

Taming the screw: The joys and pitfalls of working with screw caps

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Cork Taint

Last month I heard a story that for years I have been secretly hoping I would never hear. Australian winemaker Phil Sexton told me this:

“While I was working at Devil’s Lair in Margaret River, we received a very high rate of return on our 2004 Chardonnay. We had it tested and discovered that 14.7 percent of bottles were cork-tainted. We recalled the entire production. Our cork supplier denied responsibility, brushing it off as originating in barrels in the winery. We took legal action against them – an expensive process that would have sent us bankrupt had we lost. Part way through the proceedings I received a phone call from the winemaker of a large reputable Australian company, stating that he used the same cork supplier and asking what the batch code was on the corks. The number I told him confirmed his worst fears. This was exactly the same batch of corks that he had earlier tested and rejected.”

The batch of corks in 2004 Devil’s Lair Chardonnay had been rejected by one company and then sent by the cork supplier to another company. Confronted with this evidence, the company settled Phil Sexton’s case on the steps of the court. Now working at another winery, Phil bottles all of his wines under screw cap. In his words, he’s never looked back.

I keep hearing that cork companies have solved the cork taint problem. I wish I could say that I’ve seen the evidence. Two months ago I judged *The Great Australian Red*, a wine competition that I’ve set up with UK writer Matthew Jukes. Of the 166 entries, one-sixth of the bottles were rejected by the judges as faulty, the majority of which were cork-tainted. Of the bottles not rejected, a further three or four were found to be inferior when two judging teams compared results from different bottles. Such slight variation is often a consequence of very low levels of TCA. The Australian Wine Research Institute has found that even levels of one part per trillion – well below the threshold of most drinkers – suppress fruit characters in wine by some forty-five percent. In all, almost one in five bottles in our competition were not up to scratch.

And it’s not just happening in Australia. Within one hour of stepping off the plane in Cape Town on Tuesday,

a Stellenbosch winemaker said to me, "It is quite ironic that you visited us today. I was about to label a wine the other day, tasted a bottle first, and discovered that it was cork-tainted. A second bottle was also tainted. A bottle from a different cork supplier was fine. Now I have ten thousand litres of corked wine in tank. The problem is that my cork supplier will only accept responsibility for TCA at five parts per trillion – and this wine has three parts per trillion. I'm looking for ways to remove the taint and sell the wine for whatever I can on the bulk market." Anyone want to buy ten thousand litres of corked wine? I thought so.

While cork companies have been quick to point out that corks are not the only possible carrier of TCA, if the cork were not the primary source of cork taint, we would not see the variability in levels of taint between bottles in the same batch which is clearly apparent today. The precise source of TCA can now be pinpointed in the laboratory with absolute confidence by measuring the ratios of other anisoles and polyphenols, and in the vast majority of cases, cork taint originates in the cork.

The reduction of cork taint levels below sensory threshold remains a major focus for the cork industry, with various initiatives underway. I applaud these, but it remains that even if they are successful, this will not fully solve the cork problem.

Sporadic oxidation

For many winemakers, sporadic oxidation ranks as an even bigger problem than cork taint. Variations between corks, between bottles or between storage conditions can compromise the seal of the cork.

In a trial of the technical performance of various wine closures conducted by the Australian Wine Research Institute (AWRI), in which the oxygen permeation through the closure was measured approximately three years post-bottling, it was found that in cork-sealed bottles the best cork differed from the worst cork by a factor of more than 1200. The same measurement performed on a sample of screw-capped wines revealed extremely small variation. Further, the oxygen permeation through the screw caps was the same as that through the very best corks. These results were confirmed in an independent study by Southcorp Wines, which is reproduced in full in my book *Taming the screw: A manual for winemaking with screw caps*.

The conclusions of these studies have also been supported by the results of new methods. The University of Bordeaux has recently conducted a study of oxygen ingress through different closures using a nondestructive colorimetric procedure (Lopes, et al, *Nondestructive Colorimetric Method To Determine the Oxygen Diffusion Rate through Closures Used in Winemaking*, Journal of Agriculture and Food Chemistry, pre-publication manuscript, June, 2005). This work follows on from that of Ribereau-Gayon, which commenced in 1931. Among other things, the recent study concluded that, "The natural cork closures... had very variable rates of oxygen diffusion." While the study did not include screw caps, the report concluded that the results agree with those of the AWRI and others regarding synthetic closures and natural and technical corks.

The report stated: "It is now generally recognised that natural cork seals are permeable to oxygen... This oxygen permeability varies widely from cork to cork, and this heterogeneity is one of the main factors that may contribute to bottle variation among wines... It has also been shown that oxygen diffusion through corks may contribute to the sporadic oxidation of white wine during commercial storage."

Regardless of the method used to measure oxygen ingress, it remains clear from our practical experience that corks exhibit a wide variation in oxygen ingress and that screw caps display far less variation. Such results validate the consistency of the screw cap as a reliable seal which essentially eliminates bottle variation. Provided that the cap is applied correctly, each bottle will be just as good as every other.

Further, screw caps have been shown to permit similar levels of ingress to the very best corks, providing similar conditions for long-term ageing.

Oxygen and wine ageing

It was more than a century ago that it was first suggested that wines do not require oxygen to age.

