



Heavy metal

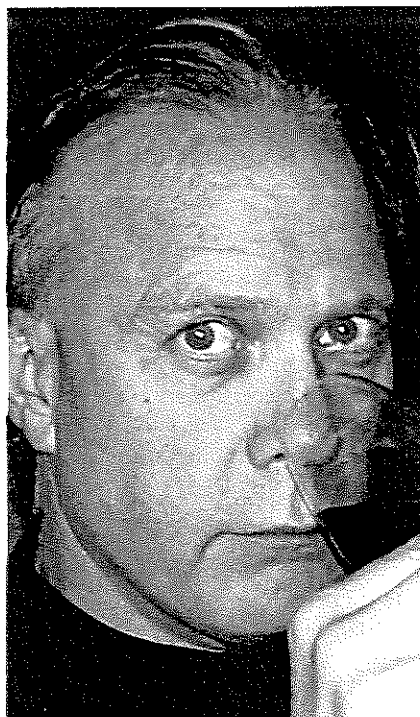
the tail wags the dog

Screwcaps are fundamentally anti-terroir, and extensive use of copper sulphate radically alters the wine. Paul White argues against overdosing and stands up for sulphides – good and bad

I've been in the thick of the screwcap vs cork debate for nearly four years now, when I first posed the question, 'Are we simply trading one fault for another?' From my perspective, the issues have never been about favouring one enclosure over another so much as about wine getting enough oxygen after bottling to age gracefully.

Anyone who looks back over my articles will see I have not endorsed cork, although much has improved within the cork industry that deserves considerably more recognition than it currently gets. I was never fussed about the trailer-park aesthetics of screwcaps, nor romantically attracted to the ceremonial pop of cork. And I didn't buy into the whole touchy-feely eco-argument surrounding the minx or manx or whatever form of endangered wildcat that is supposed to inhabit cork forests. Truth be told, I am much more sympathetic to the cork acorn-fed, free-range pigs that make Iberian hams taste so good and the common sense of keeping rural villages alive and people busily employed tending cork trees and pigs, just as they have for centuries. But that's probably more my stomach talking here.

And although the little metal rings locked on to all those empty bottles in my glass recycling bin weigh heavily on my mind when stacked up against the more noble aspects of cork forests holding back the



Paul White

Sahara Desert, I have learned to live with that guilt. No, after all these years, what truly bugs me about screwcaps is that they are fundamentally anti-terroir in nature.

At its crudest level, screwcaps are all about a manufacturing process intent on radically

altering a wine so it can be safely stored under a metal-capped container. It all seems so much more about the tail wagging the dog now than it is about making great wine. And that seems completely antithetical to the concept of terroir – an aspect of wine that many of us hold dear.

Terroir is about growing grapes in the best possible way so they express the soil where they were grown and the seasonal sun they soaked up while growing. Often, going hand in hand with this, one hears winemaking techniques described as being custodial, low impact and non-interventionist in nature – winemaking that allows grapes to make the wine on their terms. Terroir is about preserving the soul of a wine by leaving as much of its point of origin and genetic make-up intact for as long as possible in the winemaking process and then delivering it into bottle with an enclosure that encourages further development in the most positive way possible.

The ethos behind screwcaps flies in the face of all this. In a way, it is no surprise that this technology is being championed by the Australian industry, which arguably has been fundamentally anti-terroir from the earliest days of its modern revival in the 1950s. Enzymes, yeast nutrients, added tannins, acidification, oak extracts and many other forms of chemical intervention

and technological manipulation have long been used to shape wine styles – more often than not, intent on chasing markets rather than representing place. Too much of Australian wine willingly transforms itself into anything just to make a buck.

