Portland Winemakers Club

April 2016

Monthly Rant

In an important follow up to our recent name change to Portland Winemakers Club, a new website has been under construction since January. I'm proud to announce that it is now up and running, and it is nothing less than beautiful. Alice has put many, many hours into its development, and has been back and forth over it for the last few days checking all the links and making sure it works on all platforms, from desktop computers to phones and tablets. No doubt it will grow over time, adding features that we've discussed at the last couple meetings, but for now its complete enough to take public and hopefully generate some traffic and interest amongst anyone searching for a group like us.

Features include a club history, information on meetings and membership, a brief description of what our members are interested in, contact links and lots of photos! Basic SEO is in place, more will be added as we go along to drive increasing visitation to the site. Please take a moment to check it out and by all means spread the word to anyone you think might be interested. Alice and I hope you will all be pleased.

http://portlandwinemakersclub.com

Cheers, Phil

Scheduled Meetings

January 9, 2016
Annual Gala – Archer Winery; 4-9 PM

January 20, 2016
Crush Talk / Planning

February 17, 2016
Bordeaux Tasting

March 16, 2016
Speaker: Curtis Patience on distilling Brandy & Grappa.

April, 2016
Tour

April 20, 2016
Barrel / Carboy Sample Tasting

May 18, 2016
Speaker

June 15, 2016
"Open discussion of winemaking issues"

June, 2016
Tour

July 16, 2016
Annual Picnic

August 17, 2016
All Whites Tasting

September 21, 2016
Other Reds Tasting

October 19, 2016
Pinot Noir Tasting

November 2016
No Meeting

December 7, 2016
Planning, Tours, Speakers, Events, Elections

Information & Trivia

• **WALLA WALLA, Wash**. – The siren song of Pinot Noir has captured another winemaker's soul. This time, it's the most successful winemaking family in the Walla Walla Valley, perhaps the Northwest. Chris Figgins of Leonetti Cellar fame has purchased 42 acres of land in Oregon's Chehalem Mountains to plant Pinot Noir and expand his Toil Oregon project. "I'm excited about it," Figgins told Great Northwest Wine. "We've been looking for land for a long time, and we finally found some that matched what we want to do." Figgins Family Wine Estates, includes Leonetti Cellar, Figgins Walla Walla Valley and Toil Oregon.

• **From the beyond-bizarre department** comes news—are you ready?— of the world's first Champagne machine gun. Manufactured in France by Extra-Night and distributed in the U.S. by Touitou. The weapon-shaped contraption shoots lengthy (up to 23 feet) sprays of bubbly when hooked up to magnum bottles, making it an apt celebratory tool for dimwits.

• **Angry French** winemakers emptied five tankers filled with Spanish wine onto a motorway in protest against increasing imports into the country. The incident unfolded less that 10 miles from the Spanish border on April 4, when around 150 winegrowers from the southern departs of Aude and Pyrénées Orientales seized upon a number of tankers travelling into France draining their loads onto the tarmac. "In two hours some 70,000 litres of wine spilled onto the motorway.

• Once again, **Walla Walla Community** College has been ranked the best two-year college in the nation.

Note: The next regular meeting is scheduled for Wednesday, April 20, 2016 at 7:00 PM at Oak Knoll Winery.

Agenda: Member's barrel/carboy samples from 2015. If you can part with it, bring a barrel sample for everyone to taste. limit it to one bottle red or white. We would like to taste 10 – 12 samples. The responsible winemaker will introduce his/her own wine. This is not a competitive judging but a simple evaluation with suggestions for your wine. Lets see how our wines are doing so far this year.

1.) Snacks: This will be a potluck; bring a small snack to share.
2.) . Everyone needs to sign a new waiver. If you didn't pay your dues at the Gala please remember to pay your 2016 dues at this meeting.
3.) Bring a wine glass for tasting member wines.
4.) The regular club meeting will begin at 7 pm and end by 9 pm. If you can, get there a little early to help set up. Please help put away chairs and tables at the end of the meeting.

