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Old world and new world wine concepts of terroir and wine: perspectives of three renowned non-French wine makers

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ABSTRACT

The concept of 'terroir' has roots steeped in French history of wine and evocative stories of the land. Today terroir is important as a quality marker in brand management for upmarket wines. French wines have benefited from their historical connotation with terroir but other wine growing countries have also adopted the term to mean characteristics in wine attributable to place of origin. However there is no universally accepted definition of terroir except to say it refers to a particular place. This paper addresses this ambiguity by seeking the practice-based views of three experienced non-French winemakers. This reveals a social dimension to terroir that in various degrees supports and extends both the technical/scientific progress and brand value for premium wines in both Old and New World regions. This article contributes to the growing body of research that seeks to understand the practicality of terroir as a marketing and brand value indicator.

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Introduction

Today, the 'New World' is taking an interest in the study of the link between a wine and its place of origin. Competitive prices and brands contribute to recognition by consumers, but the place of origin is increasingly becoming a major factor in purchase decisions. However, this by itself is not always sufficient to judge the identity and value of a wine. In addition, the 'terroir' of place of origin is important.

The meaning of terroir is the subject of lively and appreciative discussion in wine communities around the world. The term originated in France but vignerons in many countries commonly use it, as do wine consumers, to indicate a sense of the unique qualities of particular wines. However, Spielmann and Gélinas-Chebat (2012) confirm that as a wine or food descriptor and quality marker, 'terroir' has not achieved consensus as to its meaning. Whalen (2007) for example, has called the terroir concept 'polymorphous'. The noted British wine commentator, Jancis Robinson in her TV wine course programme, has referred to 'terroir' as 'a conveniently untranslatable French word which the French use as a mantra' (<http://www.jancisrobinson.com/jancis-robinson-the-long-version>). If

terroir was only used as a mantra as Jancis Robinson suggests, it would remain exclusively French. However, the term has escaped its French origins and its somewhat ambiguous use around the world has been a consequence. The interest in the wine terroir concept now also include followers from the natural science community. Academic journals increasingly publish scientific data in support of the concept of terroir. A paragraph on recently publish scientific data on wine terroir follows in a later section of this paper.

The current ambiguity of the concept of terroir is the justification for this exploratory research into the nuances of its meanings. Wine chateau and estates in the 'Old World' of wine jealously guard their quality image attributable to terroir against any strident claims to unique terroir coming from the New World of wine. This is an important issue as terroir is widely used as a quality marker for up-market wines. Is there an objective and technical calculation that offers a precise meaning? Alternatively, is there a practical managerially oriented meaning that would give terroir alternative and valid sources of meaning?

Our method of inquiry begins with a brief review of the use of the term terroir. A popular assumption is that terroir has always been a good thing, suggesting positive attributes of a wine or wine region in question, but our brief review suggests otherwise. Then we introduce the views of three well-known winemakers from the 'Old World' and the 'New World' of wine, specifically from Burgundy (France), Central Otago (New Zealand) and Stellenbosch (South Africa). The article explores whether our chosen wine-makers view the concept of terroir the same way in the New World as in the Old World. Finally, we summarise findings and contribute some thoughts on the way forward for wine marketers and industry managers.

Many researchers have worked on the definition of terroir and Spielmann and Charters (2013) recently published a synthesis of all the items identified by past researchers. They also developed a conceptual model of terroir dimensions related to authenticity covering legal recognition of terroir products, physical nature of terroir products, and subjective perceptions of terroir products. By way of contrast, the International Organization of Vine and Wine (OIV, 2010) has offered a more formal definition:

Viticultural 'terroir' is a concept, which refers to an area in which collective knowledge of the interactions between the identifiable physical and biological environment and applied viticultural practices develops, providing distinctive characteristics for the products originating from this area.

This definition and its technical complexity suggested to us that there is a need to refer back to qualified people 'in the field' who may bring a practice perspective to unravelling the meaning of 'terroir'.

Methodology

First, an historical review is conducted of the origins and use of the term 'terroir' in France, and more specifically Burgundy. The findings from this allowed for the framing of topic guides for three in-depth dialogical interviews with well-known wine makers on three continents. The reputation of these 'thought leaders' within national borders was the basis for their choice. In each case, the interview process took the form of a dialogue extending over 60–90 min. Obtaining convergence of opinions between thought leaders was not part of the interview process. Instead, the approach chosen was to let each interview

run as an open-ended dialogue, and not impose a rigid question and answer schedule. Each of our chosen wine makers (from France, South Africa and New Zealand) was interviewed by one of the authors living and working in the same region as the wine maker. The intention was to bring a practice perspective to opening up the meaning of terroir by allowing for a free-flowing dialogue, more akin to a conversation than an interview. For this reason, the questions asked were not standardised. Dialogue is an interactive process of learning together with a strong emphasis on listening (Ballantyne, 2004; Schein, 1994). Later, thematic analysis proceeded from typed transcripts of these dialogues taken from electronic recordings (Creswell, 1994; Gummesson, 2000). A theoretical framework from the wine marketing literature is used to provide a structure to assist this analysis and the framing of conclusions. However, there is a richness and depth of meaning in the full dialogues.

Historic evolution of the terroir concept

Thinking of 'terroir', wine people often think first of Burgundy with its long and continuing vinicultural history. The first vineyards in Gallo-Roman times were most likely planted with the ancestors of pinot noir.¹ After the year 1000, the notion of terroir in Burgundy entered a gestation period, thanks to the efforts of monks who tended their '*clos*'. What is certain is that 'terroir' means much more than just the soil type or even the combination of soil types. For example, the impact of human transformational effort in relation to the land must be a factor. The drying of marshes, the building of '*murgers*' (stone heaps) and enclosing walls to fight erosion, the earth brought from the hill tops, the crushing of rocks – these all contribute to the construction of terroir.

Monks, in the twelfth century, especially the Cistercians, identified many places suitable for wine. Their approach was not scientific but empirical, based on trial and error. As they owned *Clos de Vougeot* for 675 years, they had plenty of time to study its possibilities. The eighteenth century saw the establishment of *climats*, plots of land devoted to viticulture and precisely demarcated, known under the same name for several centuries and whose precise location, soil, subsoil, aspect, microclimate and history constitute the characteristics of the unique personality of a terroir.

