

The Science of Ampelography

FRED DEXHEIMER, MS

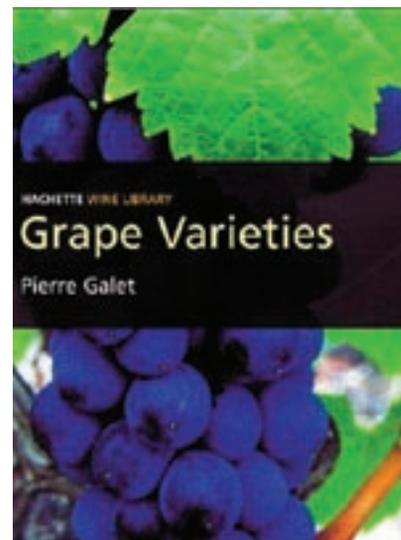
Fred Dexheimer is a Brooklyn-based Master Sommelier, cocktail creator, beer junkie, and occasional booze scribe. In 2009, he created Juice-man Consulting, with the mission of making the world a better place to drink. He is currently the U.S. educator for Wines of Chile, Wines of Southwest France, and DO Toro. In addition, he consults on wine and cocktail programs around the United States and Canada. Follow him on Twitter at FredDexMS or contact him at Fredjuiceman@yahoo.com.



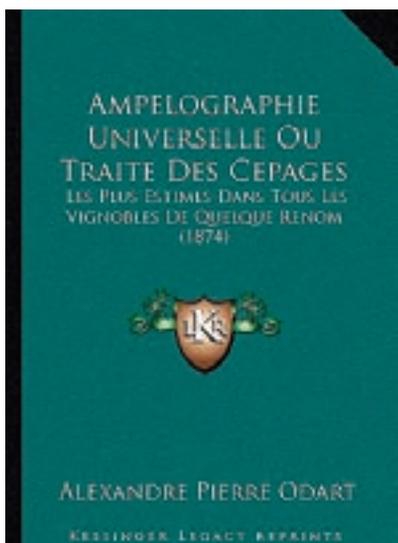
First-century Roman ampelographer Columella.

Ampelography, the branch of botany that deals with grapevines, is essential to today's winemaking industry. Yet it remains a field virtually unknown to many wine professionals. My first encounter with ampelography was as a young sommelier who never left his New York City apartment without Jancis Robinson's *Guide to Wine Grapes*. That book was my viticultural lighthouse, navigating me through the fathomless waters of the world's quirkiest grape varieties. I wanted to know every grape in the world, to taste the sweet nectar of each one, and to study their multifarious flavors and textures over the course of my career.

I'm still making my way through as many indigenous and unusual grapes as I can find. But when I started my consulting company in 2009, trips to Southwest France and Chile turned my casual interest in ampelography into an obsession. On my first visit to the region of Saint-Mont, I discovered what is believed to be the oldest pre-phylloxera plot in France—the Pedebernade vineyard, whose 85-year-old owner, Monsieur Pedeber-



200-year-old vine in the Pedebornade vineyard in Saint-Mont, Southwest France (left); ampelographer Pierre Galet (center).



nade, still walks the rows with stoic pride and his trusty vine clippers. Planted to at least nine unidentified varieties that are believed to be around 250 years old, it was like a vineyard museum. Later that day, I learned of the vines from the Institut National de la Recherche Agronomique (INRA) housed at Domaine de Vassal in Montpellier—a collection that has existed since 1876 and contains 3,000 cultivars from 35 countries. My guide and grape expert, André Dubosq, showed me a profusion of native grapes from the southwest, many of which were being cared for and resurrected from extinction to preserve a sense of history and to test them for commercial use. No

textbook could teach these lessons.

The next month, I went on a trip to Chile, where the work of French ampelographer Jean-Michel Boursiquot kept budding up. Upon my return home, as my interest in ampelography was blossoming, I started reading DNA case studies and books by pioneering ampelographer Pierre Galet. Then, when I had the opportunity to sample some of the top Croatian wines, I became aware that University of California-Davis professor Carole Meredith had identified Zinfandel as a virtually unpronounceable Croatian grape. Tasting Zinfandel from its homeland was an epiphany.