"Duclaux, in his *Traité de microbiologie* (1898), in which he dedicates thirty pages to the sole problem of the ageing of wines, asserts that the role of oxygen is of no account in the bottle: "In bottles, so long as the cork is sound..., the protection of the wine in relation to oxygen is absolute or near-absolute... In summary, the quantities of oxygen that normally penetrate into the bottles are negligible if not zero. Oxygen is not the agent of normal bottle maturation." (*Traité d'Œnologie – Sciences et Techniques du Vin*, Tome 3 (1976). By J. Ribereau-Gayon, E. Peynaud, P. Ribereau-Gayon and P. Sudraud. Translated by Michael Brajkovich.)

More than a century later, we now have at our disposal for the first time measuring equipment sensitive enough to finally prove this.

The AWRI trial that I just mentioned compared twelve randomly selected bottles sealed with 44mm “reference 2” corks. It found that the oxygen permeation per day varied between 0.0001 and 0.1227mL, with an average of 0.0179mL. The same measurement performed on a sample of screw-capped wines revealed a much more consistent result, ranging from 0.0002 to 0.0008mL, with a mean of 0.0005mL.

Similar results were obtained in the Southcorp study, in which similar corks permitted an oxygen ingress from less than 0.0010 to more than 1.0mL of oxygen per day, while screw caps permitted less than 0.0010, and synthetic closures typically 0.0100mL per day.

These results reveal a very interesting phenomenon. If you look carefully, it is clear that the oxygen permeability of the screw cap is essentially identical to that of the very best corks. In fact, in the AWRI study, the best corks permit even less oxygen ingress than screw caps. The level of oxygen ingress of both the best corks and of screw caps are negligible, facilitating optimal wine development.

The Southcorp study concluded: “It is apparent that oxygen was not a vital component for the ongoing evolution and maturation of these red wines after bottling... red wine will continue to evolve without measurable oxygen ingress via a closure.”

This is a significant finding, but in some respects it is no longer the point.

For too long, the debate over whether red wines need oxygen through the closure to develop has been equated with the cork versus screw cap debate. There’s no question that this is a key issue, but trials have been ongoing for some years using different barriers in the screw cap liner to facilitate varying levels of oxygen ingress. A number of options are already commercially available, and we are told that more are on the way. The question of the future is whether screw caps for age-worthy red wines should be perfect oxygen barriers, as they tend to be now, or whether they should be engineered to allow minute quantities of oxygen to pass through over a long period of time.

Research continues, but results to date suggest that very low levels of ingress are optimal, approximating the performance of the very best corks – those two or three in a hundred that happen to seal extremely well. But greater ingress may provide peace of mind for some. Yesterday I met with a wine producer in Wellington who was concerned that the tannins in his red wines would not develop under screw cap. If in doubt, trial a screw cap which permits a little oxygen ingress.

The way is open for experimentation. The possibility of creating different wines through subtle changes in permeability offers a whole new world of creativity for winemakers. Polymers are now available with specific permeabilities for different gases, some which will even change in permeability over time. Designer closures could soon be with us. We could reach the stage where winemakers are able to identify a precise age at which a wine is to peak, and tailor the screw cap liner and dissolved oxygen and sulphur dioxide levels to achieve this. The consistency of screw caps opens up a world of possibilities.

It should be emphasised at the same time that while a wine does not require oxygen ingress in order to develop, the correct oxygen balance in the wine to begin with is crucial for stable development. Australian author and wine critic James Halliday said recently that, “some people have the idea that the development of the wine with a Stelvin (screw cap) closure will be artificially arrested. Not so; there is sufficient oxygen in the wine and in the head space to allow that part of the development that requires oxygen to take place, and – what is more – much of the development will take place anaerobically (i.e. without oxygen).” We will look at strategies for controlling dissolved oxygen soon.

Flavour addition and flavour scalping

In the meantime, the influence of the cork permeates further than just TCA and oxidation. Last year I had opportunity to present a series of seminars for the wine trade in Japan. One of these involved a comparative tasting of wines under cork and screw cap. One of the highlights was a bottle of 1996 Penfolds Bin 389 Cabernet Shiraz. Under screw cap, the wine was a delight, but the contrast under cork was marked. The first cork-sealed bottle showed flavours and aromas of cork wood. The second had a dusty character and its fruit characters were flat and lifeless. Neither showed the fruit definition or the balanced, aged complexity of the screw-capped bottle, which had developed exactly as one would expect for a ten-year-old red.

There are two effects apparent in the cork-sealed bottles here: flavour addition and flavour removal. Consumers are becoming increasingly aware of these faults as they become more familiar with closures which prevent them. This trend will only accelerate as alternative closures become more commonplace across the wine world. Already in Australia, consumers now well familiar with screw-capped Riesling are becoming progressively more sensitive to flavours introduced by natural cork, such as woody, sappy and dusty flavours, and in extreme cases vanilla, coffee and fungal musty effects. Some synthetic closures have been shown to transfer chemical or plastic characters. Screw caps, by comparison, present a neutral, inert facing and have been shown not to modify the wine, even after thirty years of contact.

As well as imparting flavours to a wine, both natural corks and synthetic closures can also remove flavours. These “stripping” or “scalping” effects produce selective fruit loss in a wine. The AWRI has measured the exact proportions of particular characters that are stripped from wines by different closures. For instance, a particular hydrocarbon which gives a kerosene-like flavour to some white wines, is almost completely absorbed by synthetic closures and largely absorbed by natural corks. The monoterpene rose oxide, responsible for a lychee character in some white wines, is partially absorbed by synthetic closures. The slight dulling of fruit character often detected in cork-sealed wines when they are compared to the same wine in screw cap may also be due in part to low-level oxidation.

AWRI trials have revealed that there is no evidence of any absorption of flavour compounds from wine by screw caps. The choice of closure can therefore have a profound effect on wine sensory characteristics through direct absorption of compounds by the closure material.