According to de Smet (2008), it was the Cistercian monks who mostly kept alive skills in winemaking through the European 'middle ages'. From the perspective of the early monastic wine makers, the world and everything in it was a gift from God, so it followed that they worked to find the best combinations of land and grapes for wine, to give thanks to God (de Smet, 2008). These *holistic* wine making arrangements changed little until 1789 when the French State dissolved the monasteries. The State then became the custodian of all lands under viticulture. Later, by auction, these lands ended up in the hands of private owners.

Subtle changes in the meanings attributed to terroir are associated with shifts in technical and social norms. Among shifting meanings in France, 'terroir' came to mean soil-oriented in a certain kind of agricultural production. In Furetière's Universal Dictionary (1690), the author says, 'vines demand a dry, stony and rocky terroir whereas willows, alders and poplars require a humid, marshy terroir and wheat a fat, fertile terroir'. At the end of the seventeenth century (1694), the French Academy's dictionary gave a similar definition and mentioned the example of Burgundy, which had 'a good terroir for

vines'. An interesting addition was more ambiguous: 'It's said that wine smells of terroir, that it has a taste of terroir, that it has a certain [earthy] flavour, a certain taste coming from the quality of terroir.' By extension, 'a man smelling of terroir' means that man has flaws, which are usually associated with his native village. Thus, a hint of negative connotation appeared. As late as the 1960s, the expression *goût de terroir* (taste of terroir) started taking on a laudatory meaning, whereas earlier it was used to imply flaws that were supposed to come from the soil. Likewise, in city schools, pupils speaking with the strong, 'ugly', country bumpkin accent of their village were thought to speak with a terroir accent (Chapuis, 2008).

The twentieth century was a period of positive re-evaluation of terroir. Thus, bishops, monks, dukes, members of parliament, bourgeois landowners and small wine growers who successively owned the vineyards, began to serve them more actively with quality outputs in mind rather than to value them merely as possessions (Chapuis, 2008).

The concept of terroir as place specific seems generally indicated if we refer to the etymology of place names. Many single plots in Burgundy bear a name that highlights the features of the place where vines grow. Thus, *Les Perrières* (in Aloxe-Corton, Meursault) are old quarries; *Les Chaillots* (Aloxe-Corton) pertain to a gravel soil, *Les Argillières* (Pommard) to a clayey soil, *Les Lavières* (Savigny-lès-Beaune) to a rocky soil, *Les Peuillots* (Savigny-lès-Beaune) to a marshy soil.

It is not by chance that the notion of terroir was highlighted by Burgundians in a region where estates had always been small and where wine growers often made their own wine (in the Côte de Nuits and the Côte de Beaune, there are 1,247 *climats*, an average of 5 hectares per *climat*). In order to appreciate the differences between wines from different types, it is necessary to vinify the grapes from each plot separately. Furthermore, the grower tends the vines and harvests the grapes, makes the wines and has the opportunity to taste and compare them on a regular basis. Finally yet importantly, estates in Burgundy are planted with a single cultivar: pinot noir for red wines and chardonnay for white wines. Blending wines from a similar appellation harvested from different plots is not part of the tradition and is frowned upon.

Today, the 'New World' is taking a greater interest in the study of the link between a wine and its birthplace. The geographic location of the production area is increasingly becoming a major factor in purchase decisions. The mention on labels of chardonnay from Casablanca (Chile), Cabernet Sauvignon from Coonawarra (Australia) or pinot noir from Central Otago (New Zealand) is recognizing that there are special places where the climate and soils are right for the production of premium wines with a difference.

From the historical picture, with its French Burgundian origins, 'terroir' points us first to a particular place, or a particular terrain, where differences between wines are due to differences in the physiology of the place, the soil and grape types, and of course, climate and methods. More recently, some authors have added the human actor as an integrator of resources (Moran, 1991). Going beyond this, Ballantyne (2011) has argued that terroir is both a technical and social construction and that these two perspectives intersect in a fluid *socio-technical* construction of terroir, accounting for its ever-changing promise in different epochs (see Figure 1). Our historical analysis supports these two perspectives.

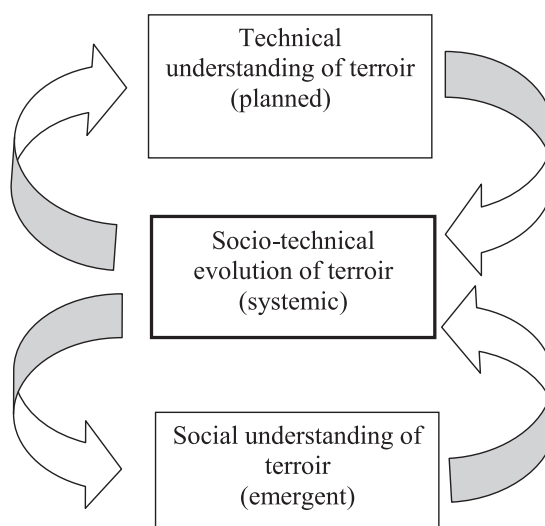


Figure 1. The promise of terroir is socially constructed.

The terroir concept has also progressively led to more and more scientific data being published that support the concept of terroir. The following section is a brief overview of some of the recent scientific research on terroir that appeared in scientific journals.

Natural scientific perspectives of terroir

A different approach in which terroir can be described and studied is from a pure natural scientific research point of view. The recent past produced scientific research that illustrates some of the lesser known or in some instances, even unknown, characteristics or effects of the terroir concept from a natural scientific research perspective.

Prata-Sena, Castro-Carvalho, Nunes, Amaral, and Silva (2018) studied fortified wine produced in Douro Demarcated Region in Portugal. They listed four factors that constitute terroir: (1) climate (with temperature, precipitation/humidity/water-balance features); (2) soil composition, (3) cultivars (used as a blend (min 4 and max 110) or co-fermented); (4) human activity including vineyard practices (plantation systems, rootstocks, training system and pruning, and stress mitigation strategies) and vinification (styles, fermentation and fortification, aging, fining and stabilisation). The study showed how these factors influence the main sensory attributes: colour, aroma, and flavour in order to make this terroir unique that can produce qualitative and authentic wines.

Belda, Zarraonaindia, Perisin, Palacios, and Acedo (2017), for instance, noted in particular the contribution of the native vine microbiota in the winemaking process that reinforces the interdependence between the anthropogenic and microbiological basis of terroir. They pinpoint that the soil-associated microbiota has been described as determinant, not only for the chemistry and nutritional properties of soils, but also for health, yield, and quality of the grapevine, and in the later fermentation performance, which in turn, contributes to the final sensory properties of wines. Earlier Bokulich, Thorngate, Richardsone, and Mills (2014), proposed the existence of a non-random 'microbial

terroir' which is the transformation process that grapes go through during their journey from the vineyard to the wine bottle.

