# THE DNA OF BOURGOGNE WINES

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A PUBLICATION of the bourgogne wine board's technical & quality department









EDITORIAL

The 2023 vintage is resting in our cellars, the happy conclusion to an eventful year. A new vintage is already taking shape on our hillsides. Like all the previous vintages, it will require our experience and responsiveness... isn't this the right time to stop for a moment and look back at our past – our heritage – to better understand it and benefit from its lessons for the present and the future?

The present technical notebook looks at this past, at the history of the development of Bourgogne,

unique: the idea of terroir, which it has stubbornly perpetuated, generation after generation, through the immense challenges faced by winegrowers over the centuries. It has thus created a culture on our hillsides, in the cultural sense of the word, unparalleled in the world of wine. This culture has achieved the success we all know: our viticulture and the culture it has engendered are today regarded as the model for all terroir-based viticulture worldwide. This situation makes us

and at some more recent technical research. I am delighted that it does so, notably through the work of late personalities in oenological and viticultural science whose contributions were appreciated by all.

Looking back on our past leads us to reflect on what I would call the "fundamentals" of our profession and our responsibilities as winegrowers. First of all, our history, which was highlighted in an interesting interview with Olivier Jacquet from the University of Bourgogne. For more than two millennia, this very long and rich history has never forgotten its key element, which makes it all the more responsible for this cultural model, which is unique and precious, but also has its vulnerabilities.

Our vineyard soils and the respect they deserve are, of course, among these fundamentals. We are currently experiencing a small winegrowing revolution, resulting from the new conditions created by the climate crisis. In this context that forces us to adapt, it is essential to remember that our viticultural soils must be preserved and protected more than ever in their dimension as terroirs. These soils are living, resilient, but also fragile environments. The "terroir potential" of each



### plot is unique; it can live, but it can also die. It is up to us to look after these soils and understand how we can help them adapt their potential to these very new climatic conditions. Our history is made up of successive successful adaptations; it is our responsibility to research and find the adaptations that suit and will suit this new environment – with patience, respect, and humility.

These same qualities of respect and humility should also guide all our decisions concerning the difficult but essential topic of best practices in the preparation of plots for planting. Respect for the terroir in question must absolutely underpin the work of both winegrowers and vineyard managers. Awareness of the responsibility we have towards our terroirs is growing, as it must if we want to maintain our place at the top of the wine world. The difference between us and the vine is that the vine never forgets what it has been given or what has been taken from it, and it always returns what it has received.

The quality of our plant material is also at the forefront of our fundamentals. Thanks to science, stubbornness, and care, our vines planted on these qualitatively generous soils were able to survive phylloxera, but viruses and other wood diseases are more present than ever. They are not easy to avoid, and even less easy to combat. We must use everything that science and experience teach us to keep them away from our vines, but at the same time turn our selection efforts towards preserving our fine varieties of Pinot Noir and Chardonnay.

Thanks to the immense work carried out by, among others, Raymond Bernard and Michel Leguay, mentioned in this publication, clonal selection has significantly contributed to the restoration of vineyards deeply affected by fanleaf degeneration and leafroll disease. Their insights now allow us to apply the same rigorous standards to a selection process more focused on preserving the diversity of our fine lineages of Pinot Noir and Chardonnay, which have been and continue to be the foundation of our wines' reputation. Oenology, understood as the science and technique of winemaking, is certainly another of these fundamentals. This publication reminds us of some of the fundamental work that has been carried out over the last few decades. Here again, new climatic conditions are changing the situation experienced by my generation, and these are changes that can be summed up in one word: speed. Everything is happening faster: bud-break and flowering are much earlier, accompanied by increased frost risks; harvest decisions must be made three weeks earlier on average than in the 1970s/80s; malolactic fermentations are often very early, immediately following vinifications, as early as November or December; and the result is shorter maturations and earlier bottlings. This acceleration in the phases of the winegrower's work, and the adaptations it imposes, have had and will continue to have a significant impact on the organization of wineries and cellars for maturation and bottle storage.

I would simply like to emphasize an obvious point: viticulture and oenology are not two distinct phases of viticulture; they are interlinked in an inseparable continuity. Only the combination of a living soil and a vine that has successfully extended the life of that soil into its fruit can impart to the harvested grapes the unique identity of the place, which vinification and maturation are intended to enhance. There can be no great wine without great grapes – it's more than just a truism, it's a law! The winegrower is both a viticulturist and an oenologist; each role nourishes the other reciprocally.

I sincerely hope that the "fundamentals" mentioned in this publication - and there are many others remain ingrained in the hearts and actions of our winegrowers in Bourgogne. My generation experienced a time when our wines were judged with scores of 80 to 100 based on criteria of power and extraction, even though it was their elegance and finesse that had built their reputation over the centuries of production on our hillsides. Today, they are increasingly judged by the fine expression of the characteristics inherent to the terroirs from which they come. This is something to celebrate. Bourgogne, if it can maintain wisdom and humility, as it has generally done over a long period, has all the assets to build a bright future, having already established a great past.

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Aubert de Villaine
 Winegrower in Vosne-Romanée and Bouzeron.

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# WHEN DID WINEGROWERS IN BOURGOGNE START **VINIFYING BY PARCEL?**

Bourgogne's remarkably well-preserved documentation provides an insight into the practices of certain estates throughout the late Middle Ages. In 2014, two historians, Thomas Labbé and Jean-Pierre Garcia<sup>1</sup>, thoroughly examined the records of the cellar of the Collegiate Church of Notre-Dame de Beaune from 1332 to 1507, after which the canons ceased all direct management of their vineyards and stopped documenting the operations involved in making wine.

The accounting records permit tracking of the daily operations of the estate, from pruning the vines to putting the wine into barrels. The two historians deduced the procedures implemented by the canons from this information.



### The year **1419**

appears to mark a significant development in winemaking. Prior to this date, the strategy of

the cellar workers at the end of the 14<sup>th</sup> century was based on what came to be known as double pressing. Each year, the organization of the harvest and the vatting of the grapes followed a similar process:

- The planning of the harvest was done "peripherally" (i.e., following a logic of distance from the cellar, harvesting the closer vines in the first week and the farther ones in the second week).
- **The vatting** process involved filling the vats initially and, once they were full, pressing the grapes without much concern for their provenance or for obtaining specific *cuvées*. Within each week, the harvesting and pressing activities generally did not overlap.

Beginning in the **15<sup>th</sup> century** 

things evolved towards a more complex organization of harvests and pressings, and They propose several reasons that could explain this evolution in the organization of winemaking: Is the increase in the number of *cuvées* a logical consequence of higher yields? Or could it be the result of changes in winemaking equipment, such as smaller vats? Or could the reorganization of harvest operations be linked to the evolution of transportation routes?

While there are still questions as to the material constraints and practical motivations behind these innovations, which became widespread even as wine continued to be referred to by consumers simply as "Beaune wine," it is nevertheless one of the earliest references to a sensitivity to wine and its place of origin, which would become a norm two centuries later.

It's hard to think of a wine named after its soil without mentioning Henri Jayer and Cros **Parantoux.** The history of this *Climat* alone illustrates the importance of terroir in our vineyards. It was once a forgotten, fallow *Climat* that would eventually become legendary, rivaling the famous Romanée-Conti in price!

### A few words about Henri Jayer

- an increase in the number of *cuvées*. It was in 1419 that the term "wines" in the plural appeared for the first time in the collegiate church's documents.
- The "peripheral" planning of the harvest was replaced by a more "sectorized" structuring of the harvest.
- It became common practice to separate at vinification the grapes from several *lieux-dits* harvested together, to produce several wines from the same harvest operation, and to indicate this clearly.
- It even became common to vinify grapes from a single *lieu-dit*. For example, in 1496, the cellar master produced five separate *cuvées*, corresponding to five different *lieux-dits* (Charmots, Grèves, Peuillets, Chouacheux, and Vergelesses).

The link between the collegiate church's attention to production sites and the development of the notion of "*Climat*" in Bourgogne is a simple one. However, historians remain cautious, particularly because this distinction between *lieux-dits* was not declared at the time of commercialization.

### BORN IN 1922, HENRI JAYER ESTABLISHED HIS WINE ESTATE IN THE 1950s AND

**BOUGHT LE CROS PARANTOUX,** a Premier Cru classified plot in Vosne-Romanée that was fallow and bordered Les Richebourgs of Romanée-Conti. Jayer distinguished himself as a winegrower with an innovative (at the time) but now widespread vision that "wine is made in the vineyard." He placed particular importance on understanding each of his terroirs. He advocated for the recognition of the link between *Climat* and the uniqueness of the wine it produces: each *Climat* yields an original wine with its own "personality." His winemaking techniques were based on classic, minimalist vinification methods from the late 1960s, with long fermentation periods in new barrels and with malolactic fermentations lasting up to a year.

# **HOW COLETTE ANGERED** THE PROPONENTS OF BOURGOGNE WINE REGION DELIMITATIONS

From the "Chauvenet Controversy" to the Climats of Bourgogne.

Colette was in love with the wines of Bourgogne. Not those of her native Puisaye, which she evokes in her article "Ma Bourgogne pauvre" ("My Poor Bourgogne"), which "has no vines," but those of the Grand Cru wines.

And yet she almost fell out with the Bourgogne winegrowers over a little-known episode.

In 1929, Colette, accompanied by photographer André Kertész, went to Nuits-Saint-Georges at the invitation of the Chauvenet cellars, where she visited their vineyards and facilities. The resulting advertorial – though not explicitly labeled as such – appeared in the magazine *Vu* on April 3, 1929, illustrated with numerous photos, including the rather famous one of her tasting with a tastevin. Unfortunately, other photos taken by Kertész on this occasion were banned from publication.