These experiences reinforced my personal mission to learn as much as I possibly could about the complex and historical science of ampelography. The works of Galet, Boursiquot, and Meredith intoxicated me. I was off to the Internet to peruse all sorts of strange and interesting websites related to grapevine studies.

What Is Ampelography?

Ampelography—its name is derived from the Greek words *ampelos* (“vine”) and *graphie* (“description”)—is the science concerned with the description of vine species and cultivated varieties. The study of ampelography covers not only the vines used for winegrowing, but those employed in rootstock selection, clonal selection, table-grape growing, and other agricultural and industrial applications.

Although ampelography has been helpful in resolving questions of vine origins for at least 2,000 years, it wasn’t until the late 19th century that it was put to commercial use. When diseases and parasites like powdery mildew, phylloxera, downy mildew, and black rot were brought from America to Europe between 1850 and 1885, ampelographers were driven to search for resistant cultivars. The need to develop more complete botanical descriptions was critical; after all, there were huge investments at stake. During this period, while ampelographers managed to develop many disease-resistant hybrids and rootstocks, they held on to their belief that



Carole Meredith (left); Jean-Michel Boursiquot (center).



Young Carménère and Merlot leaves (top); mature Cabernet Sauvignon and Chardonnay (middle top), Merlot and Cabernet Franc (middle bottom), and Petit Verdot and Pinot Noir leaves (above) from the collection at Domaine de Vassal.

Photos by Sergio Inglez de Sousa (top center), Bruce Schneider (top right); photos © J-P Bruno, INRA Domaine de Vassal, France (middle)

clusters of the mature fruit offered sufficient variation to permit identification—a method that ultimately proved incorrect because it left no way to classify related varieties and their distinguishing characteristics.

The Father of Ampelography

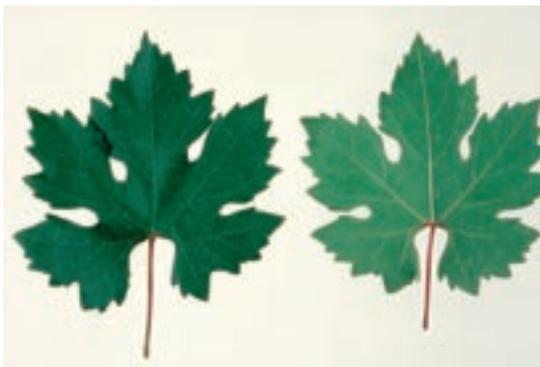
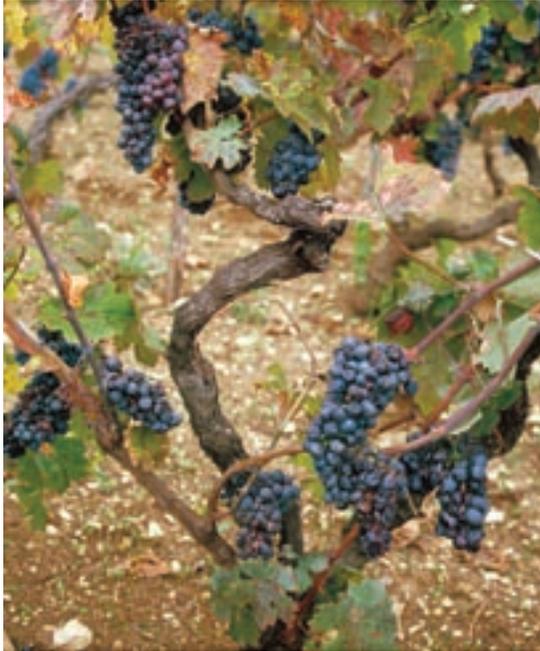
Until the mid-20th century, ampelography was an artful guessing game. After World War II, however, a new approach developed from the work of the great “Father of Ampelography,” Pierre Galet. Unlike most of his predecessors, whose descriptions and illustrations centered around the grape cluster, Galet based his system on the shape and contours of the leaves; the characteristics of growing shoots, shoot tips, and petioles; the sex of the flowers; the shape of the cluster; and the color, size, and pips of the grapes themselves. He hypothesized that grapes are less affected than the leaves and the shoots by environmental factors, and he even included grape flavor as a criterion (a subjective criterion, of course, depending on the taster).