Bonfante et al. (2018) studied Southern Italy wine region (Valle Telesina, BN), for a specific cultivar, Aglianico. They provided evidence that, founding their argument on the basis that terroir results from the interaction within the soil-plant-atmosphere system, expected climate change variability could concretely affect the resilience of terroirs within a viticultural district that might require the introduction of irrigation and the planting of different cultivars.

Miura, Sánchez, Castañeda, Godoy, and Barbosa (2017, p. 745) compared the microbial community composition of leaves and berries of Carmenere varietal from six different Chilean vineyards within 35 km of each other. They underline that both the fungal and the bacterial community compositions of the six vineyards differed, with a higher impact for fungi. Next to that, the bacterial community dissimilarity was not correlated with geographic distance, whereas the leaf and berry fungal community dissimilarities between locations increased with geographic distance. They found spatial processes play an important role in structuring the biogeographic pattern of grape associated fungal communities at local scales, which might in turn contribute to the local identity of wine.

Roullier-Gall, Lucio, Noret, Schmitt-Kopplin, and Gougeon (2014, p. 8) observed that the impacts of terroir 'could potentially be stronger in grapes than in wines'. In their research, they study the 'terroir' expression within the chemodiversity of grapes and related wines from two distinct – though very proximate – terroirs of Burgundy over three vintages (2010, 2011 and 2012). Their results showed:

Pinot noir grapes grown in two distinct "Grands Crus" appellations separated by less than 2 km, have distinct chemical signatures of environmental conditions related to local climatic, geology, pedology and phenology characteristics, all contributing to the identification of the so-called "terroir". This effect of terroir on metabolites is noticeable in wines, skin berries and especially musts.

The implication of their finding is that very small terroirs in a village can produce very different grapes.

Tofalo et al. (2014) studied the Montepulciano d'Abruzzo 'Colline Teramane' premium wine DOCG (Abruzzo, Italy) with a focus on spontaneous fermentation in order to characterize the yeast community of the Montepulciano cultivar. Specific yeasts could contribute to the fermentative performance and associated to a specific viticulture region or 'terroir'.

The experienced non-French winemakers and their views

The following section contains the practice-based views of three experienced non-French winemakers.

Experienced winemaker 1: Bernard van Berg, wine grower in Meursault, Burgundy, France

Introduction to the estate

Dutch photographer, Bernard van Berg, created his 2.5 ha estate in 2001. The first harvest was on 25 September 2002. Two hectares of vines comprise pinot noir, chardonnay,

Aligoté and Gamay whilst the remainder is left fallow to achieve biodiversity. The estate currently produces 15 cuvées. Total production is limited depending on the vintage. The estate is AB-certified organic agriculture by Qualité France.

Tractors are not used on the property. Soil is worked by horse and plough and not tilled at all unless really necessary. This is to prevent the modification of the natural soil or the addition of any fertilisers. No insecticides or herbicides are used. To control the health of the leaves, organic agriculture products (organic milk and sea salt) are used to reduce non-penetrating organic sulphur and organic copper. The harvest is done manually.

No cultured yeasts are used, no chaptalisation done and the grapes are not destemmed. The maturation period is between 15 and 27 months in 100% new barrels. The wine is bottled manually, unfiltered and without fining agents. All the wines were previously classified as Bourgogne Grand Ordinaire (BGO), the lowest rank in the appellation system of Burgundy. From vintage 2012 van Berg declassified his wine from its regional appellation to Vin de France (the former label of table wine) and changed to a new bottle shape. The estate is locally considered as something exotic, odd and original, but it is internationally recognised.

Prices depend on the vintage quality. The most highly regarded, 'Echalas Cuvée' is only made when the vintage allows it. It was last made in 2006 and 2009 for white wines and in 2007 and 2009 for red wines. The Danish Restaurant Noma (elected best restaurant of the world in 2010, 2011 and 2012), sells the vintage 2009 chardonnay Cuvée 'Les Echalas' at almost 4,000€ a bottle.

Bernard van Berg, the winemaker

(Interviewer Benoît Lecat with Bernard van Berg in Burgundy, France on 24 January 2014 and 4 February 2014)

The establishment of the domaine was based on the idea that terroirs, which were the historical premises of Burgundy vineyards, are today neglected by the INAO (National Institute of Appellation of Origin), but are still suited for the creation of great wines. At this domain, the wine is an artistic creation, the result of manual work but also of reflection, listening, and observation. van Berg says:

My 'Le vin le plus simplement' is a wine born from an idea, an innovating and intellectual conception, a fresh vision of a beverage that many people think they know. After having tasted the greatest wines in the world for many years, I now believe that the geographical origin of wines established by the (INAO) does not always represent quality in real life. I decided to create the pure and clean and easily drinkable wine I had been dreaming of drinking. My wines are the fruit of revisiting the concepts of viticulture and winemaking. This means a re-examination of holy traditions and experimentation on a new level. A great wine begins with a perfect grape. Furthermore, terroir should be defined in terms of totality, in terms of terrain (field) and not in terms of plots or units. The presence of wildlife is a prerequisite for me to develop a plot.

Old world and new world ideas

We asked him: Do you perceive any differences between the Old World and the New World regarding terroirs/terrain?

In Europe, the concept of terrain/terroir is mostly linked to regulations of appellations, a phenomenon commonplace in Burgundy. The price of the bottle and the appellation are

strongly linked. Then, the awareness of the *château* is more important than the *appellation*. Except for some noticeable exceptions such as *Chateauneuf-du-Pape*, *Château Grillet* or the *Côtes-Roties*, the wines of Southern France have a concept of a *terroir/terrain* which is close to that of the New World, which is the right *terroir/terrain*, the one that will lend itself to make good wines irrespective of any administrative classification!

Predators should be present in balanced numbers

We asked van Berg how various identifiable [plot] characteristics influence the *terroir* or the *terrain* he prefers:

For the uninformed, plots differ from others because of their geographic location, altitude and sun exposure, maybe also because of the chemical composition of the soil. Of course, these are all important. [But] it only takes a few seconds to make a hole with a spade to see the underground life. Wildlife must be balanced and diverse. What is available for the vegetal life is also available for the animal life. Predators should be present in balanced numbers. Half the plot 'En Busigny' in the village of Meursault is planted with vines and the remainder is left for animal and vegetal wildlife, a perfect balance.