Booklets featuring this article were also published. A few years later, Colette included the reworked text in her collection *Prisons et paradis*, under the title "En Bourgogne."

Although she regretted the American names chosen by Chauvenet (Red Flag, White Flag...), Colette praised branded and blended wines at a time when winegrowers were fighting for the delimitation of the Bourgogne wine region. This created a controversy that even led to a lawsuit.

> Colette's text sparked a reaction from Louis Fyot, President of the Dijon Bar Association, who argued in favor of a delimitation of the Bourgogne winegrowing area, in

contrast to the Champagne producers: « Very cleverly, our Bourgogne 'champagnisateurs' had recourse, to launch their manufactured products, to the delightful Colette, who in a fashionable magazine of the time had proclaimed to the whole world that the wines of Bourgogne would henceforth no longer be the work of viticulturists, but the work of wine merchants... »

Then Gaston Roupnel, a philosopher, historian, professor at the University of Dijon, and landowner in Gevrey-Chambertin, wrote a response to Colette which appeared in the Dijon newspaper "Le Bien Public." Here are a few extracts:

« Colette, I'm angry with you! That wine which sang out its identity, its terroir to you, you held it in the bosom of your glass (...) To be a lustrous Corton or a generous Meursault... and then to end up as "White-Flag"! To be an old Vosne or a delicate Morey and to end up as "Flag"!... even "Red-Flag"!... It's a bit harsh, isn't it? (...) We cannot, with impunity, ruin the ancient tradition that gives our wines their origin and nobility, the names of 'crus,' names that each proclaim the loyalty of a small piece of land and its glory throughout the world. »

This article by Roupnel was read before the court during the trial, which led to the delimitation of the Bourgogne winegrowing area in April 1930 and was revised in 1960. Colette thus indirectly contributed to this territorial recognition of "controlled appellations." The subject is still relevant today with the current efforts to support the candidacy of the "Climats du vignoble de Bourgogne" for UNESCO World Heritage status.

The reproaches levelled at Colette were soon forgotten, and in 1948, due to her health issues, and "with a heavy heart," she had to decline the invitation from "those good people of Beaune who wanted to appoint me as an Ambassador of Wine!" (Letter to Lucien Brocard).

An original edition of the magazine *Vu* is featured in the "Colette and Wine" exhibition, where you can read the three pages of Colette's article.



This anecdote reflects the economic context of the time. Until the 1920s, winegrowers did not have the status they hold today. They worked for others as tenant farmers, and when they owned vineyards, they sold their wine to wine merchants. After the phylloxera crisis, the quantities produced were substantial. The market was dominated by merchants who set very low prices, coupled with the difficult post-war economic conditions; these were times of crisis! These factors prompted winegrowers to modify their marketing strategy. They began engaging in direct sales and started "bottling" their own wines. Presented as a guarantee of authenticity, it was also a reaction from the property owners against the merchant-dominated system during the birth of the AOCs (this sparked a debate between terroir-based wines (cru) and branded wines2 - see article on the Colette page). In each village, there were professionals who began bottling for the first time, becoming flag-bearers for their appellation in this movement and marking an important turning point for the industry. Some examples include: Angerville; Rebourseau; Ramonet; De Vogüé; Poncon; Henri Gouges (source: Olivier Jacquet).

During the same period, the first cooperative wineries in Bourgogne were established in the early 20<sup>th</sup> century. The first cooperative winery to emerge in Bourgogne was in Morey-Saint-Denis, in 1905, followed by Vosne-Romanée in 1912, both in the Côte de Nuits. In the north of Bourgogne, the first cooperative cellar was created in Chablis in 1923. In the Mâconnais, a cooperative was founded in Saint-Gengoux-de-Scissé in 1926. Generally speaking, most of them were founded in the late 1920s or early 1930s. Winegrowers decided to form and join cooperatives in order to pool production and vinification resources, but also to improve marketing. This is particularly true in the Côte Chalonnaise and the Mâconnais, where 12 of the region's 17 cooperative wineries are still located. Initially, they sold their wine in bulk, allowing for quick sales and delegated marketing to wine merchants. From the mid-1970s into the 1980s, the members of many of Bourgogne's cooperative wineries decided to develop bottle sales and expand their range to meet the growing demand for quality wines.<sup>3</sup>

We can see that the difficult economic context was a catalyst in the structural reshaping of the industry, with the importance of terroir as a backdrop. Thus, the technical choices made by some groups have significantly shaped the history of the industry.



# THE TASTE OF WINE: BETWEEN IDENTITY MARKER AND REFLECTION OF THE EVOLUTION OF TASTING PRACTICES

We met with Olivier Jacquet, research engineer at the UNESCO Chair in "Wine Culture and Traditions" at the University of Bourgogne, who traced the evolution of tasting techniques throughout history.<sup>4</sup>



# Was the wine similar to what we know today?

The 20<sup>th</sup> century is a good example to illustrate the steady evolution of the taste of wines over a relatively short period of time, and there are numerous archives documenting these changes.

Technical developments had a considerable impact, from changes in vineyard practices (mechanization, must maturity analysis, etc.) to improvements in plant material and cellar processes (destemming, cellar cleanliness, control of fermentations and  $SO_{2'}$ malolactic fermentation, temperature control, etc.). However, other factors have also had an influence, such as the significant changes in regulations governing winemaking practices. After the phylloxera crisis, the fight against fraud and the systematic analytical control of wines, especially with the creation of the French Anti-Fraud Department in 1907, had a major impact on behavior.

The establishment of designations of origin after 1919, followed by the AOCs (*Appellations d'Origine Contrôlée*) after 1935, also pushed producers to comply with specific standards according to their production. As early as 1927, the obligation to determine authorized grape varieties for an appellation resulted, for example in Bourgogne, in the exclusion of Gamay (except for the granitic areas of Beaujolais) and Aligoté from the right to the Régionale appellation designation. Starting in 1935, constraints on yields, the alcohol content of wines, and later on the maximum level of volatile acidity, all had an impact on the taste of wines. Two key moments in this process are worth noting. First, the law of May 6, 1919, which allowed courts to decide whether a geographical area could lay claim to an appellation. The process was straightforward: a winegrowers' union or an individual could take legal action to exclude certain territories from the right to the appellation if they believed neighboring villages or winegrowing areas did not adhere to specific (local, honest, and constant) practices. Judges would then rely on administrative, commercial, historical, or pedogeological evidence provided by professionals to make their decision. It wasn't until 1935, with the decree-law of July 30 on the creation of AOCs, that we began to see the emergence of the technical specifications we know today.

Mentalities and tastes evolve, which I try to identify particularly through the archives of wine analyses and tasting notes. We can see that the vocabulary is very different from what we know today, and that it evolves over time. At the beginning of the 20th century, it was, in my opinion, very well adapted to what the main producers of the time, the négociants (wine merchants), were trying to do. Indeed, they were the ones who finished the vinifications, performed the blending, and conducted the maturations and the bottlings, thus shaping the wines according to consumer tastes. The tasting vocabulary at this time was very focused on mouthfeel. Terms like frank, sappy, mellow, hard, or acidic were used to describe wines more often than their aromas. For aromas, we'd mainly use terms like "a lovely perfume," "a beautiful bouquet," or "a wine with a bouquet." However, at the beginning of the 20th century, winemakers systematically focused on the level of turbidity in the wine. At that time, filtration - a process that would greatly change the profile of wines - was not yet well mastered, and only fining was widely used. Nevertheless, it was essential for the wine to be translucent to be considered high-quality and, consequently, marketable. Hence, among other things, the use of the wine tasting cup (a tastevin), which was well suited for observing the wine in dark cellars and, as a material expression of the vocabulary used, for assessing the wine's quality!

# Was there a lot of Gamay at the time of its exclusion from the right to the Régionale appellation in the 1930s?

To calculate how much Gamay there was, one would have to go through all the harvest declarations that have been mandatory since 1907, but that's an enormous task! It's likely that Gamay accounted for a large proportion of the total, particularly in the south of Bourgogne, given the outcry when the 1927 law was passed. More concretely, we have statistics from 1934 showing that in Pommard, 40% of the vineyard was still planted with Gamay, while in Pernand, it was 60% of the total. The appellation regulations accelerated this restructuring.

### So, there was no distinctive language between appellations concerning their typicity? Not even in commercial terms?

When defining wines from specific places, descriptions were still very focused on their structure. Phrases like "It has the bouquet of a Bourgogne" or "It has the lightness of a Chambolle" or "the firmness of a Chambertin" were commonly used.

However, the vocabulary expanded in the 1950s and 1960s due to the efforts of the INAO (the French National Institute of Origin and Quality) and certain producers who needed a broader common lexicon and more standardized tasting techniques to develop wine approval processes. The goal was to develop a vocabulary capable of more precisely distinguishing productions by appellation and to enable decisionmaking during tastings for problematic delimitations. The patent failures of tastings organized by the INAO to resolve the respective delimitations of Chablis and Beaujolais in the late 1940s also encouraged these new developments.

Jules Chauvet, in collaboration with INAO agents from Bourgogne and the Rhône, played a major role in this process of organizing and reinventing wine tasting (see p.12 "Technical Personalities of Bourgogne Wine"). Drawing inspiration from work in the perfume industry, he contributed to expanding and popularizing a vocabulary largely based on olfactory descriptors, enabling more precise distinctions between wines by appellation and characterizing grape varieties more thoroughly.