Among other important discoveries, Galet identified more than 100 distinct varieties belonging to the Pinot family. In the 1980s, he found that vines labeled Pinot Blanc in California were actually Melon de Bourgogne, the same variety used to produce Muscadet wines in the Loire Valley. That discovery played an important role in spurring further studies to determine what California vintners had actually planted.

In 1952, Galet published his groundbreaking book, *Précis d’Ampélographie Pratique* (A Practical Ampelography, translated into English by Lucie Morton in 1979, Cornell University Press), identifying 9,600 types of grapevines. Between 1956 and 1964, he brought out a four-volume opus, *Cépages et Vignobles de France* (Varieties and Vineyards of France). Galet left an indelible mark on the wine world, and his passion for the vine extends into today’s generation of ampelographers.

The Advent of DNA Testing

The development of DNA fingerprinting in the early 1990s was another gargantuan step forward for ampelography. By comparing characteristic patterns in a plant’s genetic material through simple sequencing



Crljenak Kaštelanski grapevine in Croatia (top); *Tri-bidrag* herbarium leaves, from a Croatian grape found to be the same as *Crljenak Kaštelanski* (middle); Zinfandel leaves (above).

repeats (SSR), these DNA tests proved a highly accurate way to identify grapevine varieties, no matter where they happened to be growing.

Over the past 15 years, DNA fingerprinting has unraveled the genetic parentage of such international grape varieties as Chardonnay (Pinot Noir and Gouais Blanc) and Syrah (Dureza and Mondeuse Blanche). It has also served to clearly establish the origin of such misidentified vines as Carménère and mystery grapes like Zinfandel.

A Tale of Two Ampelographers

Boursiquot, currently a professor at Montpellier SupAgro university, and Meredith, now a UC-Davis emeritus professor and geneticist (and co-owner of Napa Valley’s Lagier Meredith Vineyard), picked up where Galet left off. Both of these luminaries have conducted and published pivotal studies by means of DNA fingerprinting, paving the way for even more ampelographic discoveries in the future.

Boursiquot was born into the grapevine business: his father was a vine grower in Charentes, traditionally a Cognac-producing region. A nudge from his father turned the young Boursiquot toward academics, but it wasn’t long before his innate attraction to vines and viticulture led him to work for Galet and Paul Truel, then director of the INRA collection of vines at Domaine de Vassal. After both men retired, their positions were combined under Boursiquot. Over the years, he made a number of unprecedented findings, including one that led him back home to Charentes to discover the unusual mother grape of Merlot, Magdeleine Noire des Charentes, along with the father grape, Cabernet Franc.

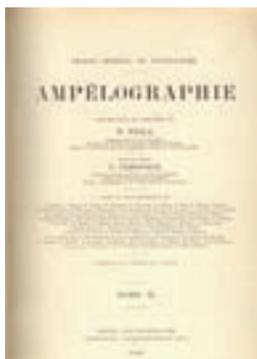
Boursiquot’s work in Chile might be his most important achievement. In fact, it’s an example of how ampelography revolutionized an entire national wine industry. On a 1994 study trip, Boursiquot was walking through the vineyards at Viña Carmen in the Maipo Valley when he noticed that what the locals were calling “Chilean Merlot” just didn’t look right. Upon closer inspection, he had a hunch that this might just be an ancient and nearly extinct Bordeaux variety called Carménère. Having trained under Galet, he was proficient at leaf identification, and he was struck by the crimson color of the leaves. His hunch proved correct, and after a few years of DNA testing, the case was put to rest. Chile had an entirely “new” grape variety on its hands—one that was planted virtually nowhere else in the world. As Meredith jokingly puts it, “Boursiquot is better than DNA at identification!” But his discovery forced the Chileans into a complete reevaluation of their vineyard plantings. The subsequent revolution in Chilean viticulture and winemaking is still taking shape today, with Carménère leading the way as the country’s unique, iconic grape variety.

Meredith entered the ampelographic world sideways. She had been immersed in genetic research on tomatoes, corn, and cotton when she landed the post of retiring UC-Davis viticulturalist and grape breeder Harold Olmo in 1980. Since then, she has directed some of the most important genetic grapevine discoveries in the world—including the heritage of Pinot Noir and Gouais Blanc, which have spawned more than 26 different varieties. Meredith’s research found that the globally dominant mega-grape Chardonnay was a scion of this marriage, as were such other common varieties as Gamay, Aligoté, and Melon. “And this only accounts for what still exists in vineyards today,” she points out. Meredith cites this work as her most significant, along with the solution of a viticultural mystery that had baffled American ampelographers for more than a century.