Technical aspects of *terroir*

We asked: 'What is your opinion regarding viticulture, canopy management and crop levels?'

After plot selection it is important not to damage wildlife to prevent what has been developed from being destroyed. Using a tractor means not only crushing everything in its way but also destroying participants in the natural chain, whether it is animal or vegetal. Once you know what you should not do, you must discover what you would like to do. The vegetative cycle of the vine requires actions in a specific sequence, from pruning to harvesting. The method of pruning is where you have the most important freedom and I have moved away from tradition and pruning starts on the first of March, weather permitting. Pruning is vital but the method used is even more important. The idea is not to impose a specific pruning method on the vine but it is worthwhile to experiment on small areas and observe whether the vines accept or reject what the vine grower is trying to impose on it. When pruning, I sit in front of each vine on a small stool. I have plots where I use 10 different kinds of pruning. During the harvest the technical activities must be undertaken with utmost precision. A leaf's position and a berry in a pitiful state are both important aspects. Nothing is unintended and everything is linked and the consequences are a chain process. From time to time, you are exposed to risks like frost and you might lose the whole crop. Nothing can be done without risks.

We mentioned that one academic (Whalen, 2007) has said that the *terroir/terrain* concept is 'polymorphous'. Did he want to comment?

*Yes, there are three approaches: First, the *terrain/terroir* is a place where the conditions (climate, soil, sun exposure, etc) are fulfilled (or not) to make a great quality wine. Then the *terrain/terroir* is a *lieu-dit* (name of a plot) where the awareness of the *appellation* will guarantee an important sales price irrespective of the quality inside the bottle. Finally, the *terrain/terroir* is a favoured place that generates both quality and profitability.*

The impact of history

We asked van Berg about the link between *terroir/terrain* and history:

The major issue is that there is little in common between the starting point and the finishing point. In imperial Rome it was considered as being sophisticated to offer guests a 100 year old white wine. Pre-oxidation was therefore not an issue at that time! During the eighteenth century as 'least coloured possible' was the hallmark for Burgundy red wines. The Dukes of Burgundy were ignoring the vinification per plot. All the grapes were poured into one press without knowing the geographic origin or variety. There was only one denomination for the Duchy of Burgundy: vin de Beaune. These examples demonstrate the evolvement of the wine concept from economic, political, religious and also fashionable realities. The idea of 'vin l. plus simplement' is to return to the original principle: make wines for the greatest pleasure of men and women and not a terroir wine or a varietal wine but only wine – make the best wine possible, irrespective of the economic, commercial, even familial constraints without bankers or boards to satisfy.

Authenticity

We asked about a link between terroir or terrain and authenticity?

Authenticity [of a wine] is linked to the respect of the wildlife of the terrain. Therefore, a wine is authentic when there are no modification of the natural soil, no addition of fertilizers of any type, no use of insecticides or herbicides, no tractor, no mechanic harvest and only use of products intended for Organic Agriculture. Just to give you an idea, in the mid-nineteenth century, an average yield per ha was around 750 litres while today, the average went up to 5,600 liters per ha. Another dimension is the lack of physical contact between the wine-grower and his wine during the foulage or crush. Nowadays, the crush is mainly mechanized. Finally, to make sure the natural fermentation is successful the berries should be ripe and healthy. Regarding the ripeness, it is just a matter of patience: wait until the sun is doing the job!

Appellation systems

From the vintage of 2012 van Berg declassified his wine from its regional appellation. We asked for his thoughts on the appellations system in France.

The system is not working. An appellation like C. de Vougeot is subdivided amongst more than 70 owners resulting in more than 70 completely different wines. Some are outstanding; some are less remarkable. Many wines from prestigious appellations do not meet our expectations. Before the appellations were established in Burgundy in 1935, there were two professions: the wine growers who were not making wine (the vast majority of them), and the négociants who were making the vinification, the maturation and the sales. The wine grower had no relationship with the client or the consumers. The négociants had all the power. In the 1930s, Charles Bouchard, chairman of the Union of Négociants of Beaune opposed implementing the AOC system. He anticipated a decline in quality. His attempts were unsuccessful and from 1935 some undrinkable wines associated with prestigious plots' names entered the market despite the administration's attempts to achieve the opposite.

In conclusion

A great bottle of wine will be strongly influenced by human work. I am quite jealous of Adam (in the Bible). He was not born, he was not a natural consequence of what we know, he appeared. He did not know anything, he looked, he touched and he discovered. He had no parents, no masters who could teach him what he was supposed to do, or to love or not

to love. He ignored the religion, politics or the concept of state. Even the ownership! He had to invent everything. I don't want to depreciate the culture but I believe that it is good for mankind to have Adam's eye on his life and on his or her environment.

Experienced winemaker 2: Jan Boland Coetzee, Stellenbosch wine grower, South Africa

Introduction

South Africa, kindly referred to as the 'oldest New World wine country' offers interesting perspectives in respect of terroir. Grape vine cuttings, which arrived in 1655 from France produced the first wine in 1659. The French Huguenots, who arrived in 1688 and settled in the Franschhoek Valley, gave impetus to South African winemaking. Wine growing and winemaking benefitted from their culture, knowledge of vineyards and cultivars and cellar practices.

The significance of terroir in the South African wine industry is illustrated by the ARC-Infruitec/Nietvoorbij Institute of Viticulture and Oenology near Stellenbosch and the University of Stellenbosch's research on natural terroir units (NTU). An NTU is a geographical unit that is unique in terms of its homogenous patterns of topography, climate, geology and soil. It is the basis for studying the effect thereof on vine phenology, wine production and wine character (Wines of South Africa, 2004).

Jan Boland Coetzee, a respected winemaker in South Africa, graduated with a BSc (Agric) degree in Viticulture and Oenology at the University of Stellenbosch. His winemaking commenced in 1967.