Great old wines in screw cap

Arguments such as these are compelling, but the evidence for screw caps as wine closures ultimately lies in the tasting. There is a widespread belief, proliferated even by some high-profile industry spokespeople, that screw caps are suitable only for short-term wines and do not facilitate long-term ageing. This is a fallacy, and is directly contradicted by evidence from some forty-five years of experience with screw caps.

There is doubt in South Africa at the moment over the ability of red wines to age properly in screw cap. I stand before you today to assure you that exactly the same doubt existed among virtually all Australian and New Zealand winemakers just five years ago. No longer. Because they have seen – they have tasted – just how well red wines age under screw cap.

Today I will explain to you why you can have absolute confidence in committing your best red wines to screw cap. But don't take my word for it, seek out a line up of top Australian and New Zealand red wines and stage a tasting of your own here in South Africa to prove it to yourselves. Ask WOSA to coordinate it for you. I would be happy to help you to source the wines from our ever-ageing supply of great reds in screw cap.

Screw caps have been on trial since 1961, and in commercial use for wine since 1972. During this time, numerous formal and informal trials have verified their long-term suitability. Prominent among these trials was the ACI/AWRI closures trial of the 1970s, presided over by Dr Bryce Rankine, who wrote the foreword for *Taming the screw*. The findings of this trial confirmed, “unequivocally,” that, “the range of [white and red] wines examined retained their quality with a Stelvin closure significantly better than with a cork.” A further trial by the AWRI, commencing in 1999 and still ongoing, has revealed that of fourteen different closures tested on white wine, screw caps maintain the highest levels of fruit, the lowest developed and oxidised characters, the lowest incidence of browning and the least variation between bottles for all compositional variables assessed.

The ability of wines to age under screw cap for extremely long periods of time has been verified through recent tastings of bottles which remain from the screw cap trials of the 1960s and 1970s. It is in this area, more than any other, that the screw cap currently offers an advantage which cannot be replicated by any other alternative closure which has – or will be – developed. Winemakers can have confidence in the ability of the screw cap to sustain a wine long-term because we now have forty-five years of evidence to demonstrate that it will do so.

Last year, Burgundian négociant Jean-Claude Boisset announced its move to screw caps in these words: “The tasting which triggered this off was that of a distinguished Mercurey 1966 closed by a screw cap, presented by a dignitary of the Chair of Oenology at the Université de Bourgogne.... It turned out that the wine had an absolutely fantastic freshness, great body, and was in superb condition.”

The wine was tasted in the spring of 2004, at all of thirty-eight years of age. It emerged from the early screw cap tests conducted at the University of Burgundy, among the first of their kind in France. An even older remnant of these trials, a 1964 Nuits St Georges Premier Cru Burgundy, was opened at a recent tasting and, in the words of Professor Feuillat in the French journal *Revue des Oenologues*, it “astonished participants by its remarkable state.”

Such experiences have been duplicated on many occasions with white wines. Another of the wines that stood out in my seminar in Japan was the 1980 Yalumba Pewsey Vale Riesling – a twenty-five-year-old screw capped wine. It was a light, vibrant, glowing yellow colour, lacking any hint of the orange or brown colour that can suggest deterioration. The flavours were of lemon, butter, spice and honeysuckle with fine, soft, lively acidity and profound length. It showed old Riesling in all its glory, with no suggestion of the decline which characterises so many wines of this age. It was singularly the best old Riesling I have ever tasted. Australian Riesling winemaker Jeffrey Grosset was present at the tasting. He announced that, “this is the kind of wine I’ve seen from 1976, 1978, 1980 and 1982 under screw cap. I took a 1980 Frankland River Riesling to New Zealand in 2001 and all four bottles were exactly the same.”

This wine marked the inauguration of the New Zealand Screw Cap Initiative. It wasn’t the last time that a 1980 screw-capped Riesling would prompt a significant turnaround. Chablis winemaker Michel Laroche described a tasting of a 1980 Australian Riesling in 2003 as “a revelation.” In his words, the wine was “not oxidised, and still quite fresh.” After suffering cork problems in 2001, his decision was sealed to release Chablis’ first Grand Cru and Premier Cru wines under screw cap in 2002. Laroche commented to me recently, “Now, when a friend asks me if he should take his wine in screw cap, I say, ‘If it’s a wine that’s not going to age for long, it doesn’t matter, provided you accept that a certain proportion will be tainted. But if you really buy serious bottles of wine that you want to age for years, please take them in screw cap!’”

These wines, and many others like them, confirm that wines can certainly age magnificently under screw cap. And yet it’s also apparent that they do not age in exactly the same way that they do under cork. Peter Godden of the AWRI said recently, “in virtually every case, this is a positive and not a negative thing.” He emphasised that the notion that “optimal” ageing should be defined by the way in which wine ages under cork is now redundant. Cork is not a reliable reference point and should no longer be regarded as the benchmark for ageing comparisons. He stressed that in his closure trials, whenever wines were bottled under different closures, they were changed so radically that they could effectively be thought of as different wines. They aged not only at different rates but in different ways.

Pascal Ribéreau-Gayon of the University of Bordeaux stated the same idea in his Handbook of Enology: “Each bottle of wine is, quite clearly, a special case, with its own bouquet, due to the heterogeneity of stoppers, corks and storage conditions.”