Thus, gradually in the 1960s, and especially in the

Along with numerous qualitative technical advances, these innovations helped to promote AOC wines that were still little known to the general public in the 1960s (only 12% of national consumption and 25% of French exports in 1968). These changes allowed higher quality wines to enter the market and culturally validated their uniqueness. This led to the institutionalization of the idea, previously little accepted by consumers, that origin and quality are inseparable under the same concept: typicity.

### It seems difficult to trace the evolution of tastes in our appellations throughout history, as the vocabulary has evolved significantly and has only recently become more precise. Isn't there another way to trace the quality of wines through history?

One could try, for example, to understand the evolution of wines through analytics. This approach has been attempted sporadically on a few Bordeaux vintages. But by systematically monitoring several indicators recorded in the numerous analyses performed throughout the last century, such as sulfite levels, alcohol content, tannins, total acidity, and volatile acidity, important insights could emerge. This is a project I'm currently working on, but it will require time, truly interdisciplinary thinking, and considerable collaboration between the spheres of research and production.

What You Should Know

1970s-1980s, the use of various fruits, flowers, or other sensory referents to specify the aromatic profiles of wines became systematic in tasting notes. While such comparisons were rarely used in older literature for certain well-known wines (such as hazelnut to describe a Meursault or Montrachet, or gunflint for Chablis), they became widespread in the last third of the 20<sup>th</sup> century in the writings of wine critics.

**Jules Chauvet**: was born in 1907 in La-Chapelle-de-Guinchay in the Beaujolais. As a producermerchant ("négociant-éléveur") and as early as 1951, he began vinifying part of his harvest without sulfur. He was a vocal critic of the use of additives in wine – such as sulfur, glycerine, chaptalization, and tartaric acid – which he believed distanced wine from its natural origins and terroir.

He noted the detrimental effects such inputs had on the flavor, complexity, and finesse of wines. Beyond his work with carbonic maceration, he also pioneered low-temperature fermentation and clarification techniques.

From the 1950s onwards, he contributed to the development of sensory analysis and the organoleptic approach that became prominent in the wine world, particularly in association with the INAO. In 1964, a simple technical tasting of Bourgogne wines at the Beaune Oenological Station, at the request of a Swiss hotelier, led him to promote his methods. He further presented his techniques at a landmark national conference in Dijon in 1966.



CÔTE D'OR



# A SNAPSHOT OF

Excerpts from the book *The Evolution of Appellation d'Origine Contrôlée Vineyards from 1950* to 1970 by the INAO<sup>5</sup>

Due to the high percentages of active is by far 41B. However, in areas where it is not compulsory, 161-49 and now S04 are limestone, the most widely used rootstock used, which seem to produce significantly better qualitative results. **3RAND AUXERROIS** 

 3309, which could be qualitatively replaced low content of active limestone has a further influence on the choice of rootstocks. Therefore, by 101.14, which is practically unavailable due the following rootstocks are commonly used:

The use of rootstocks is closely linked to their availability on the wood market. The

to its low grafting success rate;

CÔTE CHALONNAISE & MÂCONNAIS

For the same reason, certain high-yielding

rootstocks are increasingly being used,

such as Teleki and 5 BB.

However, Riparia Rupestris 3309 and

Riparia still dominate.

 161-49, which is increasingly being replaced by S04. CÔTE D'OR

Consumption Wines)\*, the most commonly used rootstock in the villages of the Côte d'Or and the Hautes Côtes According to figures provided by the 1956-1958 viticultural census carried out by the IVCC (Institute of Common was 3309C. Its popularity remained intact until 1934, after which it was gradually replaced by 161-49C.

In 1965, SO4 was introduced to the vineyards and gained significant momentum in the 1970s.



# The « Separate Square »

The principle of maintaining homogeneity of the [...] Mixing different grape varieties within a single vineyard serves as a defense against climatic destroy a harvest composed of varieties with the impoverished post-Roman viticulture but was irregularities, as frost or shatter can completely intensive practice was abandoned for centuries by revived in the prestigious vineyards of the Côte d'Or in Bourgogne starting from the oenological vineyard by using « separate squares » is one of the major tenets of Roman viticultural teaching. synchronized vegetative stages. This laborrevolution of the 12<sup>th</sup>-13<sup>th</sup> centuries.<sup>6</sup>

\* This institute was founded on September 30, 1953 by a decree published in the Official Journal of France. Its mission was to propose measures to the public authorities that it deemed necessary to ensure an overall market balance. It ceased operations in 1976.

# The constant evolution our vine rootstocks

0 JO

PAGE 9

**CHABLIS &** 

ROOTSTOCK

# KEY DATES AND TOPICS OF PROJECTS CARRIED OUT **BY THE BIVB**

FROM THE BEAUNE OENOLOGICAL STATION TO THE BIVB TECHNICAL AND QUALITY DEPARTMENT





After the phylloxera crisis, it became essential to provide scientific and technical support for vine cultivation. To prevent similar catastrophes in the future, viticultural and oenological observation establishments were created. Beaune was eager to join this movement early on. The reasons cited were that Beaune is the capital of the wine region and that the oenological station would greatly benefit both commerce and winegrowers.

In 1901, the municipality, with government support, decided to construct a "spacious building." The new facility would house laboratories, a permanent exhibition hall for winemaking equipment, a library, a conference room, and an apartment for the director. An architectural competition was held, which was won by Dijon architect Ludovic Allaire.

The construction was completed in 1905, resulting in several buildings: a main administrative building, laboratories, and a facility for testing winemaking equipment. Louis Joseph Mathieu was appointed as the first director of the Beaune Oenological Station.

From 1901 to 1919, Mathieu authored numerous documents on winemaking and oenology, which are now archived in the Beaune municipal library. The station was subsequently directed by Louis Ferré from 1920 to 1949 (see p.12 "Technical Personalities of Bourgogne Wine"). Only one building remains today, which is now the headquarters of the BIVB (the Bourgogne Wine Board).



FROM MUST TRIALS (VACUUM & FREEZE METHODS)

In 1946, the station was integrated into the newly established INRA (National Institute for Agricultural Research), and in 1960, it was administratively linked to the newly created research center in Dijon by the INRA. In 1984, the Bourgogne Interprofessional Committee (CIT) purchased the station following the cessation of INRA activities in Beaune and established the Bourgogne Oenological Center (COEB). The BIVB was established in 1989 with a team of five people dedicated to technical services. In 1995, the technical services moved to 6 rue du 16<sup>ème</sup> Chasseurs, into the premises of a former merchant house. Harvest machine trials Sprayer trials Selection and characterization of pinot noir and chardonnay clones Clonal selection

### **PELLICULAR MACERATION**

**FERMENTATION STOPPAGES** 

SETTLING LEVELS

MATURATION ON LEES AND LEES STIRRING

THERMAL PROFILES DURING ALCOHOLIC FERMENTATION

REDUCTION OF SO<sub>2</sub> DOSES AT HARVEST



### BERRY TASTING

DAVAYÉ PLATFORM: ORGANIC/ CONVENTIONAL/SUSTAINABLE

### CONSERVATORIES

NET USAGE: FROM 2015 TO 2017

ANTI-FROST TARP EXPERIMENTS FROM 2018 TO 2020

FLAVESCENCE DORÉE

SOIL EXPERIMENTS (EFFECTS OF COPPER, ORGANIC MATTER, CLIMATOLOGY...)

> | | | PAGE

### Rootstocks

VARIETAL CREATION WITH REGIONAL CHARACTERISTICS

VINE DECLINE

**CULTIVATION TECHNIQUES** 

All these studies were conducted in partnership with the ITV (Technical Institute of Vine and Wine), the University of Bourgogne, the Chambers of Agriculture, and with private companies such as cooperages.

# **TECHNICAL PERSONALITIES** OF BOURGOGNE WINE

18<sup>th</sup>C. tndre Jullien

Born in 1766, Jullien was a wine merchant originally from Chalon-sur-Saône who settled in Paris, earning the nickname of the "Bourguignon de Paris." Recognized as a passionate gourmet and a distinguished oenologist for his ability to distinguish between vintages and wines, Jullien is recognized as the founder and promoter of wine criticism in France through his two seminal works: *Manuel du Sommelier* ("The Sommelier's Manual," first published in 1813) and *Topographie de tous les vignobles connus* ("Topography of All Known Vineyards," published in 1816 and 1822). A pioneer in oenology, he was also one of the first to recommend food and wine pairings.

He emphasized the importance of grape variety, terroir (soil-climate-exposure), and must treatment as key elements for differentiating and categorizing wines (fine, average, mediocre).



The INAO (National Institute of Origin and Quality) presented Louis Ferré's obituary in its bulletin n°30 of June 1949 with these words: "An agricultural engineer, he was originally appointed as a technician at the Beaune Oenological Station in 1908, and became its director in 1920. It was there that for 40 years he diligently pursued the work that established the Station's reputation, extending beyond the region and even the country. Mr. Ferré, through his scientific work, was a remarkable technician, a member of the OIV, of foreign scientific societies, and several times a laureate of the French Academy of Agriculture.

malolactic fermentation (MLF). He was the first to demonstrate the accuracy of the Mösslinger equation. He also showed that during MLF, there is no excessive formation of volatile acids, unlike in other bacterial fermentations; Ferré believed that MLF is "much more common than is generally assumed" and added that "any wine containing malic acid is likely to undergo it sooner or later, which often leads to an improvement in the quality of red wines." According to Michèle Guilloux-Benatier, "this idea was completely new at the time."<sup>14</sup>



Guyot was born in Gyé-sur-Seine in 1807 and died on March 31, 1872, at the Château de Savigny-lès-Beaune. He began his career working for the Jacquesson Champagne house before being commissioned by the government to survey France's vineyards – a task he undertook from 1860 to 1867. This survey resulted in the monumental *Etude des vignobles de France* ("Study of French Vineyards"), which quickly became a classic and remains an essential reference in the history of French viticulture.