Jan Boland Coetzee, winemaker

(Interviewer Nic Terblanche with Jan Coetzee at Vriesenhof, on January 10, 2014)

We asked what Coetzee regards as the meaning of terroir:

I believe that the foundation of wine terroir is eloquently expressed in the words of the Australian winemaker Jack Mann who states, 'The winemaker is a humble servant of nature; his role is to give nature the opportunity to produce the best possible wine. Nature creates, man only guides' (Hardy, 2001). For me, terroir consists of the following five major elements:

- *soil;*
- *the combination of rootstock and plant material in specific areas;*
- *management of the plant – including irrigation, pruning and canopy management;*
- *assessment of the ripening process; and*
- *management of processes like maceration or fermentation.*

The combination of the terroir elements gives a sense of place that comes through in the wine, whether it is Vriesenhof or Kanonkop – who ever made it, me or someone else. It is like resembling Romanée-Conti in that respect. It would be difficult, maybe rather unfeasible to define 'terroir' in a way that accommodates all its possible constituents. Having said that, I think a view of that differentiates between the essentially technical characteristics of terroir, and the inherent promise of terroir that is socially formed and based on consumer value, illustrates the complex nature of terroir.

Nature and man as aspects of terroir

Amongst the five major elements mentioned as the ingredients of terroir, a mixture of nature and man is present. We asked Coetzee to expand on the input of man

Every phase of a new cycle from the rest period to the harvest to the fermentation, barrel-ling and bottling inherently involves many decisions to be made by the winemaker that can influence the eventual quality of the wine. French wines, traditions and practices are undoubtedly the most tested and used because of its long history of winemaking. To learn from the French, I spent a season working intensively in Burgundy with the prestigious House of Joseph Drouhin. Experience is especially necessary for decisions in the vineyard. Growing and shaping of the plant to find the correct balance between the branches and the leaves influence the eventual quantity and quality of the grape. It is essential to balance the shape of the canopy to provide for airflow and sufficient shade for the grape to prosper. This results in a blend of moisture and heat to prevent fruit and leaf diseases. The winemaker's experience is of great importance in the timing when grape picking should commence. The style to be made will determine either earlier picking for higher acidity or later picking for sugar content. The timing of the harvesting process demands a constant assessment of three aspects, namely sugar content, acidity required and, lastly, the overall physiological ripeness. A further indication that the grapes are ready for harvest is when the size of grapes ceases to increase.

Technical combinations

We asked Coetzee about the role of countless combinations of rootstock and plant material in terroir:

Combinations of rootstock and plant material result in diverse fruit types. The rootstock is of great importance for the future production of the grapes as it determines the size of the grapes as well as the time at which the grapes ripen. Only after a careful soil analysis, one would be in a position to make an informed decision on the rootstock and plant material to be planted. My opinion is that, although I have no scientific evidence to prove my view, that over long periods, the combination of rootstock and plant material adjusts to the environment in which the vine grows. During this process of adjustment, it develops its own identity.

When the monks sorted out 'better and worse' locations in Burgundy, abundance of time allowed them to observe which vines performed better in particular locations. We asked Coetzee if there is still room for the monks' trial and error approach today?

The time and capital wasted by a failure could be costly. Today we benefit from various organisations focusing on helping winemakers finding solutions to problems. These organisations experiment with all the facets of grape cultivating and winemaking. The world has become smaller than ever before with the speed at which new information and developments reach us. We have caught up with the quality of many areas such as Burgundy. Hopefully, in time, this information will become knowledge.

We quoted one of Coetzee's statements, namely that:

One's footsteps must be in the soil, you must understand the soil, the plant and the climate. I am fortunate to have portions of land on the estate that suit the growing of particular cultivars very well because of the combination of elements present in particular locations.

Coetzee was asked for examples in this regard?

Vriesenhof is situated in an area with a typical Mediterranean climate. The four seasons, each with its unique blend of sun, rainfall and wind has a specific effect on the 'outcome' of the grapes for a particular year. The close proximity of Vriesenhof to False Bay benefits from the cool southwest winds/southeast winds during the growth season. The stronger northwest winds bring the rains in winter. The variations in altitude on the farm and the diverse soil composites combine well with the seasonal climates to produce a variety of grapes with unique qualities. The combination of soil, rootstock and plant material as well as a thorough appreciation of both the mesoclimate and microclimate are vital elements for the cultivation of grapes that could produce wines with unique personalities with their own body, bouquet or complexity.

We asked Coetzee whether he regarded wine production in the New World, particularly in Stellenbosch, as more scientific in general terms, than in the Old World?

The role of science in winemaking is on equal footing in both Worlds. In the Old World, we also find many institutions with the sole purpose to undertake research and experiments to benefit the wine industry.

We also asked Coetzee whether he thinks that the scientific approach leaves room for tradition:

Our training and education prepare us to make wine based on reason – a scientific approach thus. What we view as tradition in the Old World could undoubtedly be supported by a scientific underpinning. Once the scientific leg of winemaking has produced the wine in the bottle, the 'softer' elements of tradition, etcetera enables us to market the wine. In this respect, we are far behind the Old World as they have centuries of cellaring wine, wine stories, events and other means to influence the consumer.

Coetzee was prompted about wild yeasts' influence on the eventual quality of the wine:

Yeast has a formidable impact on the fermentation and wine itself. Some winemakers are prepared to forego money and rather enhance their wine's quality with the use of wild yeasts. Wild yeast might be an asset, especially in the Old World wine areas where the average temperatures are much lower after the harvest.

You are known in the industry for your comment that the best wine is generally in the second half of the bottle. Please explain?

Our young winemakers should be exposed to and drink and not only taste great wines to appreciate why some wines are just in a class of their own. Unfortunately, those very good wines are so expensive that few of the young winemakers could afford them – that is a great pity.

Coetzee was requested to single out any wine that is better than the rest to indicate terroir:

Pinot Noir offers the most variety. Numerous factors influence it – the winemaking or wooding. In the end, it's about the place. Winemakers come and go, but the place never changes, except for the vintage. I see terroir as a reality with many benefits to differentiate our wines from the rest. At the same time, the process to assess, demarcate, assign and exercise control over the exclusive use of names, symbols, processes and other means to give effect to terroir exclusivity still has a long way to go in South Africa.

Finally, Coetzee was asked about what are, or could be, the differences between Old and New World terroirs:

The old wine world possesses – apart from what would typically be part of terroir – a richness of history, unforgettable vintages stored in ideal cellars, statements by the rich and

famous about excellent wines from particular vineyards, prominent winemakers, famous vineyards, record prices at auctions and so forth. To end off, I would like to remind you of the words of Baron Phillipe when Mouton became a Grand Cru in 1973, 'First I cannot be, second I will never be, I am Mouton. First I am, second I will never be, I am Mouton'. They say his legal file was weighing 68 kg by then!