The question of the ageing rate of wines in screw cap has been a hot topic of late. It is my belief that the rate at which mature characters develop in screw-capped wines is in fact absolutely no different to that under traditional closures. This is evidenced by the fact that wines under screw cap age at a similar rate to those with the very best corks. For a wine under an average cork, however, oxidation effects give the impression of accelerated ageing, which has led to the notion that wines mature slower under screw caps. I suggest that the absence of oxidised characters in screw-capped wines gives the mistaken impression of slower ageing.

Market response

As winemakers and consumers have begun to understand these issues, screw caps have take off worldwide. *The Scalli & Rein Global Wine Closure Report 2006* concluded that, “Screwcaps are seen as the new way of consuming wine. They have become largely accepted in New World Winemaking countries and are rapidly gaining acceptance among more traditional winemakers because of their reliability and ease of use, especially on nonaging white wines. Their volume has gone up from 300 million closures in 2003 to 1 240 million closures today.”

The report surveyed 1000 winemakers and wine trade in 55 countries and drew a number of interesting conclusions of relevance to us today. I encourage you to visit http://www.skalliandrein.com/businessintelligence/GWCR_description.php to see the whole report.

In considering what the final consumer will like to use in the future, the report concluded that, “according to all the players in the industry, the screw cap has a bright future ahead for New World wines.”

From data on how the key players rate the overall reliability of each closure, “screwcaps received the highest reliability grade, with 73% of respondents thinking the closure highly reliable or very highly reliable, compared with less than 50% for natural cork.”

In investigating how in the future the industry will consider using the different closures, two trends distinguished themselves: more than 80% think there will be fewer Natural Corks in the future and more than 95% think that there will be more screw caps.

The question of what the final consumer wants from a closure confirmed what Scalli & Rein have called in their report the “Three S’s” the consumer wants from a closure: Simplicity (easy to open, easy to keep once it has been opened and easy to take away), Security (impermeable and leak-proof), and Sincerity (the wine should taste as it is expected to taste, with no defects or taints).

Dodging the pitfalls

The advantages of the screw cap make it a ground-breaking closure, but right from the outset in *Taming the Screw* we make it clear that there is no such thing as a perfect closure. Our very motivation for writing the manual was to highlight the potential shortcomings of the screw cap if it is applied incorrectly, treated carelessly or if the wine is not prepared diligently – and, most importantly, to not only point out these shortcomings but to propose solutions to them. A 350 page manual stands as evidence of the extent and significance of the potential problems; and at the same time as a road map for navigating toward a solution.

On both sides of the ongoing closure debate, too many wine faults have been blamed on the closure. For too long, the cork has been an easy scapegoat for almost every faulty bottle. Alternative closures are now revealing exactly where this has and has not been appropriate. It is hardly surprising, then, that the same mentality has become apparent with screw caps. The anti-screw cap lobby has quickly jumped on any hint of imperfection in any screw-capped wine as pointing toward an inherent fault in the closure itself.

The message for winemakers is that they must remain more diligent than ever in ensuring that their wines remain stable in the bottle. This is true for every closure.

The cork is the traditional closure around which wine bottling and, indirectly, winemaking techniques are based. The cork has its own set of influences on the wine, and some elements of modern winemaking technique have developed so as to adapt to these.

On the other hand, the reliable seal provided by the screw cap ensures that the integrity of the wine is maintained. If the winemaker has done the groundwork in ensuring that good clean fruit gets into the bottle in a balanced and stable manner, he or she can be confident that the wine ultimately emerging from the bottle will likewise be clean and stable. But if the wine is unbalanced and unstable to start with, then the screw cap isn’t going to fix it. Garbage in, garbage out. All wines should be assessed by the winemaker both analytically and through sensory assessment before final adjustments are made prior to bottling. Any winemaking problems should be resolved at this point.

If winemaking is diligent and careful to begin with, no changes may be required. In moving to screw caps, the emphasis should be on diligence in winemaking rather than changes in winemaking. If changes are required, the attitude should be one of tweaking and refining while gaining experience, rather than on setting out to make radical changes from the outset.

Avoiding Reduction

The most important area in which care must be taken is that of reduction or hydrogen sulphide characters.

In recent months I have tasted three Australian Riesling wines from current vintages that took me by surprise. From Taylors in the Clare Valley, Henschke in the Eden Valley and Orlando in the Barossa Valley. The fact that these wines contained reductive characters did not surprise me – I encounter scores of reductive wines under every type of closure every year. That they were under screw cap was in no way alarming – screw caps are not immune from wine faults. The thing that caused me concern was that these three makers have been using screw caps for years. All three were central to the revival of screw caps in Australia this decade, and have had as much experience as virtually anyone on the planet when it comes to getting it right. But these three wines were not right.

I headed to South Australia and spent an afternoon with Orlando Chief Winemaker Phil Laffer, tasting wines

and talking through the issues. He told me that he is now working on a comprehensive regime which is successfully addressing the problem, and the initiatives that he is using are exactly those that we propose in *Taming the Screw*.

This problem will diminish into insignificance in the future if winemakers are able to gain a proper understanding of the methods first of preventing, then of removing these characters. I present them to you in brief today to illustrate the progress that has been made in this area recently and to emphasise that this must remain a winemaking priority. Full detail on each is outlined in *Taming the Screw*.