NEW! Website: http://portlandwinemakersclub.com/

March Meeting Minutes

Present = 22
• Don Robinson – Three members sent their wines to the Winemaker Magazine amateur competition.
• Bill Brown – Bill is checking out possible tours with Soter, Dick Shea & Patricia Green wineries. Bill would also like to arrange a tour in the Hood River area. Jon Kahrs likes Syncline in that area.
• Bob Hatt – Bob needs input from members as to their grape need this Fall. Bob also brought a friend to this evenings meeting.
• Phil Bard – Steinbarts in Portland want our club to put on a winemaking seminar along with a tasting of our member's wines on a Saturday sometime this Summer. This will be talked about in more detail at our next meeting. We will decide yes or no at this meeting.
• Barb Thomson – Barb reminded everyone to please pay their dues as soon as possible.
• Next months meeting will be barrel samples for evaluation. A few of the ladies gathered together last Fall and made their own wines. Hopefully we will be able to sample their wares.
• Marlene Grant said it has been a couple years since we have gone through a faults & flaws session using the smell kit. It would also be a good time to bring samples of any off or flawed wine we may have (VA etc.). Ken Stinger will try to find out who has the kit.
• It was suggested that we not report in the minutes any wines that are scored less than bronze from our competitive tastings.

Our speaker tonight was Curtis Patience who spoke on the art of distilling from pomace for Grappa or still wine for Brandy. He brought with him parts of a still he made himself. There was a lot of discussion & questions about the distilling process.

The use of inert gas in the wine making process

1. Introduction

The use of inert gas has become very common in modern wine making and still little is known of the correct use thereof. The use of these gasses has especially become more prominent with the recent boom in reductive wine making in which the winemaker strives to exclude oxygen from the wine making process. To quote Bradd Webb, " we make wine while at the bottom of an ocean of air”. The purpose of this paper is to suggest the correct use of inert gases and to show more uses.

2.0 Inerting headspace in a tank

The main purpose to use inert gas in the headspace (ullage) of a wine container is to protect the wine against oxidation and spoilage by yeast and bacteria

If it is taken into account that one mole of a gas occupies 23.6 liters of space at 15 degrees centigrade then one would use 1.18 kg N_2, 1.68 kg Ar and 1.87 kg CO_2 to inert a thousand liters of head space (see table 1). As can be seen from Table 1 the specific gravity of N_2 is 0.9669, Ar = 1.38 and that of CO_2 is 1.53. One would then naturally assume that since Ar and CO_2 are heavier than air that they would displace the air and would settle to the bottom. This is , however, not really the case. What we are going to explore next is the difference between what your mind tells you and what really happens.

GAS	NITROGEN	ARGON	CARBON DIOXIDE
CHEMICAL SYMBOL	N_2	Ar	CO_2
MOLECULAR WEIGHT	28,0134	39,948	44,01
DENSITY GAS (kg/M³ @ 15°C & 1atm)	1,189	1.691	1,875
SPECIFIC GRAVITY	1,38	1,53	2,264
SOLUBILITY (v/v)	0,017	0,038	1,01

Table 1. Properties of inert gases

The best way to separate what you think from what really happens is to measure the effect of the gas with a reliable and well calibrated oxygen meter. The oxygen meter will express the amount of oxygen either as a percentage of the total amount of air present, mg/l or as a percentage of normal air oxygen content. The last method gives a better picture of the dilution effect that takes place while sparging the head space. The oxygen content will furthermore always be quoted as a percentage of the volume of air.

It was always thought that a burning candle can be used to detect the presence of oxygen. This is however a very ineffective method as the candle stops burning in an atmosphere with a oxygen content less than 16.5% while air normally has a saturation of 20.9% at 20 °C at sea level.

Before we decide how well a gas blankets we must first decide on a acceptable level of oxygen that we will tolerate in the space above the wine. Allen thought this to be 1% and Lewis thought it to be 0.5%. Rankine agrees with Lewis because 0.5% is the level required to prevent the growth of film forming micro-organisms.