Experienced winemaker 3: Rudi Bauer from Quartz Reef, Central Otago, New Zealand

The Central Otago region in New Zealand

Central Otago in New Zealand is the world's southernmost winemaking region at 45° south. It has hot days and cool nights in summer, a long, dry autumn and snowy winters. The modern-era wine pioneers began in the 1970s. Rolfe Mills was one of the first. His experimental plantings took place at Rippon (now within the Wanaka sub-region). Other pioneers and dreamers soon joined him. These early pioneers were considered foolhardy, according to expert opinion of the day. However, the pioneers recognised that their sites allowed a warm to hot grape-growing season with cool nights, in what was later confirmed as a favourable diurnal temperature range. Individually, their small estates did not have a marketing scale advantage and so, from the beginning, they worked together to develop a regional reputation, even though they were competitors (Ballantyne, 2011; Cull, 2001).

Early vineyard operations in Central Otago were owner-operated and most of them remain so to this day, with the average size less than 20 ha (Caple, Ballantyne, & Thyne, 2010). Based on early experiments with grape types, pinot noir is the main variety grown. According to Decanter magazine (2009), Central Otago is one of the top quality pinot noir wine-producing regions in the world. There are more than 120 wineries, with differences in their geology, soils, and even climate variations within the vineyard properties themselves (New Zealand Wine Growers, 2013).

Rudi Bauer, the winemaker

(Interviewer David Ballantyne with Rudi Bauer at Quartz Reef, on December 19, 2013)

One of the most highly regarded winemakers in New Zealand is Rudi Bauer at *Quartz Reef*. The Royal Agricultural Society of New Zealand acknowledged Bauer as winemaker of the year in 1999 and 2010, and he is currently chair of the collaborative marketing arm of Central Otago pinot noir, COPNL. He was recently a finalist for World Winemaker of the Year, Der Feinschmecker, in Germany, and out of six contenders, was the only one from the southern hemisphere.

Bauer was born in Salzburg, Austria and after qualifying in viticulture and winemaking in both Austria and Germany, arrived in New Zealand in 1985 looking for a challenge. He was appointed viticulturist and winemaker at Rippon Vineyard in 1989. He later began developing his Quartz Reef vineyard, on a virgin site in the Bendigo sub-region. This site was previously of interest only to gold miners in the nineteenth century and later abandoned to rabbits. The site now has full biodynamic certification and Bauer supports this developmental approach fully. He likes to say that his aim is to 'pass on the message from the vineyard to the customer. And to do this: 'To get the best possible grapes in the best possible way into your glass, as a reflection of the land, an expression of the land'.

Terroir allied to human belonging

Bauer says effectively we have terroir, with or without the grapes, because terroir is the combination of human activity, the land, and the environment. He also likes to emphasise a sense of belonging, bringing the human dimension into play:

... what I like to bring from the Old World is that [terroir is] more to do with the sense of belonging than anything else. Yes, it is a very egocentric play, where I say to the grapevine, 'now you have to live here on this particular paddock because I have decided it so'. Because of my profession, it was for me like hitting the jackpot, having bare land here at Bendigo, nothing on it at all, and having the ability to visualise that one day, it might be a vineyard. That was my driving force [and] my inner expression or desire, because I wanted to build something, create something. The reason is that you want to make sure that what you have is going to be unique. You have to be always looking for the [favourable] differences.

Intuition and technical appraisal

In making very human choices, Bauer emphasises that this must also involve technical considerations relating to the land, especially as for him, his first choice of land was virgin territory:

Yes, this is the interesting thing, the land is the key ... if you get an overwhelming gut feeling that it can work your rational thinking then comes in. Like, you do all your soil analyses, you find out about water availability, and what other hurdles there are in the way, and because you are the first one in this particular sub-region, you have to deal with it as you go. You have to look inside the land to find out if the soil is in good shape, and then also look at it for free draining, and the general ability that it is suited for grapevines. Then you say, how does this site fit in with the climate ... I mean, we are only 25 years old as a Region and 30 years ago people would've said to you, you're absolutely mad thinking about growing grapes here.

Trial and error as a method of gaining new knowledge?

Bauer says his developmental approach might seem like trial and error but it was not, because he was thinking about it, and making judgements along the way. Because of the major investment, there was little room for error. What is interesting about the early wine makers in this region is the degree to which they cooperated with each other to improve their competencies at a regional level. Thus, other wine makers in the Central Otago region have had positive learning episodes (Caple et al., 2010). Bauer says:

The key with that is that you have to have the ability to translate the knowledge gained previously and relate it to the current situation, where the land is. The monks of old must have done something like that in Burgundy – put the vines in, saw it worked or saw it did not, and then made adjustments. My view is they did that quite quickly ... because that has been my own experience. It is quite remarkable, how quickly the New World has caught up to the quality of, let's say, Burgundy. We know that we don't reach the high, high notes of Burgundy but we have the best wines of the best New Zealand pinot noir that happily 'hang out' with any Premier Cru without any doubt, and sometimes even Grand Cru. That is because the pool of our knowledge is growing so vast and the pool of communication is so fast.

Biodiversity and learning

The transition to organics and bio-dynamics comes into this because you try to learn ... to think like a plant. You have to shift your attitude in order to understand it. You try to learn what actually is going on, so you are consistently asking yourself questions. Bio-dynamics is still a relatively new concept ... yet I strongly believe I get a better reflection [of terroir] from this particular land into your glass.

Old and new world differences

It was the New World winemakers who were indirectly responsible for teaching the Old World how to 'clean the dishes', which means to have hygienic winemaking equipment. The Old World of wine has gained from New World knowledge a very scientific/technical point of view, to add to their historical/philosophical base of understanding, where wine-making has been in the past, part of an oral tradition. According to Bauer, that means that new scientific knowledge has had a clear passage for uptake in the New World, with no barriers of tradition. He says:

We are trained to ask, always to ask question after question ... you know, in the Old World tradition, you sometimes don't want to ask those questions because either you always get the same answers, or because you know it's a waste of time, and you would have to fight more to get an answer. Their [mental] layout is strong with a very old foundation. Our [mental] layout here is still fluid, the concrete hasn't really set yet.

Striving and experimentation

Bauer adds:

In the New World we believe if you get a gold medal then you are king of the castle, but you're not ... For us, it shows a sense of young-ness, and a sense of insecurity, as well as a source of striving and experimentation. There is absolutely no need to go down that particular marketing track if you're a very good [French] domaine, because over years, you build up a reputation that you're a number one with consistency of high quality, in good years and bad years. Maybe here is the link to social understanding.

