavi brand," McCloskey observes. "Then the critics made appellations into brands, and they made Napa the market winner. Now the critics' scores have gotten inside the wineries - a development that disturbed the industry. But when the dominant market metric is deep inside your value chain, that's when you know you're in business.

"Having a quality-management mentality is the norm in business," McCloskey says. "My game is to help the small-business guys be profitable by aligning themselves with [consumers'] quality standards."

Breakthrough at Chalone

Working as a consultant in the early '90s, McCloskey began compiling a chemical database of his clients' wines. Through his contacts in Silicon Valley, he began "trying to develop a company to [address the fact] that the consumer value chain was inside the winery." He recruited Marshall Sylvan, a friend who ran the UC Santa Cruz math department, to create a statistical model combining all the data he'd been collecting and, in 1990, approached Dick Graff, chief executive officer of the Chalone Wine Group.

"Winemakers are always surprised when their products don't work out," McCloskey told him. "But I think I can predict the winners two years into the future." Intrigued, Graff proceeded to fly McCloskey around the state in his company jet, surveying Chalone wines from the past decade with all the company's vintners; McCloskey compiled the tasting results, then went home and analyzed the wine's chemistry. Ultimately, the winemakers and their assistants were invited to a tasting in San Francisco where, presented with a smaller selection of the surveyed wines, each participant was asked to rank the six best and six worst.

While the assistants tallied the votes, McCloskey produced a sealed envelope containing his chemically derived predictions. As it turned out, he had correctly guessed the group's top three and bottom three choices in the correct order. Within a year, McCloskey's fledgling company had a dozen customers. In 1993 he trademarked the name Enologix, and the following year he moved to Sonoma.

The year after that, Graff noted that not only did McCloskey's scientific results accurately reflect the tasting preferences of regional winemakers, they also mirrored those of the national critics. Translating his findings to a 100-point scale, McCloskey launched the magazine *Global Vintage Quarterly* and gained another 20 customers within the year. Today Enologix has 10 full-time employees, including a director of technology, a systems engineer, an analytical chemist, two laboratory technicians, an administrative manager and a customer relations liaison.

Enologix clients now number some 60 companies and 100 brands, including such illustrious names as Beaulieu, Diamond Creek, Niebaum-Coppola, Joseph Phelps, Ridge, Sterling, St. Francis and Sebastiani. Recently McCloskey also began working with Australian wine mega-giant Southcorp ("the conservative mainstream," he says with satisfaction). The company also consults with smaller wineries that are struggling to find their place in an increasingly competitive environment.

"Our typical client," says Peter Monteleone, the 29-year-old systems manager,

"is somebody who, though he has a certain amount of winemaking experience, can't seem to achieve a highly regarded Cabernet Sauvignon. He needs us to find out why his wine isn't up to the level of his competitors."

On the chemical trail of "fabulous" wine

When a winemaker signs up with Enologix, he or she begins by sending samples to the company in Sonoma, starting with unpicked grapes before harvest and continuing through fermentation into the barrel and bottle. On receiving a sample, McCloskey's lab staff treats it with solvents and runs it through a chromatograph and spectrometer to isolate and measure its levels of various compounds - phenols, tannins, anthocyanins - associated with flavor, color and aroma. Enologix lab technicians assemble a chemical profile of the wine and, courtesy of software developed by McCloskey, compare it with other wines of its type in the company database.

"Of its type" is an important parameter. Based on their chemistry, all red wines are classified under one of four style headings: Style I is pale in color and low in tannin, like Pinot Noir; Style II is also pale but higher in tannin, similar to Sangiovese; Style III is dark and tannic, like much of Bordeaux and Sonoma County Cabernet; Style IV is similarly dark but only moderately tannic, like Chateau Lafite. (According to McCloskey, the most elegant and popular wines in the world - "the vast majority of successful, flagship mainstream wines" - are Style IV.) On the basis of its inherent style - and compared with a virtual "ideal" wine of the same type, derived from tastings that Enologix conducts with winemakers, owners, grape growers and wine writers - each sample is chemically evaluated and assigned a "quality index" between -1.0 and +1.0. (In the pages of *Global Vintage Quarterly*, a quality index of +0.5 roughly represents a 90-point score.)

From the moment the first sample is tested, everything that follows is geared to maintain or improve the wine's quality index - or, as McCloskey defines it, "its status in the market. If it's low [in projected value], we go to our library of domain knowledge" - meaning McCloskey's own winemaking experience combined with that of the half-a-dozen part-time winemaking consultants on his staff - "and ask which of the many techniques available would be appropriate [in this particular case]. Applying these methods, we can increase value incrementally by one half-point per month."