Guyot also advocated for and strongly supported several key ideas, such as his opposition to *provignage* and excessive layering. He championed the use of trellised vines on two wires and defended the use of fine grape varieties in the Côte d'Or: "The essence of the fine wines of the Côte d'Or is the grape variety; it's the pineau noir or noirien for red wines, and the pineau blanc or chardenet (sic) for white wines." In 1870, the Prussian invasion forced Guyot to hastily leave Puteaux, near Paris. He eventually found refuge with the Comte de La Loyère, the chatelain of the Château de Savigny-les-Beaune and a prominent vineyard owner with whom he had formed a friendship during his visit to the Côte d'Or. It was there that Guyot died in 1872, and he was buried in the Savigny-les-Beaune cemetery. Guyot's legacy lives on in several ways. The University Institute of Vine and Wine in Dijon bears his name. A pear variety, "Docteur Jules Guyot," was created in his honor. Additionally, the Guyot pruning method, which he observed during his travels in France and popularized (though he did not invent it), is named after him.<sup>12</sup>

His life, with its vast and comprehensive scope of action, was entirely devoted to viticulture and oenology. He had been an expert for the INAO. One of the last issues he focused on was the natural over-ripening of grapes, which is on the verge of becoming a practical reality."<sup>13</sup> Ferré made significant contributions to the study of

Ferré had begun writing a treatise on oenology specifically dedicated to the wines of Bourgogne, but his untimely death prevented him from completing it. With the agreement of his family, the INAO published his entire manuscript in its bulletins, and issued a separate edition.



20<sup>th</sup>C. leglise

Léglise was born in 1924 in Dijon. In 1948, he joined the Beaune Oenological Station, which he headed from 1963 to 1983. He was a prominent figure in the Bourgogne wine industry and one of the pioneers of sensory analysis in wine tasting.

Departing from the conventional oenology he was taught and practiced early in his career, he experimented with new winemaking processes at the station in collaboration with professionals. He provided simple yet precise insights into viticulture, cultivation, and winemaking that differed from prevailing oenological trends. His quest was for wine authenticity in expressing its terroir. "It's pointless to refrain from using synthetic chemicals in the cultivation phase," he stated, "if they are to be reintroduced in the processed products later." He developed a sensory-focused method for approaching wine, emphasizing aromas. Although not a media personality, he was a recognized public figure in Bourgogne, generally respected, sometimes debated, and occasionally criticized (source: a supplement to the magazine Le Rouge & le Blanc).

20thc. Michel Fewilla

Feuillat was born in 1937 and hails from Montargis. He pursued his studies in Auxerre, Montpellier, and Dijon. An agricultural engineer with a doctorate in science, he became a professor at the University in Dijon in 1979, where he directed the oenology laboratory.

A specialist in microbial biochemistry, he worked on the phenomenon of yeast autolysis on the Chardonnay wine matrix in Bourgogne.

He collaborated with Champagne producers on the second fermentation in the bottle, and also worked on the yeasts used in vin jaune (yellow wine) from the Jura.





Jules Journeou



Tourmeau was born in Tours in 1942. He served as an INAO agent for 38 years, including 30 years in Dijon. Initially hired as an assistant controller, he worked alongside André Vedel, who was then in charge of INAO's Dijon center. Upon Vedel's departure, Tourmeau was appointed center manager. He played a very active role in the creation of the Crémant de Bourgogne appellation, as well as in its technical and administrative implementation. He contributed to the Essai sur la dégustation des vins ("Treatise on Wine Tasting," 1972), an essential work on the subject. Notably, he is also one of the architects of the famous "INAO glass".<sup>15</sup>

Of course, this is by no means an exhaustive list! Raymond Bernard, Pierre Rayer, Roger Bessis, Jean-Claude Fournioux, and Yves Heinzle are other experts and technicians who dedicated their careers to improving knowledge and perfecting viticultural and winemaking techniques in Bourgogne. Are there additional figures you would consider noteworthy?

# **CHRONOLOGICAL TIMELINE OF KEY TECHNICAL MILESTONES** IN BOURGOGNE (6) (7) (8) (9) (10) (11)

**BEFORE 1700** 

1700

For Chardonnay wines: Fermentation in barrels and maturation on lees with stirring for 11 to 18 months.

1800

Some oenological practices are considered traditional in Bourgogne today:

For Pinot Noir wines: Destemming, cold

maceration, long vatting (2 to 3 weeks), open

fermentation vats, punch downs, fermentation

with indigenous yeasts, and maturation in new

oak barrels for 14 to 18 months.

# VINEYARD **CHARACTERISTICS**

- High-density cultivation: 18,000-25,000 plants/ha
- Propagation by layering ("provinage")
- · Very short pruning on long supports
- Yields of 5-8 hl/ha

# **KEY EVENTS IN VITICULTURE**

1366: The word "Pinot" is first mentioned in documentation from the north of Bourgogne. It is most often referred to as a "fine plant," or simply "best."

1395: There is a push for single-varietal production. A royal edict ordered the removal of "disloyal Gamay" plants in favor of cultivating a "good plant," which is understood to be Pinot Noir.

- Yields of 18.5 hl/ha on average (1338-1860)
- · Mixed red/white grape plantings
- · A great diversity of grape varieties (in 1782, for example, 29 grape varieties in the Dijon area, 8 in Beaune, and 6 in Chalon-sur-Saône)
- · Pinot was a rare grape variety right up to its AOC status. In an 1831 survey, it accounted for 6% in Gevrey; 17% in Chambolle; 12.5% in Morey... Just seven villages had more than 50% of their vineyards planted with Pinot (around Nuits and Beaune).

17<sup>th</sup> century: There is a restructuring of estates in the Côte to plant Pinot grapes.

18th century: Improvement in the selection of grape varieties according to terroir; more attention is paid to planting noble grape varieties in fine vineyards; the first references to Climat appear; the distinction between fine wine and ordinary wine grows more pronounced.

**1766**: A survey notes the first official designation of Bourgogne wines by their place of origin, which will pave the way for designation by their specific Climat.

Late 18th-early 19th century: Intensive cultivation of Pinot-Chardonnay.



1800: Widespread adoption of the practice of adding sugar to must.

**19th century**: Pre-fermentation crushing ("foulage") becomes an established practice.

The amount of time spent in vats continues to increase, with must often left in vats until the end of fermentation, and even longer (it is common to leave wines in vats for 15 days or more).

### **KEY EVENTS IN OENOLOGY**

4<sup>th</sup> century: Fermentation in wooden vats.

12<sup>th</sup>-13<sup>th</sup> century: The development of red wine and its extensive dissemination.

1420-1440: Initial thoughts on parcel-based vinification (Beaune).

Late 17th-early 18th century: The widespread popularity of keeping wine in bottles fosters the trend towards age-worthy wines.

1760-1770: The beginnings of oenological science, which leads to the processes listed below.

**1763**: The technique of heating musts to improve fermentation control (Maupin process) becomes popular.

1772: Written reference mentions the malolactic fermentation process and its beneficial effect on wine.

### WINE **PROFILES**

Vermilion wine ("red" wine) and "new" wine (consumed within the year; "old" wine for a few exceptional vintages, e.g. 1455 or 1591).

1779: First implementation of destemming, a controversial practice.

1790-1795: Extended vatting times for more color extraction.

There is no destemming; the vats feature floating pomace and are open. The maceration periods are short (between 2 and 8 days) for Pinot Noir, and a somewhat longer maceration period for Gamay (12 to 30 days).

1728: Arnoux highlights the contrasts between the partridge-eye colored wines of Volnay and the much darker hue of those from the Côte de Nuits.

Second half of the 18th century: Deep-colored, full-bodied wines with long aging potential ("velvety red color," "body," "bouquet").

1817-1822: The process of sparkling wine production is introduced in Bourgogne by J.J. Lausseure and Adrien Fortuné Janniard.

**1825**: « Wines must have a beautiful color. body - a certain degree of firmness - an aroma or bouquet unique to our wines, a certain spiritedness, and, finally, a pleasant taste that we refer to in our region as finesse. » - Dr. Morelot

How did these practices become established in winemaking over time, to the point of being declared "bourguignon" methods, even in regions other than Bourgogne?

While Louis Ferré noted (see p.12 "Technical Personalities of Bourgogne Wine") that "the ancient winemaking methods, enshrined in centuries of observation, have remained largely intact in broad terms," significant innovations in winemaking have emerged in Bourgogne since the 19<sup>th</sup> century, including advancements in equipment and a better understanding of the chemical mechanisms involved. Delving into the history of the vineyard, which likely dates back to the 1st century, we can see that many historical references to winemaking methods are linked to the Côted'Or area along "the Côte."

It would be a historical oversimplification to claim that these traditional bourguignon methods are the legacy of the Grand Cru wines of the Côte de Beaune and Côte de Nuits. A more technical explanation is that, up until the phylloxera crisis, and even a few decades afterwards, the Côte de Beaune and Côte de Nuits were more or less the historical cradle for cultivating Pinot Noir for fine wine production. In the majority of the vineyards, "ordinary" wine was produced from common grape varieties like Gamay.

The reconstruction of the vineyard after the phylloxera crisis, and especially the creation of the AOCs (*Appellations d'Origine*), gradually led to the abandonment of common grape varieties in favor of Pinot Noir and Chardonnay. The expansion of fine grape varieties was therefore an indisputable marker of the quality of Bourgogne wine.