Authenticity

I rather think authenticity would be to have the wine from grapes of pinot noir in your glass, and when you taste them, that you know that it's not only from Bendigo, it's from the Quartz Reef paddock.

Findings from dialogues with the three experienced winemakers

What follows are the findings derived from dialogue with three well-known winemakers from the Old World and the New World of wine.

Ever changing nature of terroir

The complexity and the continual changing nature of terroir is illustrated by our three winemakers. van Berg supports the view that terroir is 'polymorphous' (as suggested in the earlier section on natural scientific perspectives of terroir) and that it consists firstly of 'a place where the conditions (climate, soil, sun exposure, etcetera) are fulfilled',

secondly it is 'a name of a plot ... where awareness of the appellation will guarantee ... sales price' and thirdly it 'is a favoured place that generates both quality and profitability'. For Coetzee terroir consists of five elements which when combined 'gives a sense of place that comes through in the wine'. Coetzee articulates the complexity of terroir as follows: '... a view ... that differentiates between the essentially technical characteristics of terroir, and the inherent promise of terroir that is socially formed and based on consumer value ... illustrates the complex nature of terroir'. Bauer emphasises that we have terroir 'with or without the grapes, because terroir is the combination of human activity, the land, and the environment' and he is also keen 'to emphasise a sense of belonging' which draw attention to the human dimension of terroir.

Partnership between man and nature

The vital role of understanding and working with nature to create a distinct terroir is emphasised by all three winemakers. van Berg leaves part of the estate 'fallow to achieve biodiversity' and 'Half the plot ... planted with vines ... the remainder is left for animal and vegetal wildlife ...'. van Berg also sees man's role as dependent on what nature offers or provides, with the least modification of the natural soil. At his domain ... 'wine is an artistic creation, the result of manual work but also of reflection, listening, and observation' of nature. Terroir is the result of a partnership which is well described by Bauer as combining human activity with the land and the natural environment. Bauer furthermore emphasise that one should '... try to learn ... to think like a plant.' Coetzee states that 'One's footsteps must be in the soil ... plant ... and climate' and he sees the 'winemaker ... a humble servant of nature ... give nature the opportunity to produce the best possible wine'. Coetzee supports the view of Hardy (2001) who said 'nature creates, man only guides' and states furthermore that 'a mixture of nature and man is present' as ingredients of terroir.

The pressure to make informed decisions

From the time of deciding where to put a rootstock and its plant material into the ground until its first grapes are turned into a wine, the winemaker must make a multitude of decisions. The monks of old had an abundance of time to observe the more and less suitable locations for particular vines in Burgundy. According to Coetzee there is not room to follow the earlier trial and error approach as 'time and capital wasted by a failure could be costly' but fortunately winemakers can 'benefit from various organisations ... helping winemakers finding solutions to problems'. Bauer, in the same vein, mentions that because of the 'major investment, there was little room for error'.

Continual education as part of man's role

Terroir consists of a number of continuous changing elements that result in an endless process of learning and experience assimilation. Bauer mentions that '... monks of old ... put the vines in, saw it worked or saw it did not, and then made adjustments. My view is they did that quite quickly ... because the pool of our knowledge is growing so vast and ... communication is so fast'. Coetzee refers to the benefits created by various

organisations that help winemakers to find solutions to problems as the '... world has become smaller ... new information and developments reach us' faster and winemakers in other parts of the world '... are approaching the quality of ... Burgundy' and 'hopefully this information will become knowledge'. Coetzee illustrates the importance of experience for decisions in the vineyard by saying that 'Growing and shaping of the plant to find the correct balance between the branches and the leaves influence the eventual quantity and quality of the grape'. van Berg elucidates his views in respect of the continuous learning process by explaining his approach to the method of pruning to be followed, namely he does not strive '... to impose a specific pruning method on the vine but ... to experiment on small areas and observe whether the vines accept or reject what the vine grower is trying'. Bauer's view is that 'you have to have the ability to translate the knowledge gained previously and relate it to the current situation, where the land is.'

The increasing importance of biodiversity in wine farming

All three of the winemakers interviewed mention in some or other form the growing trend to extend biodiversity as part of their farming practices. van Berg's whole wine producing operation is built on the footings of biodiversity as he integrates both vegetal and animal life in his vineyards. For instance, van Berg uses organic agriculture products (organic milk and sea salt) to control the health of the vine leaves. Bauer strongly supports the role of biodiversity and sees the major benefit thereof as its contribution to help him understand more of the intricacies of wine making.

Conclusions

The historical evolution of the term 'terroir' is essentially a social history, part myth, part stories and more increasingly, scientific. The concept of terroir was born in Burgundy, a region of small estates. Today, the idea of terroir is stronger in regions where there are small estates and where pinot noir is grown. Other regions of the world, which have comparable natural influences and production conditions, also recognise the idea of terroir.

Recognising human interventions within the concept of terroir makes good sense to our chosen wine winemakers. Adaptations over time in preferred locations, with climate, grape clones and methods are all the result of human choices: based on trial and error, experience or scientific knowledge. In our view, the lack of universal consensus in the meaning of terroir is a consequence of differing social and technical histories relating to the origin of particular wines.

Using modern management terminology, terroir in the New World is a 'continuous improvement' aspiration. As Bauer says, 'The concrete (of idea generation) has not set yet'. In the Old World, decisions about the quality of wine have largely been set within a restricted scope for innovation that is the unintended consequence of appellations d'origine systems. All three of our thought leaders value the freedom given by the absence of what they see as an AOC straitjacket. In rejecting AOC, paradoxically, the aspirational goals they impose on themselves and willingly accept are often stricter.

The uniqueness in wine due to differences in aspects of terroir is not in doubt but a precise *technical* definition remains elusive. Taking an outcome-oriented approach in contrast to a technical production orientation, Spielmann and Charters (2013) have suggested

that terroir is a form of perceived authenticity. Our thought leaders would agree. Each of them in their own way is pursuing what they see as a necessary *rebalancing* of the notion of terroir by recognising a new range of intervening human factors. A process of change and improvement is still current in the New World but in many Old World wine estates, what was distinctive has been decided and embedded in AOC classifications.

van Berg, Coetzee and Bauer do not have a blind belief in terroir as they are fully aware of the importance of the human choices they make, as to soil, aspect, drainage and climate, in the making of good wine. They integrate the technical/scientific and human factors, combining the grower's energy, dedication, hard work and sensible decisions concerning compatibility between soil, rootstock and cultivar, trellising, canopy management and harvest date.

