

school of ROCK

MINERALITY IS ONE OF THE MOST USED – SOME WOULD SAY ABUSED – TERMS IN THE SOMMELIER'S LEXICON. BUT WHERE DOES IT COME FROM AND WHAT DOES IT REALLY MEAN? BUCKLE UP, SAYS **DARREN SMITH**, WE'RE IN FOR A BUMPY RIDE



It was at a Rhône masterclass that I first heard that most damning of wine world questions. One of the winemakers was giving his terroir spiel about how his deep-rooted vines penetrated the limestone bedrock to confer *mineralité* on his wines, when a wine journalist in the audience asked: 'By what mechanism is this achieved?'

The winemaker didn't quite hit him, but there were a couple of rather prickly seconds when I thought he might. How dare this Englishman question the essential truth of his wine, that vital, unassailable link between the land and the liquid? How very dare he?

It's a scene which has played out at many a masterclass over the years and illustrates just how controversial minerality is. It is probably the most abused term in the wine enthusiast's lexicon, yet, in this country, go back 10 or 15 years and it was barely used. *The Oxford English Dictionary* still doesn't recognise it.

Some people point out that it's only as wine has shifted away from rich, oaky Parker-pleasing styles that the term has gained currency. But does it register as a taste, an aroma, a mouthfeel, or a combination of all three? It is used in so

many different contexts it would seem hard to attribute any meaning to it at all, and yet it is there, omnipresent and, for many people, the essence of many of the world's (cool-climate) wines.

So it is that when we taste Chablis, we can't help but be struck by a certain non-fruity, non-floral character, a cool, clean, somehow chalky flavour or texture. A Mosel Riesling makes us salivate as much as licking the blue slate that blankets the

blows to the very idea that minerality could come directly from geology – that is, from rocks.

Minerals... and minerals

As Maltman points out right from the off, minerality is different from other descriptors we have for wine – pineapple, hay, old leather, whatever – in that it is actually taken literally. It is assumed that it is actually vineyard minerals, rather than being simply a metaphor to make sense of the information that our noses and palates receive.

The 'flashpoint of misunderstanding', says Maltman, is that geological minerals, the ones contained in vineyard rocks, are not the same thing as the nutrient minerals that vines use to grow.

'When we talk about minerals in foodstuffs such as wine, we usually mean single elements, chiefly metallic elements such as magnesium, zinc or iron,' he explains.

'These are minerals in the nutrient sense. If they are in solution, as in vine sap, grape juice and wine, these nutrient elements exist in ionic form, as cations. However, minerals in the vineyard

'THE CONCENTRATIONS [OF MINERALS] ARE TINY – VALUES BELOW HUMAN DETECTION THRESHOLDS' PROFESSOR ALEX MALTMAN

region's steep slopes would. The stones contain minerals. Vine roots take up minerals. Wines become mineral. What is so difficult to accept about this?

Enter the terroir romanticist's *bête noire*, Prof Alex Maltman of Aberystwyth University. Maltman has been steadily dismantling the architecture of such thinking for years, and in a presentation at the Institute of Masters of Wine late last year he delivered a series of hammer

THE GREAT STONE DEBATE

WHAT DOES MINERALITY MEAN TO YOU AND YOUR GUESTS? WE ASKED A RANGE OF TOP SOMMS FOR THEIR THOUGHTS



OLIVIER GASSELÍN, HAKKASAN WINE OPERATIONS MANAGER, UK

'Minerality is a term which I use in tasting notes mostly for white Burgundy, and for Chablis in particular. I would not use the term when speaking to a guest, as it might be misunderstood. In my opinion it relates to the salinity expressed in certain wines, and other good examples of such wines would be Grüner Veltliners from Austria, Pecorinos from Italy and Albariños from Spain.'



TERRY KANDYLIS, HEAD SOMMELIER, 67 PALL MALL

'It is a very misleading term that I am trying to use less and less, because it creates confusion amongst the wine drinkers. I believe that many people use the term to try to express the certain absence of fruit of certain wines, like the steely or a leaner character that a Chablis or a Riesling from Mosel will show, though scientific research on this subject disapproves this theory. 'Recent research was trying to prove that "minerality" is related to cool climates. But Assyrtiko from Santorini is definitely not coming from a cool climate and is definitely "mineral". I believe that is more related to water regulation, as it is a common truth that the best wines come from poor soils, with very good water regulation.'

bedrock – minerals in the geological sense – are almost all compounds, and usually complex and insoluble ones at that.’

In other words, these geological minerals are actually not available for the vine to take up.