2.1 Nitrogen (N_2)

Nitrogen gas is the easiest gas to understand since it's specific gravity is less then that of air. It would therefore not form a blanket but would be dispersed in the head space equally without being confined to a certain region and if anything, it would float to the top. It would, therefore, be thought that if one wanted to displace all the air in the head space one would just have to add an equal amount of nitrogen gas. This seems pretty straight forward until one tries it in the cellar. As was previously mentioned one would need 1.18 kg of N_2 to displace 1000 liters of air. In practice this is closer to three to seven times that amount. This is the result of the mixing effect and currents being generated by gas streaming into a tank. The only way to minimize this is by lowering the velocity of the gas. Spargers come in several shapes and the most commonly used ones are those made from sintered stainless steel, the floating diffuser (see figure 1) and the gassing bell.

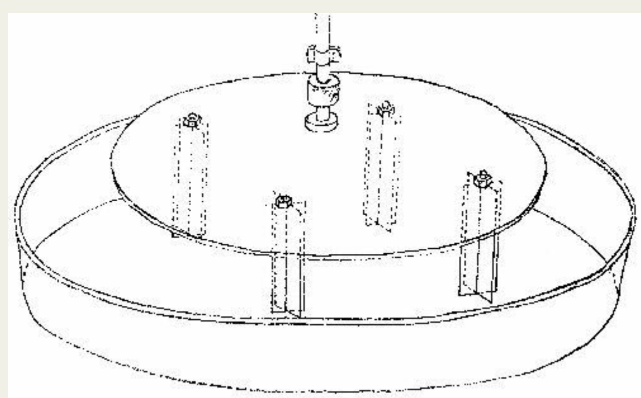


Figure 1. Floating diffuser

A more efficient way to do this is to displace the tanks volume of water or wine with N_2 gas . In practice this is difficult because the rate of nitrogen flowing in must be the same as the rate of the liquid flowing out, otherwise the tank could collapse or inflate. The best way of doing this is to use the positive pressure system described in 3.0.

2.2 Carbon dioxide (CO_2)

CO_2 is one of the most common gases used in wine making. It is thought to be heavy and it is assumed that the gas covers the wine like a solid blanked. One can say that the same amount of oxidation can occur in the headspace of a tank totally exposed to air in one day as in a tank with 1% oxygen in the headspace in 21 days. This is of course not completely true (because of the kinetics involved) but it is sufficient to make a comparison. Lewis did an experiment to test this and it was found that the percentage oxygen in the head space deteriorated from a acceptable level O_2 in the tank to a unacceptable level within 20 minutes. Two mechanisms can be considered, namely that the gas is dissolved in the liquid or that it is dispersed in the space above the blanket (see the original depth profile of the gas, Figure 2).

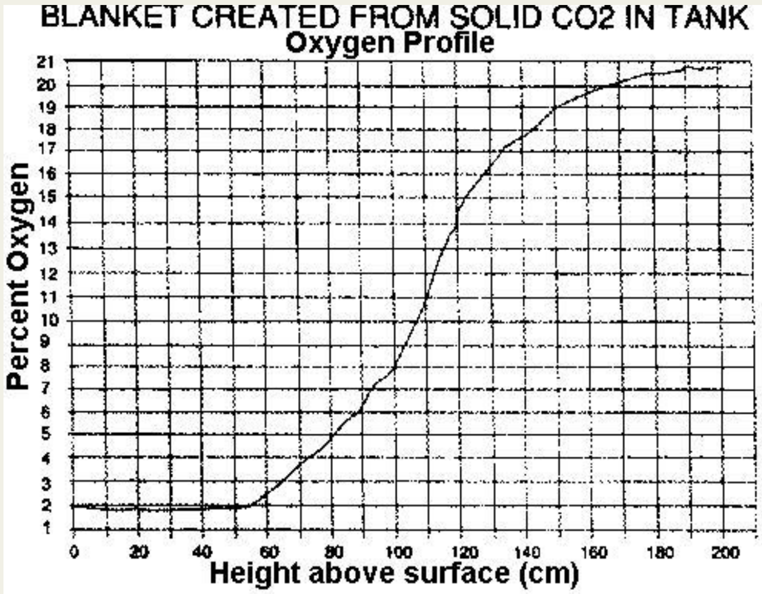


Figure 2. Distribution of CO_2 blanket (Lewis, 1990

2.3 Argon (Ar)

Argon occurs naturally in the atmosphere and makes up 1% of the air around us. Industrial gasses are made by compressing air and by cooling it down. Because argon makes up such a small percentage of the atmosphere, much less of it can be made and that explains the fact that it can be so expensive.