He offers a couple of recent examples: Last year, one of his clients on the Central Coast sent in a sample of fermenting Syrah whose quality index measured 0.42. According to Enologix, if left alone, the juice would have produced a Style III wine that would score in the 80s. Thus, to lower its level of tannin, McCloskey advised the producer to press the wine off the skins before it was dry (i.e., before all the sugar had converted to alcohol). The winemaker followed suit, and when he sent in a sample of the result, it had turned into a

Style IV with a quality index of 0.95.

Another example: In early October 2003, with much Cabernet Sauvignon still on the vines, a heat wave sent grape sugars soaring throughout the North Coast. Many producers rushed to harvest their fruit, but McCloskey advised holding off. According to samples he'd been receiving from clients around Napa and Sonoma, the grape-quality index in the vineyards was still at a "mediocre" level, but based on extrapolative analysis involving (among other things) growing degree days, Enologix predicted that the 90-point quality threshold would be crossed on October 21.

"In the first week of October, Leo was saying that tannin levels were too high," recalls Mark Lyon, winemaker at Sebastiani Vineyards. "Even though the sugars were high, the fruit wasn't physiologically mature - the grapes still needed to hang out there. When the weather finally cooled off again, the sugars went down, which isn't uncommon. So people who picked early are now dealing with high tannins and green flavors, but people who waited were richly rewarded."

"Jim Laube just reviewed the '03 Cabernet vintage in the Wine Spectator," McCloskey reports. "He said it's spotty, like '98. But my customers, if they delayed picking, had flavors that turned from herbal to plummy, and they made fabulous wine."

Clients' opinions of Enologix

While less experienced clients may let the experts at Enologix drive their winemaking, many say that the service they value most highly is the company's analysis of secondary chemistry. "Being able to measure tannin at different levels during fermentation is pretty impressive," says Corey Beck of Niebaum-Coppola. "In the past, we said, 'This tastes like it's ready to press,' but now we have the analytical data to back it up. Typically we'll do tastings every two weeks, but in conjunction [with Enologix], we're able to build models and do our tastings from that.

"When you're making a \$100 bottle of wine, it's always valuable to have another piece of information," Beck notes. "And if you're an Enologix client, you have a pretty good idea how the harvest is going all the way through. People are sending in hundreds of samples from different regions, so Leo can tell you, 'From what we've seen, Napa Cabernet has 10% more tannin than last year.' He's a very resourceful, intelligent individual, and he challenges you as a winemaker. He's always asking: 'Have you thought about this? What about this?' I like Leo, but we need to have a couple of shots of espresso before seeing him."

"Charlie Rosen, one of the founding partners of Ridge (and head of Robotics

at Stanford Research Institute), considered Leo a genius," says Paul Draper of Ridge Vineyards, which still works with McCloskey 33 years after giving him his first job. Draper says that Ridge continues to consult Enologix about its Bordeaux varieties, checking the wines' chemistry periodically after the harvest is over. "We do our own tannin analysis to give us instantaneous data to act on during fermentation," Draper says. "Then we run samples by Leo over several months to determine stability and again as the parcels are assembled into the final wine. But we don't have him tell us what we should be doing." Nor does Ridge utilize Enologix's unpicked-grape analysis since, according to Draper, "There's no way you can take a handful of clusters and get something typical of an acre of vines."

The Enologix database includes exhaustive information about soil, climate, clones, prices, winery equipment, viticulture and vinification practices, along with archived sensory analysis and critical scores, all of which can be cross-referenced by computer so that, according to McCloskey, "I can tell you which Cabernet clone Jim Laube likes best when it's grown on the Napa Valley floor." The company also evaluates wines in barrel, creating digital models of simulated blends (replete with virtual quality metrics) and goes so far as to recommend price points via its storehouse of economic data. (McCloskey reports that no Chardonnay priced under \$13 ever gets 90 points from the national critics. Optimal pricing, he says, produces "maximum dollars before the consumer rejects the product and maximum volume before the price drops.")

All of this, McCloskey says, is designed to "make winemaking better." "American males don't strive for anything but the best," he observes, expressing sympathy for the typical California vintner. "We need to help these people! Right now, the winemakers and critics are warring groups, but I want winemakers to be successful. The fundamental problem they have is scaling quality and volume - maintaining quality as they grow. I want to help people scale up the size of their company from insignificance to a good family business; my application helps them simulate a higher level of production before they actually make the wine. I'm here to help a producer break out above 2,000 cases into the national market - then 10,000, then 30,000 cases - all with the highest level of excellence."