Sensory limitations

The good professor also points out that the concentration of mineral nutrients in the finished wine are so minute that we cannot possibly sense them. Potassium, the key mineral nutrient of vines, has the highest concentration of any in wine, but even this rarely exceeds 1,000 parts per million (ppm) – 0.1% of the wine. Calcium and magnesium typically come in at 10-120ppm – which, as he points out, puts the standard descriptions of ‘mineral-rich’ and mineral-packed’ wines into context.

Even if these minerals can be picked out by the sophisticated analytical tools now available, they would be impossible for us to detect (much less identify different ones) because, with the exception of halite (sodium chloride), there is no taste to them. Similarly, these mineral elements are not volatile – ie, they do not vaporise – so there is no smell.

Maltman is not denying that nutrient minerals and geological minerals are linked; what he argues is that it’s through such a complex, convoluted

VINEYARDS IN THE PRIORAT COUNTY OF TARRAGONA PROVINCE, CATALONIA



JONATHAN KLEEMAN, HEAD SOMMELIER, SOCIAL EATING HOUSE

‘I know that many people will say that, scientifically, there are not really any minerals that are detectable in my glass of wine except small amounts of potassium and calcium. To these people I would say that there is also no pineapple, tomato leaf, dragon fruit or cat pee in my glass of wine either.’

more stable ones – and applies it to the winemaking process. So you start with a chemically ‘unstable’ juice and it grows more stable by racking, fermenting or punching down, ageing and so on.

relationship, as part of a long series of dissociative chemical processes (in the ground, the vine and the wine), that to talk about a literal transmission of geological minerals into the finished wine is a nonsense.

But, the terroirist will argue, there can be no doubt that wines have a certain ‘mineral’ character – call it a mouth-watering tension, call it flintiness, steeliness or saltiness – which differs according to soil type and is there in some wines and not in others.

To deny this is true would be pig-headed. So what could it be?

On mineralisation

The French oenologist/journalist David Lefebvre has gained a reputation across the channel as the go-to man for a steer on minerality. He borrows the term ‘mineralisation’ – that is, in very broad terms, the chemical process which turns relatively unstable compounds into

Lefebvre says that this mineralisation process in wine is expressed on the palate as different types of salinity. He notes that these minerals do not come from photosynthesis, but from the soil – which leads some terroirists to refer to his findings in defence of a soil-derived minerality and of terroir.

Interestingly, Lefebvre argues for an index of minerality that could be measured from the weight of the ash (mineral dry extract) in the wine.

Does this wash with Maltman? In a word, no – the concentrations of such minerals, he counters, are just too small. He also suggests this is stretching the definition of ‘salinity’ to its extreme.

‘Their concentrations are tiny – in general, values below human detection thresholds in pure water,’ he explains. ‘How much of these virtually tasteless elements would have to be present in wine to be detectable, in the presence of all the highly aromatic organics?’



CHRISTOPHER BOTHWELL, HEAD SOMMELIER, ALAIN DUCASSE AT THE DORCHESTER

‘The most common descriptors of minerality are “stony” and “steely”. I personally think that the source of minerality is open to interpretation, but I believe it has a strong link to terroir.’



It's never been established – the wine would probably be toxic.'

It remains a possibility, however, that what goes on underground does have a crucial influence on wine character and quality, even if it's not attributable to rocks and stones.

Emmanuel Bourguignon, soil scientist of the Laboratoire d'Analyses Microbiologiques des Sols (LAMS) argues that micro-bacteria is the missing link between vineyard geology and wine. 'Chemolithotroph' organisms, he says, are able to source energy from the degradation of rocks, and in doing so they release minerals – potassium, magnesium, etc – into the soil solution that then become available to the vines.

He refers specifically to microscopic fungi known as mycorrhizae, which live symbiotically with a vine's root system, and can increase its ability to pick-up nutrients within the 'deep horizon' of the soil 'ten thousand-fold'.

As a tangent on the microbial theory of minerality, Nik Weis of St Urbans-Hof in the Mosel suggests that an aromatic minerality in his wines is derived from petrichor – organic oils secreted by micro-organisms, which coat stones. These are the source of that strange smell of a pavement on a sunny day after rain.

This is all very well, but for Maltman, vine nutrition is much more prosaic. The important thing is not the bedrock, neither the deep roots (these are only important for accessing supplementary water), nor the microbiology; rather, it is the rotted vegetation close to the surface which provides the vast majority of a vine's nutrient minerals.