Controlling sulphides is not simply a case of copper fining to remove them before bottling. A comprehensive approach is required, which first necessitates reducing the formation of hydrogen sulphide from the outset. This can be achieved in five ways:

1. By ensuring that elemental sulphur present during fermentation is reduced to an absolute minimum, through:
 - a. Ensuring that vineyards are not dusted or sprayed within about four weeks of harvest,
 - b. Avoiding the burning of sulphur discs or wicks to sanitise barrels,
 - c. Rinsing barrels before they are filled to reduce the amount of sulphur dioxide released from the wood,
 - d. Delay of sulphuring of the wine until ten days after alcoholic fermentation is completed, and
 - e. Minimising sulphuring during racking.
2. By minimising the sulphide characters produced during fermentation, through:
 - a. Choice of a strain of yeast with a low capacity for reducing sulphur to hydrogen sulphide (incidentally, this is a key strategy for Phil Laffer, who is now employing a whole new yeast regime in his white winemaking),
 - b. Provision of adequate levels of nitrogen during fermentation through suitable additions of diammonium phosphate,
 - c. Adequate supply of vitamins and amino acids both prior to and during fermentation by means of nutrient supplements,
 - d. Appropriate aeration during fermentation to maintain oxygen levels, and
 - e. Careful temperature management so as to avoid yeast shock resulting from high or low fermentation temperatures.
3. By avoiding the development of hydrogen sulphide from contact with manganese sulphide, which naturally develops on stainless steel surfaces, through a simple acid rinse prior to use.
4. By delaying the bottling of wine styles more susceptible to sulphide faults until long after fermentation has been completed, in order to allow the wine to complete the "oxidative" phase of its development (such as through barrel, tank or micro-oxygenative maturation) prior to bottling.
5. By appropriate racking of red wines to oxygenate the wine and reduce sulphide levels.

If sulphide characters do develop, hydrogen sulphide must be removed. This can currently be achieved in two ways:

1. Copper-fining, performed:
 - a. As early as possible, ideally immediately following fermentation, so as to:
 - i. Reduce impact on the positive sulphide characters which are integral to varietal character in some wines.

- ii. Have maximum impact on hydrogen sulphide, which is at its maximum concentration at this time.
 - b. Using very small additions
 - c. Through a number of additions to allow equilibrium to be established such that when the wine goes into bottle the concentration has been cut sufficiently that further equilibrium shifts in bottle will not cause the sulphide levels to rise back above detectable thresholds.
2. Hydrogen sulphide may also be removed using a relatively new technique. A procedure involving racking with aeration and temporary removal of lees has been shown to have a dramatic and lasting effect on sulphide compounds. This is based on the fact that yeast walls are able to absorb certain volatile thiols, and in particular methyl and ethyl mercaptans. In this method, a wine with a reduction defect is racked and aerated and the lees are kept separately and stirred frequently in barrel for 48 hours. When the lees are then put back into the wine, hydrogen sulphide levels are diminished, methyl and ethyl mercaptans have disappeared completely and the lees cease to generate any new sulphur compounds. Adding lees back into a wine with a reductive fault therefore has the potential to significantly reduce unpleasant sulphide odours. This procedure was first published by Lavigne-Cruege and Dubourdieu in 1999 and has since been successfully implemented by many winemakers, including Michael Brajkovich in New Zealand in his Kumeu River Chardonnay. I understand that a number of you are also using this method successfully.

Diligent application of these principles is allowing Phil Laffer and many other winemakers like him to avoid sulphide problems. In a letter to Harpers UK wine magazine last month, AWRI managing director, Professor Sakkie Pretorius, commented that "The AWRI began to develop and to actively disseminate its strategies for the avoidance of this potential problem... from mid 2001... and the success of the strategies in Australia suggests that the science behind the hypotheses on which the strategies are based is sound."

He also highlighted that these problems are not simply a screw cap issue.

"The idea that there is a high incidence of post-bottling reduction in wines sealed with screw caps is a false premise. With Australian wines, where the AWRI has particular expertise, this is demonstrably not the case. By any measure of technology adoption the rate and extent of the uptake of screw caps in Australia and New Zealand has been extraordinary, and we suggest that such uptake would not have occurred if there were systemic problems with the new technology. It is surely obvious to all in the wine business that the overwhelming majority of wines closed with screw caps do not show post-bottling reduction, and therefore we further suggest that claims to the contrary... should be treated with scepticism."

Further, "Our position, which we believe is undeniable, remains that the propensity of a wine to develop 'reductive' aromas post-bottling is a function of the wine, and that post-bottling reduction is not the 'fault' of the closure but may be exacerbated by the closure if the wine has a propensity for such aromas to develop." "In his Screw cap Symposium presentation, Peter Godden discussed data from one of our AWRI Advanced Wine Assessment Courses which indicates a higher incidence of reduction in wines sealed with cork compared to wines sealed with screw caps. Two subsequent courses have provided similar data."

My own tastings have shown no correlation between closure type and incidence of reductive characters. Other Australian and New Zealand tastings and wine show results have likewise revealed similar sulphide levels under both closures. The very best corks have been shown to provide the same oxygen-barrier characteristics as a screw cap, and hence possess the same propensity for reductive characters to remain in the bottle if they are there to start with.

Yesterday I visited a wine farm in the Wellington area, and the maker expressed concerns about reductive characters in his white and red wines under screw cap. When it came time to look at some bottles for comparison, a red blend was opened under both cork and screw cap. The first cork bottle was oxidised, so another was opened, which showed a dusty cork character and flat fruit. The screw capped wine exhibited a hint of reduction but much better fruit definition than the cork bottles. However, this was not the most reductive wine that I was to taste during this visit. That prize went to a 2005 Pinotage which was – wait for it – sealed with a cork.