Argon's specific gravity is very close to CO_2 (Ar =1.53 compared with CO_2 = 2.264) but is only 38% as soluble in wine as CO_2 (see table 1). Allen noted that argon is the best gas to use for either alone or in a mixture of gases (see table 2). From table 2 it can be seen that the argon always had a positive effect on the color, flavor/aroma and shelf life of the wine. Allen did however not provide a mechanism to explain this phenomenon.

GAS/MIX	COLOR	FLAVOR/AROMA	SHELF LIFE (DEGREE OF OXIDATION)
Nitrogen	70	50	50
Ar	95	90	90
CO_2	25	50	50
N_2/CO_2 80:20	30	50	50
Ar/CO_2 80:20	40	60	60
Ar/N_2 80:20	90	90	90
Ar/N_2 50:50	80	80	80
Ar/N_2 20:80	70	70	70

(Relative Scaling of Effect compared to Oxygen, set to 0)

Table 2. Effect of different gas storage atmospheres

A good way of applying the gas is by letting it in the tank by means of a flexible hose or sparger attached to a float. A gassing bell (light stainless steel ball with holes) which disperses the gas evenly on the surface of the wine is very effective. The floating diffuser is also very effective. This is especially ideal when the tank is being filled or emptied when the gas hose is able to rise or fall with the surface. The amount of argon necessary to inert headspace is usually 2 to 3 times the volume of the headspace and should be monitored by measuring the O_2 content.

3.0 Use of a mixture of gasses

Because CO_2 can dissolve in wine and N_2 gas can completely deplete the CO_2 content in a wine, a mixture of gasses which keep the level of CO_2 in the wine constant is preferable. As a rule of thumb the CO_2 content in red wines should be below 900 mg/l and that of white wines below 1400 mg/l. A too high or too low CO_2 content can be detrimental to the wine and the exact level should be determined by taste. From figure 3 the mixture of gases can be determined at different temperatures. A mixture of twenty percent CO_2 and 80% nitrogen should be used at 50°F to maintain a CO_2 content of 500 mg/l in the wine. So if you consider both the normal cellar temperature and the amount of CO_2 needed in the wine, then you can work out the ideal mixture. Gasses can be bought premixed or can be mixed on site using a mixing panel.

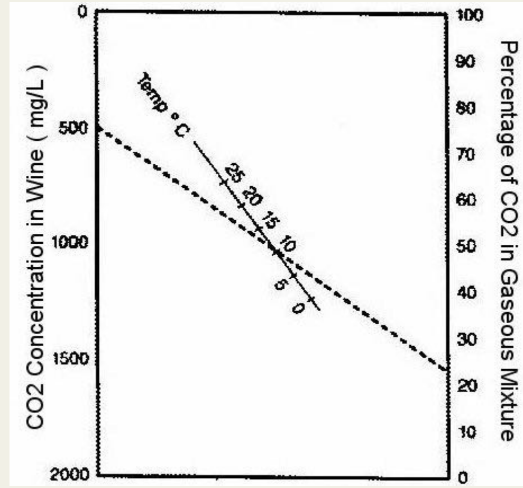
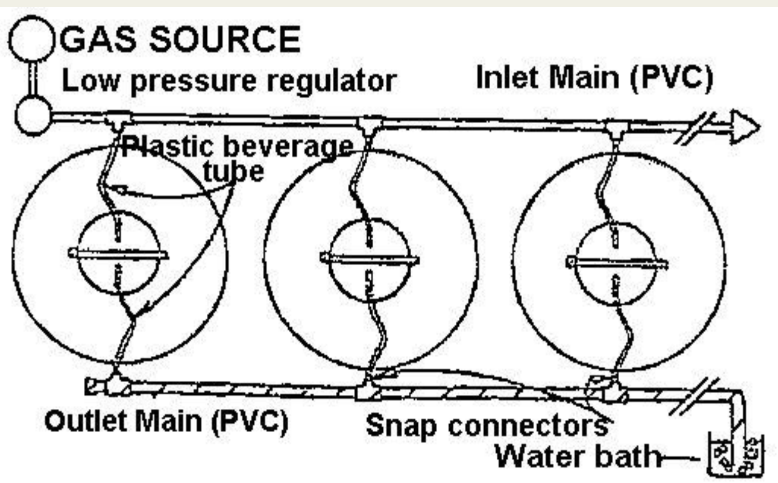