Vine worlds collided when Napa Valley winemaker Mike Grgich, a native of Croatia, claimed that Zinfandel reminded him of Plavac Mali from his homeland on the Adriatic Sea. This observation put agents of ampelography—particularly Meredith and her UC-Davis colleagues—on the case. In 1998, she and a team of scientists met in Croatia to begin studying old, indigenous varieties. By that fall, DNA testing had made clear that Plavac Mali was not Zinfandel, but was most likely related. In 2001, another Croatian variety, Dobričić, was found to be related to Zinfandel, but was still not an exact link. Later that year, during one last expedition around the island coasts of Dalmatia near Split, a tiny planting of a grape variety called Crljenak Kaštelanski was found. The DNA testing results came back a perfect match.

Over the past 10 years, the nascent Croatian wine industry has used this discovery as a springboard for the production of wonderfully unique wines from ancient indigenous varieties. “Winemakers there are now capitalizing on their association with Zinfandel and are increasing their production of this almost-lost variety,” says Meredith. “And wine tourism is increasing. I’d like to think we have given this area an economic boost, after all the damage done to their wine industry by centralized winemaking under Communism, not to mention the physical damage to facilities during their civil war.”

Whether we look at ampelography from the perspective of 2,000 years ago or the present day, it’s clear that this science has been essential in promoting an understanding of the fundamentals of viticulture and in boosting the success of today’s global wine industry. Ampelography has identified grape families and parentages, developed disease-resistant vines and rootstocks, and solved the mysteries of many of the world’s unknown or misidentified vine varieties. Considering the renewed interest in the indigenous grapes of ancient Greece, Turkey, and Croatia—as well as countries like Italy, with more than 1,000 varieties still to discover—ampelography will only become more indispensable. Of course, the culmination of all this amazing work can be shared and celebrated in the form of a delicious glass of fermented grape juice. 🍷



IMPORTANT EARLY AMPELOGRAPHERS

Columella (1st century A.D.)

This renowned Roman agronomist was a wealthy landowner who traveled throughout the Roman Empire, documenting rural cultures and methods. In his 12-volume *Res Rustica*, the third volume deals with vineyards and orchards and the fourth with viticulture.

Alexandre-Pierre Odart (1778-1866)

A French ampelographer who specialized in viticulture and vinification, Odart published his *Manual of the Winemaker* in 1845 and an *Ampelography of All Known Varieties*, containing descriptions of more than 700 species and varieties of vines, in 1849.

Victor Pulliat (1827-1896)

Born in Chiroubles and appointed chair of viticulture at the Institut National Agronomique de Paris in 1884, Pulliat was an early advocate of grafting in Beaujolais. Songs were written in his honor: “I raise my glass and I drink to your health, Victor Pulliat.”

Pierre-Marie-Alexis Millardet (1838-1902)

This French botanist first proposed the hybridization of *Vitis vinifera* with American vines and, in 1882, created the famous 41B rootstock, still widely used today. In 1885, he mixed copper sulfate and lime to produce what we now know as the “Bordeaux Mixture,” a fungicide and bactericide.

Pierre Viala (1859-1936)

Viala is considered the first modern ampelographer. His early works focused on vine diseases such as powdery mildew and rot, but the real enemy of the era’s vintners was phylloxera. In 1887, Viala left on a mission to the United States to find rootstock varieties that could vegetate in limestone and marl soils; he returned with samples of *Vitis berlandieri*, *Vitis cinerea*, and *Vitis cordifolia*, deeming these the most suitable species to combat phylloxera. From 1901 to 1910, along with fellow ampelographer Victor Vermorel, he published a monumental seven-volume opus, *Ampelography: General Treaty of Viticulture*. Today, this rare edition fetches more than \$10,000 at auction, if you can find it.

Alexandr Mikhailovich Negrul (1900-1971)

A Russian ampelographer and inventor, Negrul was the first to group grape varieties according to their similarities in families.

Victor Pulliat (top left); Pierre-Marie-Alexis Millardet (top right); Pierre Viala (middle right); Alexandr Mikhailovich Negrul (bottom).