1950

1850

**1861**: In the Côte d'Or, vines are densely planted ("*en foule*") with a single arm per vine, using layering ("*provignage*"); in the Grand Auxerrois, trellised vines are planted along rows with 2 to 5 arms per vine, also using layering; and in Chablis and south of Bourgogne, vines are planted in rows with 4 arms per vine, without layering.<sup>10</sup> Grape Varieties:

Côte Chalonnaise, Mâconnais: Pinot Noir, Petit Gamay, and Chardonnay \* Chablis: Gamay, Tresseau César (red), and Morillon Blanc (Chardonnay)

\* North of Bourgogne: Pinot Noir, Tresseau (or Verrot), Romain, César (or Picorneau), Épicier, Gouais, and Gamay \* Tonnerre: Gamay, Tresseau, Romain, and Lombard (red) or Béarnais and Morillon Blanc (white) \* Côtes d'Auxerre: 2/3

Pinot, 1/6 Tresseau, and 1/6 Romain

**1868**: Jules Guyot recommends planting vines at regular intervals, in spaced rows (trellising), so that the soil can be cultivated with a horse-drawn plow.

**July 17, 1878**: Phylloxera is discovered in Meursault. In Bourgogne, the first signs of phylloxera are spotted in Mancey in the Mâconnais in 1875.

**1887**: Authorization for the introduction of American vines into the Côte d'Or, and subsequent grafting.

**1840**: Introduction of submerged cap or immersed cap maceration.

**1845**: The Dijon Winegrowers' Congress severely condemns sugaring, considering it "detrimental" to the reputation of the region's wines (particularly in reference to the use of starch syrup).

**1866**: Regulations are established regarding the volume of casks.

• In the Auxois region, a **19<sup>th</sup>-century** census mentions a wide array of grape varieties: Mâlain, Gamay, Pinot Noir, Gris and Blanc, Chineau, Melon Blanc, and Troyen.

1900

And in **1948**: Gamay, Pinot, Aligoté, Melon, Gouot, Saint-Martin, Chagneau, etc.

- In the Côte de Beaune: Statistics from **1934** show that in Pommard, 40% of the vineyard is planted with Gamay; in Pernand, 60% of the vines are Gamay.
- Use of goblet, Royat, and Guyot prunings.
- Yields of 29.7 hl/ha on average (1945-1960).
- Appearance of trellising just before phylloxera (in the south of Bourgogne only) and then subsequent development in post-phylloxera plantations.
- Introduction of the plow and disappearance of the use of stakes around **1930**.
- Fertilization is generally discouraged until this period (with some exceptions).



**In the late 1950s**: The use of gas chromatography enables public authorities to better detect directproducing hybrids in wines. These hybrids had been banned from appellation wines since 1934, but are still present in some vineyards.

**In the 1960s**, there is a rapid disappearance of direct-producer hybrids in the vineyards.

**Early 20<sup>th</sup> century**: Modification of winemaking methods:

- Shorter fermentation periods (reduced to 5 or 6 days)
- Refinement of the traditional floating cap fermentation system
- Increased use of destemming ("égrappage")
- Reduced aging times to 5-7 years
- Gradual adoption of potassium metabisulfite (at very low doses)
- Beginning of published winemaking recommendations by the respective directors of the Beaune Oenological Station

**1903**: A law is passed to regulate the addition of sugar, requiring mandatory declarations and setting limits on the amount used.

**1912**: References are made to fermentation with indigenous yeasts or by preparing starter cultures – practices that are widespread in Bourgogne.

# Fermentations take place in small barrels (228 liters, sometimes even 114 liters), in which the wine remains until bottling.

1930: Louis Ferré describes the MLF process.

From the **1930s** onwards, pump-overs are recommended by various scientists. The practice gradually spreads to wineries.

The decree-law of **July 30**, **1935** on AOCs introduces more stringent regulations, leading to changes in vineyard and winemaking practices.

During **the post-WWII economic boom**, there is a gradual improvement in the cleanliness of wineries, better control of fermentation temperatures, and enhanced filtering. Destemming also becomes increasingly widespread, depending on the vintage.

In the 1950s, MLF slowly becomes widespread.

By **the late 1950s**, systematic grape ripeness control and assessment, which was first adopted in the Beaujolais, becomes the norm in Bourgogne.

**1884**: A law is passed lowering the duties on sugar to encourage chaptalization.

**1868**: Diversification of wine vocabulary: A. de Vergnette-Lamotte uses new terms such as "sappy," "roundness," "velvety," "dry," and "sharp".

Last quarter of the 19<sup>th</sup> century: For the good vintages, wines feature great body and long aging potential, in all forms (red, white, or sparkling).

References are made to keeping white wines on lees, and to slow, low-temperature fermentation of white wines.

**Early 20<sup>th</sup> century**: Generally, wines are more full-bodied and supple, but also less age worthy.

There is a significant reduction in vatting times to obtain maximum color with minimum tannin.

Managing ripeness and controlling vinification remains quite unpredictable, and difficult vintages still produce wines that are often very acidic, tannic, and low in alcohol. **1970**: Shorter vatting durations.

**1980s**: Lees stirring for white wines becomes a common practice.

**1966**: First use of the term "typicality" ("*typicité*") in a tasting note (*Revue du Vin de France*).



# **MATURATION** ON LEES AND LEES STIRRING FOR WHITE WINES

nterview

### Interview with Claudine Charpentier

Claudine Charpentier worked at the University of Bourgogne in the 1980s as part of Michel Feuillat's team (see p.12 "Technical Personalities of Bourgogne Wine") on several research projects focusing on maturation and, more specifically, the maturation of white wine on lees. She is now retired, and we met up with her to discuss the key results of her research on this subject.

# What are the main reasons for choosing to mature wines on lees?

This maturation choice is generally based on stylistic objectives. From an organoleptic point of view, several studies indicate that maturing wines on lees has led to balanced and creamy wines and, more generally, modifies the aromatic intensity of the wines. More broadly, sensory analyses have highlighted distinctive aromatic profiles between wines matured on lees and wines matured in barrels without lees. Additionally, the presence of lees gives the wine great aging potential and protects it from premature oxidation due to their strong reductive power.

# What impact does maturation on lees have on white wines?

During the maturation process, yeast cells break down upon cell death through a process known as autolysis. This phenomenon has been extensively studied at the University of Dijon. Yeast autolysis leads to the release of numerous substances that have a major impact on the stability and sensory characteristics of wines (see diagram).

# What are the aromatic compounds released by autolysis?

Our research has shown that there is release of volatile odoriferous compounds or aroma precursors, which are detailed in the accompanying diagram. A 1986 study conducted on a reference wine revealed the release of ethyl esters (with fruity odors) through yeast autolysis, with these compounds increasing significantly after several months of contact with the lees. This study also showed an increase in isoamyl alcohol and 2-phenylethanol with a rose-like scent during the first three months. Terpene alcohols, such as geraniol, linalool, citronellol,  $\alpha$ -terpineol, and farnesol, increased throughout the maturation process, with the exception of linalool, which decreased after three months.

And then there were the grassy-smelling aldehydes, which can adversely affect the wine's aroma. Most aldehydes tend to disappear during aging. Only benzaldehyde, which has a bitter almond odor, increased. helps limit the overall tannin content from oak wood and reduces the proportion of free-form ellagic tannins.

### And apart from the aromatic molecules?

A study has shown an increase in total nitrogen and amino acids in white wines matured in barrels on lees, as well as an enrichment in polysaccharides. There was also evidence of some protein degradation by acid protease A, which is released during yeast autolysis.

### What parameters can influence autolysis?

The maturation conditions of the wines are quite different from the optimal conditions for autolysis (pH 5.0, temperature 45°C), but the reduced rate of autolysis is compensated for by the length of time the wine is matured on lees, which can last several months or even years.

# What influence does lees stirring (*bâtonnage*) have on these processes?

At the beginning of our research, we noticed that when maturing white wines on lees, fining was almost unnecessary, as it occurs naturally. What's important in this type of maturation is to put the lees back into suspension (*bâtonnage*). In Bourgogne, this is done with the use of a special stick-like tool, called a "*dodine*" in French, which accelerates yeast autolysis. Stirred wines release more total nitrogen, amino acids, and polysaccharides. These polysaccharides tend to decrease, as do high-molecular-weight fractions, suggesting the action of a protease is enhanced by stirring.

This process ensures homogenization of the oxidationreduction potential (reduction at the bottom of the barrel and oxidation on the surface). Maturation on lees protects both white and red wines from oxidation, especially in new barrels, and limits reduction in older barrels. Lees have much higher potential oxygen consumption rates and affinities than the polyphenols in the wine, and compete with them for oxygen. We also realized that compounds released by yeast degradation can serve as food for lactic acid bacteria, thus influencing malolactic fermentation.

The importance and benefits of lees for the quality and stability of wines are well known to winegrowers. In Bourgogne, they say "lees are to wine as a mother is to a child." This saying has been verified by numerous scientific studies. Another unique aspect of Bourgogne's approach to this subject is the presence of a research team at the University of Bourgogne, which has significantly advanced our understanding of the chemical processes involved in maturing wine on lees. Eight lactones (with peach and coconut odors) were identified, with  $\alpha$ -decalactone being the most abundant. The formation of vitispirane, with camphor or eucalyptus scents, was also observed, along with the production of sulfur compounds.