It may seem paradoxical but not every winemaker needs or wants the provenance of its terroir displayed and communicated to its market (Charters, 2010). It is in upmarket wine categories, where wine experts, critics and keen customers show most interest in terroir. Spielmann, Jolly, and Parisot (2014) explain that terroir becomes a quality cue in these markets, where the wine media frames terroir in relation to price and quality.

Our experienced winemakers respect the technical/scientific aspects of terroir certainly, also its social/historical dimensions, so far as they judge them relevant to their customers and markets. What is revealing and of note is that each winemaker in their own way is trying to maintain respect for what they see as a natural integrative order between man and place, or what we might say today is the 'systemic connectivity' of parts to the whole that requires the careful and intelligent interventions of man. The technical expertise necessary for developing a wine reputation in a young wine estate is very much the consequence of human choices with no fixed 'blueprint' as a guide, except the accelerated learning of like-minded pioneers, which we argue, is an unrecognised social dimension of terroir.

The evidence from the dialogues with our experienced winemakers from three continents and our earlier historical analysis support the view that terroir, as understood today, is a socio-technical construction (Ballantyne, 2011). In other words, the relationship between social elements (including local wine history, the role of influencers as 'taste makers' supported by the wine media, changing consumer taste preferences, and word of mouth) and the more familiar technical expression of terroir (including advances in scientific knowledge as suggested by Belda et al., 2017; Bonfante et al., 2018; Miura et al., 2017; Prata-Sena et al., 2018; Roullier-Gall et al., 2014; Tofalo et al., 2014 and Bokulich et al., 2014) can be understood as two sides of the one coin. The less recognised social distinctions we argue account for variations in opinion and practice between wine regions and consequently explain the difficulties to date in arriving at a definitive statement on terroir.

We also propose that the promise of terroir includes viticulture and winemaking collaborations, and extends to include the word-of-mouth commentaries spread by winemakers, wine writers and cellar door staff, as well as by enthusiastic customers around the world. We argue that this social element of terroir has, in various degrees, supported and extended brand value for premium wines and wineries in New World sites. We conclude that terroir is in a state of 'becoming' in New World environments, never fixed, as might be the case in Old World AOC estates.

Implications for management in the wine industry

Role of nature

The importance of the environments that a business is exposed to is illustrated well by the necessity to study and react to or anticipate the changes in the micro and macro environments that the winemaker has to deal with. Like their counterparts in other areas of business, winemakers come across numerous challenges that seek answers. Some of these (such as frost that, in the words of van Berg might result in losing your 'whole crop') one can only accept and try to minimise its devastating impact; similar to how managers have to attend to happenings in their business's macro environment.

Constant striving for more/better wines

The accumulation of wine making knowledge and experience as well as the fast and widespread dissemination and application thereof, has created many opportunities on the one hand and severe competitive environments on the other hand. The afore-mentioned state of affairs place a heavy burden on winemakers when a market strategy is put together. The wine industry, unlike many other industries, has to live with the impact of a season or seasons (e.g. extreme temperatures or pests) before a change of direction in a strategy can be considered. As a result, the tactics available (price reduction or an earlier release of wines) to remain within the focus of the more comprehensive strategy, is rather limited because of the potential of damage to a brand name. In other industries, managers also have to manage in market conditions that are not favourable to them but if the firm is well diversified it may escape severe long-lasting financial damage. The options to deal with severe conditions in nature are more limited for winemakers.

Continuing education

Winemakers have to be equipped with knowledge to attend to a host of issues originating from both the natural and social sciences. Changing weather patterns, more demanding consumers that are spoilt for choice, global competition, multiple channels for marketing and so forth requires winemakers to subject themselves to an unavoidable lifelong education process if they wish to remain relevant. Many technological advances, such as GIS systems are available to assist winemakers in their daily decision making to monitor water requirements, identify under-nourished vineyard sections. The value of GIS systems for management in general is also manifold. Graphical market segmentation, visual identification of under-served areas and other geodemographic variables are some of the valuable uses of GIS systems for management. The recent academic literature in natural sciences is also playing a key role to assist the growers and the wine-makers to motivate their decision given their high investment and limited time to experiment trial-error.

Strategy development

The initial development of a vineyard to produce a wine has much in common with the foundations that should be in place to build and develop a long-term business strategy. There is a similarity between a winemaker's endeavours to optimise a cultivar's output

(in terms of quality, taste, volume or whatever measure is used) with his knowledge and experience that nature provides (for instance, soil and microclimate) and that which a business manager has to consider and manage for a particular result. The essential building blocks should all be identified in both instances to produce the desired outcome.

In general

For a wine brand to remain intact and persistently occupy a clear and distinctive position in the minds of consumers, a winemaker has to ensure that the taste and quality perceptions of consumers are consistently met. A coherent brand image requires attention to details by the winemaker over a long period of time. The winemaker has most probably a more challenging task than his/her counterparts in many other industries. Management, in general, can benefit from studying the processes in place to manage the similar and dissimilar components of a wine brand.

Institutional regulations like AOC in France and equivalent systems in other places do have advantages in achieving uniformity of practice across a wide range of participating members. A similar but more incremental effect is achieved with 'best practice' admonitions in many industrial settings. Rules and best practices need to be re-considered when environmental or competitive conditions change. For example, the appellation systems in Burgundy have rules governing bottle shape, crop yield, pruning, and the grape varieties allowed. However this does not always have beneficial effects. The topsoil layers in Burgundy are steadily thinning due to erosion (Bourguignon & Bourguignon, 2008). Bringing fresh soil in from the hills beyond the vineyards is banned by AOC legislation.

Our thought leaders demonstrate innovative vineyard management and wine making practices. Their approaches are by no means representative of wine regions as a whole in the Old World or New World. However, are there lessons for general management in the use and review of business models applicable in other business domains? We think so. Nothing inhibits innovation more than a business mind-set attuned to times past without reference also to changing market opportunities. Successful firms are not exempt from adopting a rigid mind-set. In the last decade, new ideas have emerged relating to reviewing patterns of innovation (Chesbrough, 2010). An *open innovation* view is emerging involving willingness to reconsider existing business models that have served well in the past, and so to get ahead of, or maybe lead, future market bifurcations. This in our view has application within wine regions as much as in broader agricultural and industrial settings.

Note

1. Roman historian Titus Livius.

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