Figure 3. Theoretical composition of a CO_2/N_2

4.0 Inerting wine tanks using a positive pressure system

This method uses a positive gas pressure in the headspace of a tank preventing oxygen from entering the tank. It also compensates for fluctuations in tank level caused by temperature changes. With a temperature fluctuation of between 68 and 77 °F the change in the ullage volume can be up to 8%. This means that if the tank is cooled (by rain or day/night temperature differences) that air to the quantity of 8% of the tanks volume can enter the tank. When the tank heats up, this air is expelled and next time fresh air is taken in. A positive pressure system would let in gas when the volume of the tank drops and let out gas when the volume expands. The only gas in contact with the wine is therefore the inert gas. Nitrogen is most often used because of it's low solubility in wine and because it is cheap. The Nitrogen will however cause the wine to lower it's natural CO_2 content and therefore a mixture of gases (See 3.0) is preferred.

A schematic of the basic system is shown in figure 4. It consists basically of a temperature compensating regulator connected to a tank or series of tanks and a pressure relief system. The pressure relief system can take two forms, namely a mechanical valve or a short hose suspended under water. The mechanical valve is usually used where a positive pressure higher than 0.3 kPa is needed.



The working of the mechanical valve is quite straight forward but the working of the hose is very interesting. The pressure at sea level is one atmosphere. Ten meters under clean (not salt) water the pressure is also one atmosphere (plus of course the atmospheric pressure which is for practice purposes not included) and therefore 101.3 kPa. Twenty to thirty centimeters under water would then represent 2 to 3 kPa of pressure that the gas in the ullage have to have to flow out via the relief valve (see figure 5). The reason why the water system is so important is to make sure that the pressure the system exerts is not more than the tank can handle. If the pressure is more than that set by the depth of the hose in the water bottle then the gas would escape through the hose so doing protecting the tank.

The system can also be used to displace the whole volume of the tank with nitrogen when the wine is pumped out. When the tank is being emptied the hose in the water bottle should be lifted to a shallower depth to see that the air bubbles come through. This means that a positive pressure is still present and that the rate at which the wine is being drawn from the tank is less than the system is able to provide gas for. If the hose doesn't bubble air then the possibility of the tank being deformed exist. The hose would also suck in water if a negative pressure exist. The pressure that the system would keep the ullage at would then be set just below that of the overflow device.

This system of course allows a wonderful way to make sure that a tank that is being filled is completely oxygen free. This is accomplished by filling the tank with water and then emptying the water and allowing the gas to displace the water.

The pressure that the system would keep the ullage at would then be set at a pressure just below that of the overflow device.

Currently a system like this is installed at the Sonoma-Cutrer and Louis M. Martini wineries in California.

5.0 The use of dry ice(frozen carbon dioxide)

Dry ice can be used both for cooling grapes or wine and also for providing a gas cover for head space.

5.1 The use of dry ice for the cooling of grapes and wine

Dry ice has the advantage of both cooling and protecting against oxidation. The technique is widely applied in Australia and New Zealand.