It was also demonstrated that yeast cell walls are capable of combining with the wine's aromatic compounds, thereby reducing their volatility. Consequently, maturation of wine in barrels on the lees reduces the impact of wood taste and aroma, preventing it from excessively dominating the wine's other aromas. Oak lactones and vanillin are also linked to lees, although to a lesser extent. Furthermore, maturation on lees

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### ORIGIN OF THE VARIOUS COMPOUNDS RELEASED FOLLOWING YEAST AUTOLYSIS AND THEIR POTENTIAL IMPACT ON STABILITY AND ORGANOLEPTIC PROPERTIES



- Development of reductive odors
- Potential microbiological deviations if the harvest is initially spoiled

In the early 1980s, selected dry yeasts were not widely used. Selections had already been made in France and around the world, and professionals in Bourgogne used them whenever they wished. The Technical Commission of the Interprofessional Committee of Wines from Yonne and Côte-d'Or wanted to set up its own selection to be able to utilize yeasts from the terroir of Bourgogne. This initiative was launched in 1987. Wine samples were collected throughout the region.

This work was carried out with several partners,

including the Oenology Laboratory of the University of Bourgogne, the Departmental Laboratory of Mâcon, ITV Val de Loire, and the Interprofessional Committee of Mâcon Wines. The project lasted five years.

After two sampling campaigns, nearly 3,500 yeast strains were isolated. Following physical characterizations, fermentability tests in the laboratory, and small-scale trials in an experimental winery and then in actual wineries, about 10 strains were selected for both red and white wines. Three yeast strains from Bourgogne, CY3079 for Chardonnay wines, RC212 and RA17 for red wines, were made available to winemakers in Bourgogne, in France, and worldwide starting in 1992. This was done in partnership with the company LALLEMAND, which produced and marketed them.

The success of these strains has remained strong ever since, generating significant annual royalties for the BIVB.

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# CHANGES IN PHENOLIC COMPOUNDS IN PINOT NOIR DURING RIPENING AND VINIFICATION



# Interview

The Pinot Noir grape variety is known for having unique compositional characteristics that set it apart from other red grape varieties. This is because this grape displays particular traits in its phenolic composition. This grape is relatively low in anthocyanins and lacks acylated anthocyanins (which are more stable). These two characteristics explain why wines made from Pinot Noir have a low color intensity, and why it is more challenging to maintain the color of wines over the long term.

We spoke to Dominique Peyron, who worked at the Oenology Laboratory of the Jules Guyot Institute at the University of Bourgogne. After completing a thesis in Grenoble on the biosynthesis of polyphenols in peas, she spent 15 years researching Pinot Noir polyphenols. She discusses the key results of her research.

# What prompted you to start working on Pinot Noir polyphenols?

When I joined the team, I had the opportunity to work on a major program focusing on maturing wines in oak barrels. We began studying the characterization of Pinot Noir polyphenols because I had observed differences in how this variety matured in oak barrels compared to other grape varieties, and I was interested in understanding these differences. We started working on this subject around 1985; this type of research was new at the time, with hardly any teams studying the composition of grape skins. By monitoring polyphenols during the maturation process, we could determine the target maturity level, decide the harvest date, and make recommendations on the vinification process to get the best out of the grapes. We worked on this topic until 2000.

### What makes us so unique? What sets us apart from the rest of the world in terms of our knowledge about polyphenols?

We started by characterizing the grape variety. What initially surprised me was the paradox between Pinot Noir's ability to produce age-worthy wines and its relatively low concentration of color molecules compared to other grape varieties. This is mainly due to its rather distinctive tannic structure. The goal was to better understand the composition of the grape and its skins and their capacity to be more or less extracted during vinification. I will always remember that the first year we did these experiments, I didn't dare talk about the results we obtained because they contradicted almost everything that was being said at the time.

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Changes in tannin concentration in Pinot Noir skins and other red grape varieties during grape ripening.



Indeed, we observed a decrease in tannin concentration in the skins during the maturation of Pinot Noir, whereas it was previously believed that tannin concentration increased. We found that just a few days after veraison, there was a decrease in tannin content which, depending on the vintage, could decrease by as much as 80%.

determined. This peak usually occurred 3 to 5 days

before the classic sugar/acidity ripeness, depending

We also verified that this was a genuine decrease and not due to potential polymerization with other molecules making them difficult to extract. To demonstrate this, we used strong extraction methods, including grinding and solvent extraction.



This meant that by harvesting grapes at the traditional ripeness level, some anthocyans were already being lost. However, this also resulted in lower tannin levels in the skins, which can be explained by the initially very high tannin concentrations in the skins.

Evolution of tannin concentration in the skins and seeds during the ripening of Pinot Noir grapes compared to other red grape varieties.

on the vintage.



The final feature, and one that was very characteristic and surprising, was that the decrease in tannin levels in the seeds was always much less pronounced than in the skins. This reduction in seed tannins was observed in all grape varieties, but in the case of Pinot Noir, the tannin levels in the seeds were significantly higher, sometimes even vastly higher, than the tannin concentration in the skins.

In some years, tannin levels in the seeds were two, three, five or even ten times higher than those in the skins. Seed tannins maintained their astringent structure right up to the end of ripening, showing very little change in their structure. In contrast, tannins in the skins evolved in structure, resulting in tannins with a higher molecular size as the grapes matured.

\*The purpose of these curves is to illustrate trends and should not be used or considered as definitive results.

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### Is this concept of assessing polyphenol levels, which you've been working on, taken into account by professionals?

We have practically standardized this method. While it doesn't allow for instant decision-making, using it over two or three years would enable professionals to evaluate and adjust the techniques applied to the harvest. In the first year, we sampled and analyzed grapes as they were vatted, tank by tank. Then, at the end of alcoholic fermentation, we analyzed the pomace and juice. We compared what had been extracted with what was present in the wine. We noticed that there were losses, and these losses could be extremely significant depending on the winemaking techniques used, particularly in terms of color.

### Could that be related to the extraction percentage?

Yes, exactly! This also enabled the winemaker to learn how to better control the cold maceration period. We observed

*primeur* wines, there aren't enough tannins to bind these anthocyanins, which then degrade very quickly. After one or two years, 80-90% of the color is lost, resulting in red wines with the color intensity of rosé wines.

This is truly the hallmark of Pinot Noir, and it's essential to be extremely vigilant in managing both color and tannins. This means focusing on operations that favor combinations from the moment the grapes enter the vat, and taking care not to overdo them. If you perform too many vigorous pump-overs or excessive aerations, you'll lose color. Similarly, excessively long macerations will inevitably result in color loss. It's important to note that color is primarily extracted at the beginning, so we shouldn't rush the extraction process! The vat must be managed in a flexible or moderate way, with gradual extraction. Tannins are not extracted at the start of maceration because extracting tannins requires a certain alcohol percentage. Only when alcoholic fermentation has begun can tannins be extracted gradually. If color is extracted at the very beginning of the vatting period, by cold maceration for example, but tannins are not extracted afterwards, the color of the juice will be very fragile. So, it's really important to go very slowly, so as to be able to extract color and tannins almost at the same time. This approach enables the formation of combinations that stabilize the color compounds.

Depending on how we manage the extraction process, if we manage to lower this curve, meaning we perform very few mechanical operations and don't manipulate the harvest too much, we will extract less color. early and do not stir the bottom of the tank, the extraction will be much lower. This can be a key parameter to consider in managing the vinification process. In our research, the goal was to provide winemakers with tools to analyze their vinification outcomes, allowing them to reflect on their processes and experiment further in subsequent years.

We also conducted a study on the end of maceration and how to manage the extraction of tannins from the skins. The tannins in the skins have large molecular structures, which contribute to roundness, and are less aggressive than those extracted by leaching with the juice alone. The leaching technique is not sufficient to extract skin tannins, whereas towards the end of alcoholic fermentation, it can be beneficial for the wine's structure to extract them. This can be achieved by moistening the cap and, once moistened, gently pressing it in without breaking or overworking it. The objective is to prolong this period without any spoilage. We conducted several trials with Nadine Gublin on an estate in Meursault, which produced very satisfactory results. However, extending the process beyond alcoholic fermentation carries the risk of losing color. It is well known that the longer the process lasts, the more color is lost. Therefore, it is important to balance the gain in tannic structure with the consideration that color will also be lost during maturation. The challenge is to minimize color loss while achieving the most desirable tannic structure.

Could climate change affect these observations? Could

that there were often significant color losses during the transition from cold maceration to the resumption of fermentation with aeration.

### But is it possible to extract everything?

No, we never could, especially in the case of Pinot Noir, which has the most fragile anthocyanins among all grape varieties. This finding is unprecedented and rarely cited in the literature: the composition of Pinot Noir is unusual because it lacks acylated forms of anthocyanins, which are present in virtually all other red grape varieties. Acylated anthocyanins are much more chemically stable, so they retain their color more easily. This explains, as I always tell my students, why there are virtually no *primeur* wines made from Pinot Noir in the world. In Pinot Noir

### And what about minimalist techniques?

Here, it's a question of time. In the case of less manipulation, there's less binding in the must. Naturally, when there are fewer punch-downs, the grapes are crushed less, so the juice doesn't escape as much, which prolongs alcoholic fermentation. This fermentation is slow because there are always sugars available in the berries.

Managing the punching down process is also crucial. Since Pinot Noir has a high tannin content in the seeds, if you have a traditionally crushed or destemmed harvest, the seeds are released more easily. However, if you avoid early punchdowns and instead do them later in the process, the seeds in the cap will fall into a juice that is full of alcohol, leading to significant extraction. Conversely, if you let the seeds fall

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### having more advanced maturities have an impact?