Controlling Dissolved Oxygen

When I met with Phil Laffer, I was to be confronted by another disturbing finding. A number of the wines that he opened under screw cap were not quite right, so in each case he opened a second bottle which proved to be much better. How can such bottle variation occur under a consistent closure? The answer proved to be dissolved oxygen levels.

Oxygen is the gas that demands the most stringent monitoring in bottled wine. Both its absence and its excess can have a marked impact on wine quality. Too little oxygen, and the wine can become reductive, taking on rubbery, struck flint or even rotten egg characters. Too much, and it can become oxidised: flat, lifeless, and tasting of vinegar. Even small quantities of oxygen can have a discernible impact on the fruit freshness of both the bouquet and palate.

While oxygen plays a key part in the maturation of red wine in the winery, it is an important skill of the winemaker to determine when this process is complete and the wine is ready for the anaerobic environment of the bottle. The key question at this time is how much dissolved oxygen the wine should contain.

In *Taming the Screw* we suggest that levels consistently below 0.3mg/L should be the goal. Dissolved oxygen levels in tank prior to bottling should be as close to zero as possible, and less than 0.2mg/L uptake should be the target during bottling.

Careful dissolved oxygen management and monitoring should commence as soon as fermentation and maturation are complete. Oxygen can easily be picked up from a number of sources, such as:

- Leaky suction hoses, splashing in tanks and poor bottling equipment,
- Contact with air at bottling, particularly in the wine at start up, at tank changes and in the filling bowl during stoppages,
- Wine left in part-full bottles during line stoppages and
- Through the filling heads. The heads can be a notorious point of oxygen pickup. Significant bottle variation in dissolved oxygen levels in some bottling lines has been found to be a consequence of differences in the flow characteristics of individual spouts. The more turbulent the flow, the more oxygen can be picked up. The solution is to improve the flow to make it less turbulent or to remove the oxygen from the bottle.

The filling heads proved to be the problem for Phil Laffer. The solution was to regularly check wines coming off the bottling line for dissolved oxygen. This proved to be a difficult task, as he uses 120 filling heads for his larger bottling runs. It is necessary to check bottles from every head, hence 120 bottles at a time, multiple times a day for him. As soon as a higher dissolved oxygen level is detected, it must be traced back to the particular head and the problem rectified.

Kumeu River has greatly reduced the oxygen pickup in its wines to consistently less than 0.2mg/L during bottling by machining the filling heads to create a smooth flow. Yalumba instead uses snow-dropping with solid pellets of carbon dioxide to evacuate the bottles. Others utilise carbon dioxide or nitrogen flushing. Vacuum bottling is now also available for screw-capped wines.

We have considered sulphide chemistry and dissolved oxygen as two of the key considerations in getting wines right under screw cap. I could also talk extensively about sulphur dioxide levels, about tolerances for the physical application of screw caps and about their proper handling post-bottling. These are covered in *Taming the Screw*, so I refer you to the book instead.

It is not simply enough to get the screw cap technically right, we must also ensure that the message is properly communicated.

Miscommunication in the media

Regrettably, this has not always been the case. A recent string of media articles has been embarrassingly misinforming.

The WineNews South Africa web site rightly reported the following last week in relation to the 2006 International Wine Competition:

“IWC research found 2.2% of the total wines tasted to have had high sulphide faults relating to screw caps and 2.8% of wines to have had cork taint. A further 1.6% of wines were classified as showing oxidation faults relating to cork.”

However, other reports of this information have been glaringly misleading.

From Berry Bros & Rudd in the UK, under the heading of “Screw Caps blamed for Wine Faults” we read this:

“Research carried out for this year's International Wine Challenge, concluded that faults caused by screw caps were almost as common as cork taint. It was originally thought there was much less chance of wine going off under a screw cap. Now tasters at the IWC in London have overturned this view. From a blind tasting of more than 13,000 wines, they discovered that faults from oxidation or high sulphide levels (which impart an egg-like smell) in wines with corks have gone down from 10% in the previous years to 4.4% in this year. The same problems for screw cap bottles seem to have been underestimated: 2.2% of the screw-capped wines were actually tainted.” (http://www.bbr.com/db/news-item/713?referring_site=rss)

The errors here are laughable. Line ‘em up. 1. Screw caps do not cause high sulphide levels. 2. 2.2% is not almost as common as 4.4%. 3. “Wine going off” has nothing to do with sulphides. 4. And it is unclear from this report as to what the 4.4% figure relates to? Cork taint, oxidation, reduction or all three? The contradictions continue.

Regrettably, such misleading reports have gone global, with the China Wines Information Website reproducing virtually identical information – only worse – stating that screw tops can “leave some vintages just as tainted as cork.” (<http://www.wines-info.com/html/2006-09/189/2006921101314296.html>) Where in the results does it suggest that it is “just as tainted” and where does it say that it has any relationship to vintage?

The UK Evening Times Online adds to the confusion by saying that “screw caps can leave some wine just as tainted as corks can” and in the very next line that “faults caused by screw caps are almost as common as cork taint.” (<http://www.eveningtimes.co.uk/print/news/5057312.shtml>)

Putting misreporting aside for a moment, should we be alarmed by faults in 2.2% of screw-capped wines? Quite the contrary, according to New Zealand winemaker Dave Williams, who said this last week:

“With so many wine companies moving to screw cap closures, I'm surprised the volume is this low. The problem does not lie with the screw cap closure, it is with the winemaking practices adopted. Here in New Zealand we have known for some time that best practice needs to be achieved in order to avoid bringing the closure in to disrepute, and we have best practice procedure recommendations in place. Indeed Tyson's book is a step in that direction. In New Zealand we have been very successful in improving the quality of the wines produced, and screw cap closures have assisted tremendously in that regard. Unfortunately such stringent winemaking procedures for screw-capped wines are not commonly found overseas, and some winemaking companies may have adopted a ‘trial and error’ approach.”