It should come as no surprise then that the solution settled on to overcome the major obstacle facing screwcaps – post-bottling sulphide reduction – is to dose wines with as much ‘heavy metal’, in the form of copper sulphate, as they can bear. Preferring to avoid enclosures that allow in just enough oxygen to cure the problem naturally, screwcap advocates such as Tyson Stelzer suggest instead that wines should be ‘prepared’ by regularly copper fining after fermentation, followed by repeated doses during maturation until the wine is perceived to be clean enough to bottle. This philosophy demands that wine must adapt to its container, not the other way around. Where most people want fewer chemicals in their food and drink these days, screwcap advocates are stepping in with more.

Historically, copper fining has always been considered a radical treatment that should only be used as a last resort to salvage an undrinkable, therefore unsellable, wine. There are good reasons for this. Copper sulphate indiscriminately targets by-products of yeast fermentation – sulphide compounds called thiols, which are responsible for producing both positive and negative aromas, flavours and palate characters in wine.

Bad sulphides and good sulphides

The problem here is that, in targeting ‘bad’ sulphides with copper sulphate, winemakers are also stripping away all the ‘good’ sulphides that give a wine its distinctive terroir character. Native yeasts – one of the purest expressions of terroir – are especially rich in sulphides, most particularly the dangerous ones that can turn bad under screwcap’s near anaerobic environment. But even sulphides produced from inoculated yeasts are unique expressions of the relationship between grapes, soil and climate. These fundamental connections to terroir are stripped away with copper fining.

The alternative, of course, is to risk letting post-bottling sulphide reduction take its inevitable course under screwcap’s near anaerobic nature. This is equally damaging to the terroir elements of any wine. As post-bottling sulphide reduction progresses, wines gather increasingly stronger sulphidic notes. Observed aromatically first as struck-flint aromas, eventually these arrive at pongier, increasingly unpleasant rotten-egg or burned-rubber characters. Rather than speak of a specific soil type or place or vintage or variety, sulphide

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reduction casts a sort of vinous chiaroscuro haze that tends to obscure all underlying expressions of terroir.

Indeed, what is described above represents sulphide reduction when it is in its final full-blown aromatic phase. Previous to this there is a gradual build-up of reductive changes to fruit and palate character, the so-called screwcap palate. Chemist-winemaker Dr Alan Limmer ‘has frequently seen wines described with reference to their particular acidity and/or mineral tones when the presence of sulphides is apparent. A copper clean-up in the glass (as long as the dinner guests don’t object) will more often than not alter this aspect of the palate dramatically. The sulphides impact from an organoleptic perspective, towards the end of the palate imparting a “mineral” or bitter/hard/astringent aspect. This has the appearance of shortening or closing up the palate, so the wine does not display a fine, fresh, long finish, but ends abruptly and somewhat harshly. These effects vary depending on the wine and the sulphide levels.’

Anyone who has observed wine writers in Australasia over the past couple of years cannot help but note the increased occurrence of ‘minerality’ in wine descriptives, many applied to wines that were formerly

described exclusively in much fruitier terms. It’s hard to believe so much Sancerre-like terroir has suddenly cropped up over the past few years. This instant terroir wouldn’t have anything to do with the advent of screwcap bottling in Australasia, would it?

Sales of copper sulphate increased astronomically over the rush to screwcaps in 2003/04 within New Zealand and presumably in Australia as well. Consumers that I’ve spoken to are shocked that screwcap wines are routinely dosed with copper pre-bottling and that residues can remain for years after bottling. How close residues are coming to recommended levels for human consumption is anyone’s guess, and it’s not unreasonable to be concerned that some wines may be approaching, possibly even broaching, the upper legal limits.

Unfortunately there is no cure for the malady; the best all this coppering can ever hope to do is treat symptoms temporarily by stripping out sulphides for a short period after bottling. The mechanisms and kinetics of sulphide chemistry tell us that sulphide compounds will eventually reform post-bottling and may eventually throw out negative reduced sulphide characters.