I'm not sure it's solely due to climate change, but in my opinion, it's more related to all the factors disrupted by the changing conditions for grape development, such as the availability of water, for example. Even after the end of the program in 2010, we continued to assess the composition of the grapes and observed the same trends.

# HISTORICAL ANECDOTES

Crémant Bourgogne

The economics of red wine were so contested at the beginning of the 19<sup>th</sup> century that some local operators saw sparkling wines as a promising opportunity. They predicted a shortage of Champagne products in proportion to the growing consumption. As a result, a wine merchant from Nuits turned his attention to sparkling wine (*editor's note: red*) made using the Champagne method.

### Around 1822-1823

Joseph-Jules Lausseure "converted his finest Pinot Noir cuvées into sparkling wine: Nuits, Vosne, Tâche, Richebourg, Chambertin, Romanée, and Clos de Vougeot..." He was subsequently imitated by other producers, and production in Bourgogne reached nearly one million bottles in 1927.

### From 1822

In Rully, Mr. Petiot-Groffier, a wine merchant and mayor of Chalon-sur-Saône, commissioned François-Basile Hubert, a Champagne producer, to make sparkling wine... Crémant de Bourgogne was born. <sup>(2)</sup> (6) (16)

of Measurement #02

**Since antiquity**, successive authorities have tried to legislate a unified measurement system, but in vain. Local measurements persisted until the French Revolution, when the grievances expressed by the peasantry highlighted their frustrations with the lack of standardized measurement systems. The creation of a decimal metric system thus emerged between 1794 and 1799 during the abolition of privileges. As for the wine trade, it has retained its peculiarities to this day, although the law of June 13, 1866, established an official gauge for bottles and barrels.

SOME EXAMPLES OF THE MEASURES STILL IN USE TODAY IN BOURGOGNE:<sup>17</sup>

### La Pièce

### Ouvrée

Depending on its capacity and the<br/>region where it is made, a barrel<br/>or cask can be called a "feuillette,"The term "ouvrée" refers to a<br/>measure reserved for a vineyard<br/>area. An "ouvrée" is equivalent to<br/>one-eighth of a "journal," which<br/>translates to 45 "perches," 4.28 ares,<br/>or 428 square meters. Although<br/>these casks was established by<br/>the law of 1866:The term "ouvrée" refers to a<br/>measure reserved for a vineyard<br/>area. An "ouvrée" is equivalent to<br/>one-eighth of a "journal," which<br/>translates to 45 "perches," 4.28 ares,<br/>or 428 square meters. Although<br/>"ouvrée" has become the prevalent<br/>term, "oeuvrée" or "œuvrée" would

### From 1819

- The finest Tonnerrois wines were made into sparkling wine.
- The first bottles of sparkling Chablis appeared in **1840**.
- In the Chatillonnais, the first sparkling wines appeared under the impetus of field marshal Marmont around the beginning of the 19<sup>th</sup> century.

The *Pièce de* Mâcon: 212 liters - The *Pièce de* Beaune: 228 liters - This last-mentioned barrel is so significant that it is even used as a reference unit! measure reserved for a vineyard area. An "ouvrée" is equivalent to one-eighth of a "journal," which translates to 45 "perches," 4.28 ares, or 428 square meters. Although "ouvrée" has become the prevalent term, "oeuvrée" or "œuvrée" would have been more accurate, as it derives from the word "œuvre" (work), reflecting the work or task a vineyard worker could accomplish in a day.<sup>18</sup> The area covered by an "ouvrée" can vary depending on the district in Bourgogne.





# **COLD PRE-FERMENTATION MACERATION,** A BIOLOGICAL PROCESS THAT IS STILL LITTLE UNDERSTOOD TODAY

Historically, cold pre-fermentation maceration of red grapes has been more or less practiced naturally in Bourgogne. It is the result of often low temperatures during the harvest and the lack of temperature control equipment. As its name suggests, cold prefermentation maceration (CPM) can be defined as maceration in the absence of alcohol for a period of time that allows selective diffusion of water-soluble grape compounds, such as pigments, aromas, polysaccharides, and tannins. The predominant diffusion of anthocyanins during the pre-fermentation phase, as well as lowmolecular-weight tannins, may explain the increased color of the wines obtained. The absence of ethanol promotes the formation of higher-molecular-weight polyphenolic species, which would also contribute to increasing the color intensity.<sup>19</sup> This technique is primarily chosen by winemakers to extract color. The advantage of CPM is that it allows for better management of the fermentation process, and particularly the start of alcoholic fermentation (AF). However, the downside is the potential development of undesirable flora if the temperature is not sufficiently low or if the harvest is damaged. It is therefore advisable in this context to take the initiative by inoculating at a low dose during CPM. It should be noted that the notion of "cold" is quite relative! A temperature below 12°C is preferable, but various scientific studies on the CPM of Pinot Noir use very different temperature/time combinations, as presented below.

This technique has attracted varying degrees of interest among winemakers in Bourgogne over the years, and has been implemented in a number of different ways. In the 1980s, some winemakers delayed the start of AF by sulfiting their harvests at particularly high doses: 20 to 30 g/hl. This process, known as cold sulfite maceration (CSM), was advocated by a private oenologist, Guy Accad. However, this controversial method was quickly abandoned in favor of refrigerating the harvest.

With experience, and according to numerous practitioners in Bourgogne, it is believed that CPM of Pinot Noir results in wines that are more colorful and aromatic. CPM allows for a better revelation of Pinot Noir's varietal aromas, such as notes of red fruits like blackcurrant or raspberry. This was notably demonstrated by a Swiss team in 1996 (protocol used: 15°C for 3 to 4 days, in an air-free environment).<sup>20</sup> However, the results from experiments conducted by other research teams have been divergent.

**Between 1990 and 1993,** Michel Feuillat (see p.12 "Technical Personalities of Bourgogne Wine") conducted a three-year experiment across multiple sites. He compared cold sulfite maceration (with sulfite levels of 25 to 30 g/hl) and cold pre-fermentation maceration (with sulfite levels of 5 to 10 g/hl, cooled to 15°C, and placed under inert gas to prevent oxidation) against a control batch (with sulfite levels of 5 to 10 g/hl, heated for a quick start to fermentation). Over the course of 4 to 5 days of cold maceration, he observed the development of a diverse and abundant population of indigenous yeasts, which did not develop with a quick fermentation start. In terms of tasting, the control batch. Regarding the extraction of phenolic compounds, the CSM batch was richer but had a more purplish hue. The CPM batch contained fewer phenolic compounds than the control, which may contribute to the tasting observations describing this wine as finer and less tannic.<sup>21</sup>

Feuillat renewed the experiment in 1997, but with lower levels of sulfur dioxide. He compared CSM (with sulfite levels of 19 g/hl, maintaining the temperature at 9°C) and CPM (with the usual doses of sulfur dioxide: 5 to 8 g/hl, maintaining the grape temperature at 10-13°C for 3 to 4 days, under inert gas protection to avoid oxidation) against a control batch (with sulfite levels of 6 g/hl). He demonstrated that, with the same maceration duration, CPM produces finer, fruitier Pinot Noir wines, but with less structure (tannins). In particular, there is a better expression of small red fruit aromas. This enhanced expression of varietal aromas existing in the grape as non-volatile precursors is thought to be enzymatic and/or microbiological in origin. Furthermore, he observed that several days of CPM, which promotes the growth of indigenous yeasts, does not hinder the subsequent implantation of an inoculated *Saccharomyces cerevisiae* strain to ensure the proper progression of alcoholic fermentation.<sup>22</sup>

**Five years after this study**, a team from the IFV (French Institute of Vine and Wine) in Beaune demonstrated that, contrary to the findings of Feuillat and the Swiss team, cold pre-fermentation maceration (maintaining the temperature at 14°C for 5 days) did not have a significant impact on the color, phenolic composition, or sensory quality of Pinot Noir wines.

Today, CPM is widely used, but the maceration times and accompanying temperatures vary greatly.

Louis Pasteur was the first to discover the existence of lactic ferments in the mid-19<sup>th</sup> century, attributing their role to diseases in wine.<sup>24</sup> For Pasteur, yeasts made the wine, and bacteria destroyed it. The notion that these microorganisms were harmful to wine persisted until the mid-20<sup>th</sup> century, despite numerous studies observing malolactic fermentation (MLF). A shift in perspective occurred for the first time with Louis Ferré in 1928 (see p.12 "Technical Personalities of Bourgogne Wine"). Ferré believed that MLF "often leads to an improvement in the

quality of red wines." However, Pasteur's ideas remained influential, and it wasn't until the work of Bordeaux researchers Ribéreau-Gayon and Peynaud in 1937 and 1944 that the general and normal existence of acidity reduction in wines due to bacteria was established, taking on a definitively positive character. They stated, "Without malolactic fermentation, there would be no great red Bordeaux wine." With the chromatographic analysis of this phenomenon developed by Ribéreau-Gayon in 1954, which allowed for the analysis of malic acid, lactic bacteria finally

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became recognized as "a useful ferment if well controlled." Armed with this knowledge, Ribéreau-Gayon and Peynaud continually promoted the mastery of this practice among numerous producers, both in Bordeaux and other vineyards, managing to generalize MLF for red wines and certain whites during the period 1963-1972<sup>14</sup>.

# PERSPECTIVES OF TECHNICIANS PAST AND PRESENT: CLONAL SELECTION IN BOURGOGNE



# nterview

Before 1975, significant degeneration had been identified in the white grapevines of Puligny, Chassagne, and Meursault. There were many instances of leaf mottling, which was very noticeable, but there were also forms of fan leaf virus without mottling. The result was a loss of yield, and at that time, we did not know how to combat nematodes; we simply replanted immediately after uprooting the vines.