And the highest possible price?

"I'm very uninterested in high prices," McCloskey maintains. "A high price is just a signpost of failure to produce volume. You might want (to make) the highest-priced wine in Napa Valley, but that also means you'll have the lowest volume - and you'll be out of business in a couple of years. Napa gets into an upward price spiral that drives their own brands out of the market - look at the highest priced brands of the '80s and '90s. They're not successful today. High prices kill the wine business (which is), ultimately, what causes housing developments

to go in instead of vineyards. To optimize price, quality and volume, you have to be a juggler. You have to think in three dimensions, which means you have to include the consumer."

For all his embrace of laboratory and digital technology, McCloskey's revered winemaking model is the old-fashioned, low-tech "French wine farm." "That's the tribe I came in with," he says of his days at Ridge, which was known for employing Old World methods in modern-day California. He says he's against such modern gimmicks as reverse osmosis and micro-oxygenation, which enable producers to reduce alcohol or "age" their wines without taking traditional measures in the vineyard or winery. "We want to keep people from having problems, rather than fix them," says systems manager Monteleone, adding what sounds like a signature quip: "We're a high-tech tool for low-tech winemaking."

The dissenting view

Not everyone buys this rhetoric. "Unwittingly or not, Leo plays right into the hands of that stuff," says Joel Peterson of Ravenswood Winery, who has worked with Enologix in the past. While characterizing McCloskey as "brilliant" and his service as accurate, Peterson found that Enologix "only provides certain kinds of information for producing wines in a certain range. I wasn't particularly interested in making wine that fulfilled that model."

Peterson elaborates: "If you look at the core of what Leo does, he archetypes wine by profiling wine critics. Because the financial stakes are so high, winemakers will look at that profile and try to get their wines there by any means possible. So critics - as opposed to the flavor and terroir of a region - are now leading the winemakers. We see Italian wines tasting like California wines and Bordeaux shifting to a sweeter, riper character through techniques like reverse osmosis.

"Of course, you can ask: 'What's the problem if it tastes good and people like it?' No problem, except that there's less diversity and less interest. Some people like unique, idiosyncratic wines, but if critics dictate consumer taste, a total of three or four palates end up defining what wine should be. That's how commodity products are produced - and at the end of the day, wine will be the subject of focus groups. When all wines begin to taste alike, as a consumer, you've got to ask what you're paying for. It just amounts to one more step away from wine as an art and one more step toward wine as technology."

Blending art, science and commerce

Peterson is rebutted, in theory, by the so-called Enologix Creed, a set of 10 principles, three of which are as follows: (1) "Winemaking is an art, not a science," (2) "Fine wines are born in ecosystems" and (3) "Distinct regional

wines is the first goal." (Two of the others, however, are "Know how to blend art and commerce," and "Marketplace performance is our measure of excellence.")

"Soccer teams may come from different countries, but all of them have to score goals to win," McCloskey says of regional wines. "What I'm interested in is indexing wines to consumers' rulers. The old way to make wine was the French farm; the new way is mass production. But I want to use information technology to manage the wine farm in California. That's the avant-garde. In any other industry, I'd be considered an innovator, but people in the wine industry are laggards and proud of it. Whenever there's change, there's resistance. When you come along with new ideas, you're inevitably perceived as disruptive. But you don't want to feel the resistance as negative because it tells you that you're there."

Enologix would indeed seem to be there. McCloskey reports that, on average, his customers achieve a five-point increase in their scores for red wines, six for white. Enologix bills its stellar client base more than a million dollars a year. With four straight years of debt-free profitability, McCloskey has had several offers from interested investors. Thus far, though, he's kept the kit and kaboodle to himself.

"I enjoy my company," he muses. "In the long term, I'll be looking for investors and another president, but the longer I hold out, the more the company is worth. My revenue stream now is larger than UC Davis' for wine. When the economy comes back, my valuation will go way up." Meanwhile, McCloskey says, "I'm hiring the best and the brightest - straight-A, towhead students from mathematics, biology, geology, analytical and developmental chemistry. They're the same age as the [up-and-coming] winemakers, but they're more highly paid. I want to keep these kids here and eventually give them the business.

"Here's my formula," McCloskey reveals, predicting his own future quality of life index. "I'm windsurfing in Rio Vista, and my employees are here trying to make winemaking better. As an old man, I'll just come around and hang."

But even when he's 84, McCloskey's employees will probably still need a few shots of espresso before he shows up.

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