From figure 5 the amount of dry ice required to cool grapes from an initial to a final temperature can be calculated. If the ambient temperature is 68 degrees Fahrenheit and the temperature required is 50 °F then 85 kg of dry ice is required per ton of grapes.

The dry ice come in several forms. It can be in brick form, manufactured on site or bought in insulated containers. The technique for making dry ice on site is however not very efficient since only 53% of the liquid carbon dioxide eventually ends up as dry ice and the rest is released into the atmosphere (Lewis, 1990). In brick form the ice is handled by wrapping it in newspaper or handling the brick with rubber gloves. The brick should never be put directly into the wine as a layer of ice will form around it which will hamper it's effect. It is therefore better to let the brick float in a plastic bucket or something similar on the surface of the wine.

Dry ice can also be available in the form of snow. The snow is formed by the change in pressure the liquid undergoes when it is released from the storage cylinder to atmospheric pressure. The snow shoots out from a cone attached to a hose similar to that employed in fire extinguisher.

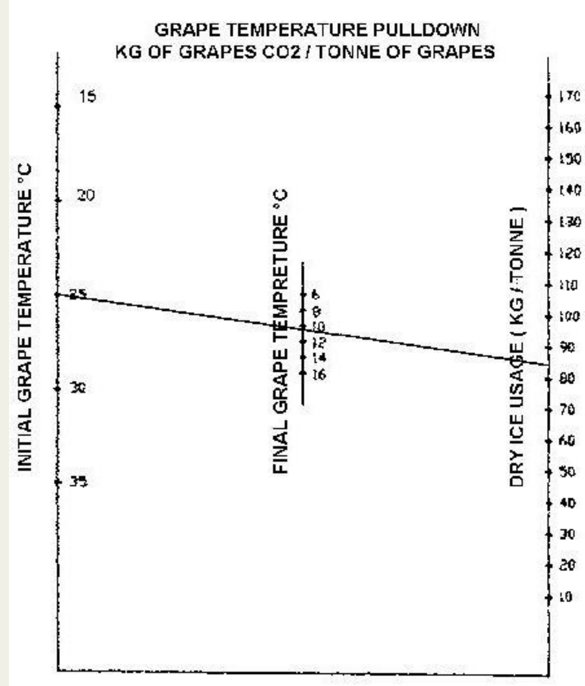


Figure 5. The amount of dry ice needed to cool down grapes can be determined from this graph

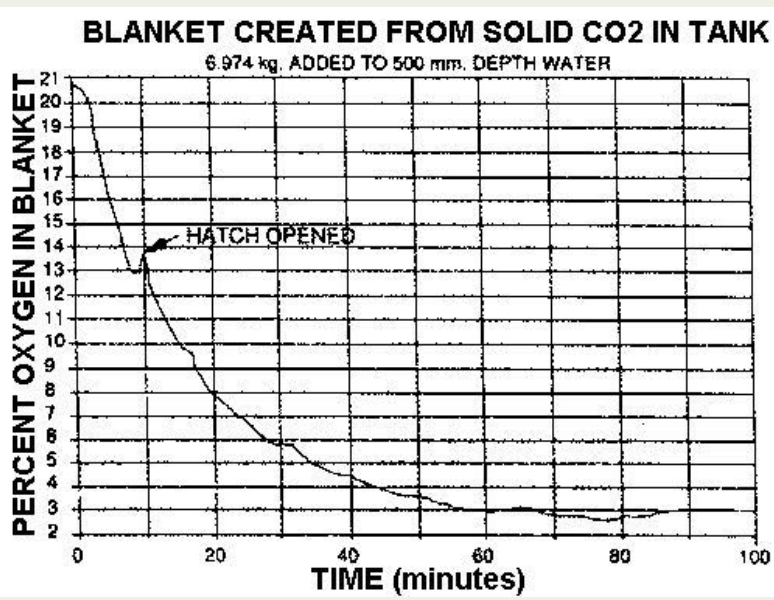


Figure 7. Blanket created with dry ice

5.2 The use of dry ice to blanket headspace

Lewis used dry ice to determine how effective it would be to blanket a storage tank. As can be seen from the graph in Figure 7. the oxygen content above the surface of the liquid did drop but not to the required level of 0,5%. It can also be seen that it took to reach 3% which is usually a bit impractical. The amount of dry ice used was the amount traditionally used and if the amount of ice was increased the results could have been more satisfactory.