'By definition, bedrock and subsoil are little weathered, and sustain little



ANJA BREIT, SOMMELIER AT LARGE

'In any sommelier exam we are asked to describe mineral flavours and aromas such as pebbles, granite, flint, or slate, and from my experience I am confident that this is possible. The minerality of wines often gave me the final clue as to where the wine was from.'

life,' he explains. 'The bulk of a vine's nutrition comes from the topsoil, from the humus. But people like the idea of deep roots and don't want to relate minerality to rotted vegetation.'

Is reduction the key?

Perhaps the most frequently explored theory to date for a single source of minerality is the volatile sulphur compounds associated with reduction. A study by the late Denis Dubourdieu and his research team at the University of Bordeaux identified benzenedimethanethiol as a compound giving a gunflint flavour in white wines and thus as a more-than-likely source of a type of minerality.

As recently as November 2016, researcher Professor Pascale Deneulin conducted an extensive survey of 2,000

**'I'M TOLD THAT YOU CAN'T
TASTE STONE TYPE AND I'M
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French and Swiss wine professionals. The study revealed a strong association between perception of minerality and sulphur compounds/reduction, almost 50% referring to gunflint or flint as their primary association with minerality.

Just under 30% reanalysed white wines



**ANDREAS ROSENDAL,
HEAD SOMMELIER,
ORMER MAYFAIR**

'I'm definitely a strong believer of minerality in wines, though I'm quite wary about when I use it. I think many guests still don't really understand the term. If you're not into wine, then it's not really the easiest thing to explain either.'



A VINEYARD IN SAINT JULIEN WITH SILICIOUS EARTH



GINO NARDELLA, HEAD SOMMELIER, THE STAFFORD

'Like many of my colleagues in the industry, I use the term "minerality" very often – it's a term we have exported to the rest of the world. We sommeliers and wine lovers around the world agree minerality possibly describes a mystical sensation common to all our palates.'

from Switzerland, Burgundy, Jura and French Savoie, which pointed to the influence of free SO₂ on perceptions of minerality. Deneulin's recent findings back up a study by Wendy Parr and Jordi Ballester et al published in July last year which looked at perceived minerality in Sauvignon Blanc using wines and tasters from both France and New Zealand.

While the study concluded that cultural differences influenced the perception of minerality, a key finding was that concentrations of both free and bound sulphur dioxide were positive indicators of perceived mineral character in the wines.

Tasting the stone

The search for the Higgs boson particle of minerality continues, but while the science does, of course, advance our understanding here, some are justifiably unwilling to let the geological link go.

'I think you can definitely taste these elements when you taste wine,' insists Les Caves de Pyrene natural wine sage Doug Wregg. 'Often, if I've been given wines blind to taste I will say, ooh, that's got a really granitic, salty flavour, and, lo and behold, it turns out to be a Syrah that has been planted on decomposed granite soils. Then I'm told that you can't taste stone type and I'm thinking, that's got to be wrong, because I'm tasting it. I may

not even know the grape variety but I can tell you that's limestone, that's granite or that's schist.

'I think science is trying to hijack language and hijack our sense of what we feel and prove it, almost in an equation. I don't think that's true and I don't think that it's been demonstrated that I'm not tasting that.'

Sommeliers use the idea of minerality to pick out a wine in blind tastings when all other identifiers fail. And winemakers find these geological references helpful, too.

'As far as we're concerned, it really does make sense,' says Gregory Viennois, head winemaker at Domaine Laroche in Chablis. 'The nature of soil has an indirect impact on the wines. How this happens exactly remains to be proven. But everything which is synthesised in a vine is made by

enzymes which are completely dependent on trace elements coming from soils.'

Like terroir itself – with which minerality is synonymous in many people's eyes – geology-derived minerality clearly remains a powerful idea in the wine industry.

Imagine if those elemental associations with Kimmeridgian chalk, Mosel slate, Santorini lava stone or Priorat licorella suddenly vanished – wine would lose all its mystique.

Maybe we are talking in metaphors. But, as Maltman says, who wants to hear that their mysterious minerality comes from rotted vegetation? 🍷

CATCH ME AT

Intrigued? Come and learn more at Imbibe Live. On 4 July at 12.30pm in Wine Sessions, Professor Alex Maltman will be putting forward his views on the science of minerality.



**ANSGAR SCHMITZ,
DIRECTOR, MOSELWEIN**

'I associate the term minerality with Riesling wines that smell like wet slate and produce a certain mouthfeel, a lasting saltiness. In sweet Riesling it is less obvious than in dry or medium dry wines because higher residual sugar seems to cover it. It is separate from acidity. I think it has to do with the sugar-free extracts of a wine, all the content beside natural sugar and acidity.'