While copper fining can clean up sulphides for a while, it cannot touch other compounds like disulphides and the





common preservative SO₂, both of which are immune to copper fining. Under near anaerobic post-bottling conditions these become mechanisms through which sulphides are formed, thereby effectively recreating the problems that were being avoided with copper fining in the first place. This explains why in the infamous ACF enclosure trials, Penfold's Bin 389s, which had been copper fined pre-bottling, still managed to end up with post-bottling reduced notes after several years in bottle. It also explains why these problems are cropping up in other screwcapped wines that have been 'prepared' using screwcap advocates' formulas for making wine safe for bottling.

Dirty wine cleans itself up

The crazy thing is that all this copper intervention is unnecessary. The simple alternative to heavy metal is oxygen. Throughout history, corks have provided a fairly benevolent environment in which wines can mature. Enough oxygen seeped into the cork to provide a natural buffer against sulphide reduction. Most wines found a fine balance with just enough positive sulphide influence to add complexity. In fact, the relatively forgiving nature of cork meant that a relatively dirty wine could be bottled and would eventually clean itself up in bottle with cork's steady

stream of oxygen. When serious reduction did occur under cork, it was the result of a 'bad' cork that sealed similar to screwcaps. In other words, too anaerobically.

We know now from scientific trials that several technical corks (Diams, agglomerates, twin disks etc) appear to have found a sweet spot where a tiny ingress of oxygen consistently keeps post-bottling sulphide reduction at bay. Synthetics also counter reduction well, although they allow wines to oxidize far too quickly in their present form. Natural corks also do a good job of foiling sulphide reduction.

Contrary to the wild claims from screwcap advocates that natural corks suffer from variation at rates of 1,000- to 1,227-fold (the now-discredited MOCON

data), there is solid science to support the fact that variation is no more than three- to fourfold – not that far off screwcaps. And within that three- to fourfold range, ingress is near to or slightly above the same sweet spot that technical corks manage.

It is very telling that, with the advent of TCA-free Diams and considerably cleaner technical and natural corks, the screwcap lobby has shifted strategies towards painting cork products as wildly oxidative and, most recently, more prone to sulphide reduction, than screwcap wines. You can't have it both ways.

Of late, I've read screwcap advocates cite an AWRI Advanced Wine Assessment Course where participants consistently identified a higher incidence of reductive characters in wines sealed with cork closures compared to screwcaps.

Alan Limmer comments, 'While it is entirely feasible that corks produce post-bottling sulphide reduction, the evidence to date suggests this is not a regular occurrence. There has been no sign of this in the sensory data from AWRI's closure trial from a pool in excess of 100 wines under cork subjected to sensory assay. Further, the evidence above should be questioned in this respect. Taking wines off the shelf and conducting sensory assessments of their sulphide content tells us nothing of the original state of the

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sulphide profile at bottling. The wines may well have been bottled with residual H₂S and thiols. In which case, to assess them at some point later does not tell us whether the thiols are diminishing through oxidation or increasing through post-bottling 'reduction'. The only way to determine this aspect is to compare the same wine under various closures, as per the AWRI closure trial – which to date has not demonstrated this behaviour of cork."

One has to question then what's really going on here. Firstly, the AWRI citation isn't a clinical survey with controlled conditions tightly following scientific methodology. The samples were collected randomly, we don't know how recently they were bottled, and the scoring seems to have been more along the lines of a show of hands. No scientist would take any of this seriously. It is entirely possible the screwcap wines were all freshly bottled and recently coppered, while the cork wines may have been bottled dirty and were in the process of naturally cleaning themselves up, for all we know.

When it comes down to it, you can put a sulphide-rich wine under an oxygen-permeable seal and it is very likely either to maintain a complex sulphide balance or to clean itself up. Put the same wine under screwcap, and the only surefire way to keep it from reducing further is to nuke it with copper sulphate.

This is an aspect of consumer choice far too few consumers understand yet. Given the proof is in the pudding, the truth of the matter is not bound to stay bottled up for much longer. 