Tastings

How can we as an industry respond to the misreporting that continues? Getting the screw cap technically right is the first step, then we must work hard to correct the misconceptions that have for so long been spouted. We need to understand that no level of argument or scientific “proof” will convince any sceptic of the merits of any closure for wine ageing. It is true that most people need to experience something for themselves before they will believe it. It is here that we must focus our efforts.

The most important way in which we can communicate the truth of the screw cap is to demonstrate its success.

Regardless of elaborate winemaking and bottling procedures and complex scientific trials, the final test of the success of any closure is nothing more than the quality of the wine which comes out of the bottle. As we continue to gain access to an ever-ageing supply of screw-capped wines we must ensure that they receive an audience with the people who count. We need to be staging tastings. Comparative tastings with different closures. Young wines. Old wines. Industry tastings. Consumer tastings. In all of our domestic and export markets.

It has been through tastings of some of the great old wines under screw cap that I mentioned earlier that many producers have been inspired to make the change to this closure. We should not expect that it will take anything less to convince the rest of the industry and ultimately the consumer.

This assumes two things. First, that producers will maintain a healthy museum stock of age-worthy wines under different closures for comparison in future years. This is also sensible in that it provides a means for scientific analysis of the wine as well as facilitating tasting assessments as it develops. This allows tweaking of viticultural, winemaking and bottling practices to be better aligned with long-term cellaring objectives.

Bottle your best wines under screw cap first

The second requirement for staging tastings is that the wines are of sufficient quality to convince the sceptics.

Come back twenty years with me for a moment. It's 1984. The year that screw caps first came to grief in Australia. It was right at the moment that the screw cap looked the most successful, when it was reported as "being regarded as THE closure of the present and of the future" that the market took everyone by surprise and rejected it altogether. All attempts at its introduction were quickly abandoned. Not because of any inherent fault in the screw cap itself – virtually nothing has changed in twenty-five years. Nor because of a lack of scientific evidence – the trials had been done and the results were out. And not even because consumers weren't yet ready for change. Screw caps failed because they were not introduced strategically. The closure became established in particular niches that were far from desirable – low priced table white wines and wines served in economy class on airline flights. This situation helped stamp the image of the screw cap as a cheap product in the minds of most mainstream consumers.

Don't pretend for a minute that we are somehow immune from this scenario today.

Screw caps are still very much a niche closure. The 2006 Scalli & Rein Global Wine Closure Report pointed out that of almost 20 billion closures put on wine bottles every year, less than 1.25 billion of these are screw caps. This is barely half the number of synthetic corks, well under half the technical, colmated and agglomerated corks and less than ten percent of the global market for natural corks.

If screw caps are to be accepted in the mainstream, consumers must be convinced that they give them a tangible advantage over corks. The single most important statement of confidence that you as South African winemakers can make is to bottle your premium wines first and foremost under screw cap.

We know this because we have seen it work. Putting 1984 behind us, wind the clock forward to the Clare Valley initiative of 2000 and the New Zealand initiative of 2001. Consumer confidence was established through a united front that targeted a niche market segment. And not just any segment. In both cases, that niche represented the premium sector of the market. The screw cap was firmly established as a premium product for these wine types. There is no reason why it should be any different for South Africa.

Be wary of following the trends in the United States. Bonny Doon, Murphy-Goode, Beringer Blass, Hogue Cellars, Kendall-Jackson, R.H. Phillips, Corbett Canyon. In the last two years the US has produced millions of cases of sub-\$15 screw-capped wines. Is this reinforcing the impression that screw caps are cheap? Is the US setting itself up for the backlash that left many Australian producers burnt twenty years ago?

I urge you to work to undo this trend and to erase the Tassenberg stereotype by confidently committing your best wines to screw cap, to showcasing them at comparative tastings, and to holding aged stock back to demonstrate the long-term ageing potential of the screw cap.

We need to see leadership from the top: the icon red wines of South Africa need to be screw-capped first. But don't wait for this to happen. Bottle the top wine in your portfolio first, whether you are an icon producer or not.

It is this alone that will make the most confident statement for your markets. There is nothing that you can do that speaks louder than the message sent by committing your best wines to screw cap first. And it makes a lot of sense. If there is any wine that is deserving of a closure that maintains fruit definition, surely it is the wine that is made from the very best fruit? If there is any bottle that demands a near-airtight seal, surely it is the bottle destined for a long life in the cellar? And if there is any sector of the market which understands the advantages of screw caps, is it not the same sector that is prepared to pay a little more to purchase a premium wine?

Nick Tucker, marketing director at Bonny Doon, commented recently: “We found that the more wine-educated a person was, the quicker the acceptance and uptake.”

If you are not prepared to put yourself on the line and trust your top wines to screw caps, how can you expect your customers to trust any of their wines to screw caps?

I urge you to follow quality standards, not the fickle impressions of the market. Scalli and Rein’s report included the question: “At what price segment would you consider the following type of closure to be appropriate (% of affirmative answers)?” The results pointed out that while the over \$25 segment is very important for 30% of cork buyers, the majority of screw cap buyers indicated that it was appropriate under \$25.

How do we turn around market trends? We must not underestimate the challenge of changing hundreds of years of history, and the strength of custom and tradition that so strongly influences the buying habits of most consumers. We need a systematic marketing strategy – a united approach to very purposely securing a niche segment of the market. And it must be first and foremost at the premium end of the market.