### What was the context of plant selection when you arrived?

Each winegrower had their own sensitivity to selection, but it was not always very technical. They would collect cuttings from estates renowned for the quality of their wines. Nurserymen thus used the origin of the cuttings as a marketing argument, but this did not necessarily mean that the selections offered were virologically healthy. When yields were 15 or 20 hl/ha, making good wine despite the presence of fan leaf virus was considered normal! For some time, there was confusion between the reputation of an estate regarding the quality of its wines and the "genetic" quality of the selection behind it. However, clonal selection already existed. When I arrived in 1975, the first Chardonnay clones were already present, and we were finalizing vinifications clone by clone from a Puligny plot. At that time, there were no Pinot clones available on the market. It is worth noting that the Côte-d'Or department had a significant interest in varietal issues, and the creation of the ATVB (Bourgogne Winegrowers Technical Association) coincided with the establishment of the ENTAV (National Technical Establishment for the Improvement of Viticulture) at Espiguette.

### nurseries themselves.

When clones were developed, we started with these positive mass selections from marked vines. It was from these plants that we developed the clone heads. These clone heads were gathered into a "study collection" in Echevronne on a parcel of the Domaine Lucien Jacob. Some cuttings were sent to ENTAV for conservation and potential testing.

### How was clonal selection achieved?

For Chardonnay, selection work began as early as 1960. From a parcel of vines in Puligny cultivated by the Beaune agricultural school, vinifications in barrels or half-barrels started in 1968 as soon as the vines were in production. The tastings included professionals from the white-wineproducing villages and technicians. The selection work helped guide plantings towards clones that were deemed "qualitative," such as 95 and 96, while putting a brake on slightly more productive clones like 78, which were better suited to the yields of Champagne. Later, additional plots were established, including one in the village of Savigny-lès-Beaune at Mont Battois and another in Meursault. Different Chardonnay clones were harvested separately by family, but they did not develop as quickly as the earlier 95, 96, and 76 clones.

I arrived in the first year of production for the Pinot Noir Echevronne plot. We harvested the marked plants separately, and the ITV (Technical Institute of Vine and Wine; in 2007, ENTAV and ITV France merged to become the French Institute of Vine and Wine) conducted mini-vinifications. The ITV had developed a vinification methodology using very small stainless-steel tanks with conservation in glass demijohns. H. Biol and R. Naudin, the two technicians from ITV at the time, successfully conducted these mini-vinifications. They even managed to carry out malolactic fermentation, so we held two tastings: one after the completion of fermentation and another after the malolactic fermentation, if it occurred. We invited a panel of about 30 winegrowers to these tastings.

### Interview with Michel Leguay Conducted in January 2022 by the BIVB

As an agricultural engineer by training, I began working at the Institute of Common Consumption Wines in Dijon in 1975 under the authority of Raymond Bernard. One of my responsibilities was to monitor mother vines and nurseries to combat what was then referred to as "infectious degeneration," specifically fan leaf virus.

### Which vines did you use for clonal selection?

As far as Pinot is concerned, before my arrival, we had already carried out extensive mass selection work in the vineyards of winegrowers in the Côte-d'Or, but also in other French departments. The search for typified selections with satisfactory health status involved eliminating overly virusinfected plants from the plots. These were called "positive" mass selections. Only the vines that appeared interesting and visually free of viruses were marked. The marked vines were harvested separately and then, of course, blended together – this was mass selection – which created batches that allowed for the planting of entire vineyards (daughter vines from mass selection) on large areas for growers. This technique led to a sort of blending in the selections offered by nurseries, combining selections from reputable estates with acceptable health status and selections made by the

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For the most promising clones, we requested their registration in the catalog. This registration was done using plants tested at ENTAV, which were then stored, forming an "initial base material" family. It was this family that was subject to official approval by the CTPS (Permanent Technical Committee for the Selection of Cultivated Plants). From this family, grafting was performed plant by plant to create the base material, which then constituted our mother vines.

We were fortunate to quickly identify healthy clones among the Meursault selections that produced satisfactory qualitative results. These included clones 111, 112, 113, and especially 114 and 115, which were disseminated very rapidly. Alongside this small-scale experimentation, we established several so-called "behavioral" plots using graft samples. There were multiple sites: in Echevronne, in Meursault, at the Beaune agricultural school, in Morey-Saint-Denis, a municipal plot, and in the Corton at the Domaine Bonneau du Martray. This resulted in about 10 plots in the Côte d'Or that were monitored at the time by ONIVIN (National Interprofessional Office of Wines, now FranceAgriMer) [...]. This first generation of clones was followed by a second generation in the Côte Chalonnaise and the Mâconnais, which was a precursor to Aligoté clones.

### Were there only registered clones in the behavior parcels?

In the behavior parcels, there was a bit of everything! There were registered clones, clones we hoped to get registered, and clones that were never registered. The purpose of these parcels was to serve as demonstration areas for winegrowers, with support from the CETA (Agricultural Technical Study Center) for viticulture. This initiative worked very well, and the numerous exchanges with winegrowers contributed to the acceptance of clonal selection.

The clone tastings were also extremely helpful in convincing them! When we showed them that we could produce wines that they themselves found good in small mini-vinification tanks and in volumes preserved in 10-15 liter demijohns, they were astonished! I believe it was this technical feat of mini-volume vinification that ultimately persuaded them. One of the roles of the behavior parcels was to demonstrate that a Morey-Saint-Denis made with a clone would still be a Morey-Saint-Denis, and that a Santenay made with a clone would still be a Santenay, emphasizing that the result was due to both the soil and the work of the winegrower. Their involvement in this work also played a significant role.

### cuttings among the nurseries.

We worked extensively with them to identify mother vine sources for cuttings, where they could take good mass selections and create daughter vines from these mass selections or mother vines for multiplication. We also had collaborations with the Saône-et-Loire, specifically with R. Boidron from the Chamber of Agriculture, and with the Yonne through JP Couillault from GETEVAY.

So, this provides the context, involving an evolution where we also had to convince others with selection objectives that were not necessarily aligned with those we would pursue today.

### What were the selection objectives at the time?

Recall the years 1972, 1975, 1977, and 1980-81, which were marked by difficult ripening conditions. During this time, the focus of selection shifted towards moderately productive clones with good ripeness. Following the multiplication of these clones in homogeneous plots and on new land, there were criticisms regarding excessively high yields. It became necessary to recommend new cultural practices, such as shorter pruning or increasing the height of the trellis to achieve the target of 45 hl/ha, which was the goal at the time.

Then, following the registration of the first clones, clones such as 375 and 292-236 emerged, which proved to be too productive, as became evident very quickly. For instance, in a Marsannay parcel, theoretical yields of 150 to 200 hl/ ha were observed in years like 1982! At these levels, more suitable for producing base wine than quality red wine, it was necessary to correct course, and we concluded that these clones were better suited for Champagne.

In Pinot Noir, there were essentially two main selection types between the southern Côte de Beaune and the rest of Côte d'Or. More productive and fertile Pinot vines were found in Santenay, which were cordon-pruned, while less fertile Pinots with smaller clusters were found in the Côte de Nuits/northern Côte de Beaune, which were canepruned. So there were two traditional methods of vine training that competed with each other to some extent, with some swearing by one or the other. If we pruned the small Pinots from the Domaine Ponsot in a cordon style, they did not produce enough, so later on, we shifted towards clones like 375 or slightly less productive ones that could achieve 45-60 hl/ha in a cordon system. were quite significant in Pinot Noir. Everyone knows that, genetically speaking, Pinot is a very heterogeneous grape variety. There are differences in growth habit, bunch size, fertility, and ripeness timing – and these are just a few examples, whereas for other grape varieties there is greater homogeneity, and just a healthy selection of vines could have sufficed. Clones haven't been a cure-all, but I believe they have been beneficial in the challenging fight against leaf roll disease.

### The screw cap

### was born in Bourgogne!

STELVIN® screw caps were originally developed and produced by the French company Le Bouchage Mécanique in Chalon-sur-Saône, Bourgogne. The product was invented in 1964 after several years of technical experimentation and testing with wine professionals, thanks in particular to the work of Jacques Bergeret and Michel Feuillat at the University of Dijon's oenology department.

Furthermore, there were some very proactive ATVB presidents, particularly Mr. Fetzman, who advocated strongly for the clones – and Jean-Michel Menant, the ATVB coordinator, ensured the follow-up and continuity of the work. The winegrowers recognized the benefits within their own estates, including in some expansions in Ardèche.

As for the nurseries, there was a desire to involve everyone, not just those who were already aware of the initiative. They were included in the GRAPVI (Regional Group for the Improvement and Pre-multiplication of Vines). This group aimed to pool resources and distribute certified

It is worth noting that Bourgogne, under Raymond Bernard's guidance, was a pioneer in integrating qualitative and tasting criteria into clonal selection work. While the differences in Chardonnay were not as evident, they



The brand was officially registered in 1976 and was originally known as STELCAP VIN.



### MORE THAN 30 YEARS OF BIVB WINE PROMOTION CAMPAIGNS

Bourgogne wines have benefited from more than 30 years of promotion by the BIVB. Here is a retrospective of examples of promotional campaigns reflecting the context and language of their respective eras.















# BOURGOGNES DES TERROIRS BÉNIS DES DIEUX

Longtemps les malles ont transporté les bouteilles de Bourgogne et fait voyager leurs arômes délicats à travers le monde. Ces vins, parmi les plus exportés de France, sont révélateurs de saveurs et épousent parfaitement toutes les cuisines du monde.

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