If this is to be a success, it must be a collective initiative. The diffusion of screw caps into the marketplace must be a unified strategy between all players. We have seen just how powerful this can be, through the success of the Clare Valley and New Zealand Initiatives. We do well to learn from these successes and replicate them in South Africa. In the past, the cost of bottle moulds, bottling facilities and the challenge of introducing a largely unknown closure meant that small producers were forced to band together. While this necessity may no longer exist, the urgency for a collective initiative to ensure a strategic marketing approach is no less than ever. I encourage you to work together as Winemakers of South Africa to plan a strategic, collective, united approach to screw caps for your domestic and export markets. A haphazard approach without a deliberate strategy could be disastrous.

It is clear from discussing this idea with some of you that it will be harder to get everyone on side in South Africa than it was in Australia and New Zealand. Banding together to bottle your top red wines under screw cap and presenting them to domestic and international markets simultaneously will be a risk, there’s no doubt about it. But if you talk to Aussie and New Zealand winemakers, you will learn that it was a risk that they would happily take again without a moment’s hesitation. Many of you have already told me that this is a risk that you cannot afford to take alone. If this is to work, you must band together.

And when you do, use this as an opportunity to rally for higher standards in screw-capped bottles. Put the pressure on your glass suppliers to meet the demand, to provide a good variety of options in their range and to guarantee consistency in the important specifications.

When it comes to bottling under screw cap, don’t start with red wines, start with Chenin Blanc and then work your way up. I put this challenge to you: I would like to see every bottle of 2008 South African Chenin Blanc screw-capped. Every bottle. Young, fresh styles, oaked styles and sweet styles. Domestic markets, export markets – every export market, every bottle. Every single bottle of 2008 South African Chenin Blanc. Australia did it with Riesling in 2000, Marlborough did it with Sauvignon Blanc in 2001. Now it’s South Africa’s turn to take the baton. Treat this as a challenge for getting every producer on side. Every producer. And then springboard off it to tackle your top reds in 2009. There’s a challenge for you.

Education

The final stage in this process is education.

A recent New York *Beverage Media* article suggests that “despite significant research by Hogue Cellars and the Australian Wine Research Institute, there is still debate about whether wines can age properly under screw cap, so most wineries are trying out the closure with younger wines.”

It seems that the evidence for the ageability of wines under screw cap is somehow not filtering through to many of the conservative markets. Many key wine critics are yet to acknowledge the suitability of screw caps for age-worthy Riesling. With the evidence at hand today, it is clear to us that Riesling is capable of ageing extremely well under screw cap. Even for red wines, the evidence is more than positive, certainly not warranting the blanket concern or warning that continues to come from some of the world’s most highly regarded wine writers and industry commentators.

It is only after we have been diligent in working to get the closure right, after we have demonstrated to the market that the closure is right, it is only then that they will be open to hearing why it is right.

And when they are, the results can be quite remarkable.

From the same *Beverage Media* article, this time from the US Sales Manager of Villa Maria Wines:

“We had a big year in Milwaukee and Louisville, which aren’t regions you would think would take to screw caps, but we had a 40 percent increase in sales there last year... We’ve seen sales increase by 25 percent every year across the US.” (Stuart Devine, US Sales Manager, Villa Maria Wines of New Zealand.)

The quote comes from the same article as the earlier comment of screw cap gloom in the US. Quite a contrast. Why the difference? Education, for one thing. *Seal of Approval: Why choose screw caps*. Twenty straightforward reasons for choosing screw caps, in consumer language with quirky pictures. Villa Maria has distributed thousands of copies of this booklet in the US.

Stories like this highlight the need for communication. My three books on screw caps have surpassed all sales expectations and are now available in more than twenty countries. Not because there is anything remarkable about what they say. But simply by virtue of the fact that they say it. The industry is hungry for information. And it is up to us to ensure that what they hear is reliable.

For this reason, I encourage you to take full advantage of the technical expertise that we have compiled into *Taming the Screw*. I also urge you to continue with your own trials and research into closures, sulphides and the development of wine under screw cap.

I encourage you to join the International Screw Cap Initiative. This group is made up of winemakers with the shared passion of seeing the screw cap succeed. This gives it more credibility than if it were made up of closure producers.

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Conclusion

In closing, choosing a screw cap will allow you to avoid cork taint, sporadic oxidation, flavour addition and flavour scalping, enabling your wines to age consistently. I urge you to work diligently to avoid reductive characters and employ measures to control dissolved oxygen. Bottle your best wines under screw cap first, put them on show for the world to taste, and band together in a unified front.

Peter Godden of the Australian Wine Research Institute said recently that “The closure... has a profound impact on wine quality which may outweigh vineyard and winemaking... Closure can swamp the influence of terroir.”

During my visits throughout this region over the past two days I have been overwhelmed by what I have seen. I have observed the passionate attention to detail with which you make your wines. I have seen the way in which you seek out just the right site for a particular varietal, how you identify specific soil types and rows in the vineyard which make the very best quality, how you check for disease on every vine, and when it comes to picking, the way you assess every single bunch. It is this rigorous attention to detail that is giving full voice to your remarkable terroir and taking your wines to the next level. It is this striving for quality that brings me here from exactly half way around the globe and then stops me in my tracks. You are wowing the world with what you are doing. Now seal your work with a closure that does full justice to your efforts and your terroir.

Taming the screw: A manual for winemaking with screw caps can be purchased from www.winepress.com.au.