Dry ice in brick form can also be placed on a float on the wines surface to form a blanket.

A 2 kg brick takes about 30 minutes to sublime off totally and the layer of gas takes another 15 to 30 minutes to start diffusing and allowing air to come into contact with the wine.

5.3 The use of fry ice to get rid of off flavors

Dry ice (20-30 g/Hl) can be used to drive off undesirable flavors in wine. When added to wine the ice will form fine bubbles that will drive off SO_2, H_2S as well as flavors formed during high solid fermentations. During the process a lot of foam may form so it is advisable to make a tank no more than three quarters full.

6.0 Gas assisted mixing

This is a technique which, despite its infrequent usage, is practiced both in local little usage is practiced both in around the world.

6.1 Mixing additives in tanks

SO_2, fining agents and any other wine additives can be mixed in a tank by blowing gas in the tank through the sample valve or a suitably attached fitting. A fitting with a sparger is sometimes used. The tank should not be completely full because the turbulence could cause the tank to overflow. Allen & Day found that at 0.3 L/L of nitrogen a 1500 HL tank could be thoroughly mixed within 15 minutes compared to the usual time of 3 hours with a pump.

An argument against this technique is that while mixing the wine or must flavor compounds are blown off. This can be minimized by using gas with relative big bubbles (see 8.0 Sparging wine). Mixing by means of a large quantity of gas in a short time would then be preferable to using less gas for a longer time to achieve the same mixing effect.

6.2 Gas assisted pigeage

Pigeage is the process of breaking the cap during red wine fermentation. To do this with gas a large amount of gas is needed and a bulk tank of gas is preferable.

The gas should be administered through a fitting with a one-way valve in the bottom of the tank. There is usually a pipe (about 30 cm in length) running to the inside if the tank from the valve. Gas can be taken from the gas cylinder through a regulator that reduces the gas pressure to the maximum that the gas line can handle. Gas can then be administered just by opening the valve from the gas supply. Wineries usually position this valve at the top of the tank so that the person who opens the valve can look inside the tank to see it's effect.

The effect is that the cap is slowly tipped because the gas only applied on the one side of the cap. The cap then tips causing a huge eruption which mixes the tank. The technique is however not very effective when the cap is not well formed.

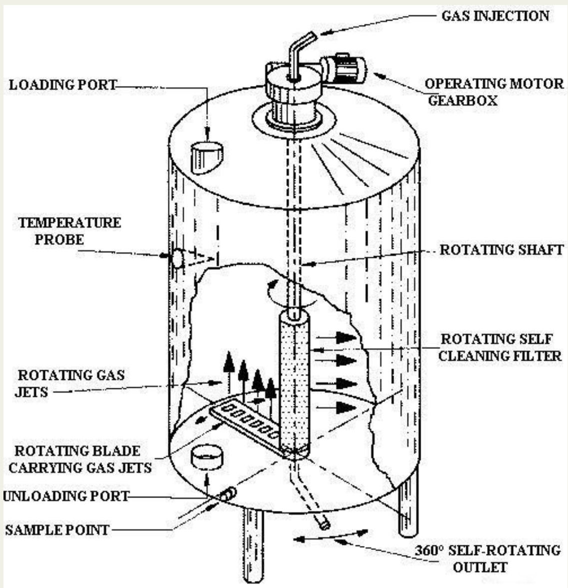


Figure 8. The Magyer fermenting vessel

Another version of the same technique is given in Fig. 8. This is the "Magyar" closed anaerobic fermenter and the principle of it's operation can be deduced from the illustration. Wine fermented with this fermenter was preferred to the control samples, having better color and more extracted tannins.

It should however be noted that these techniques cause the fermentation to be more reductive than normal and that a huge amount of nitrogen is used.

7.0 Transferring wine with an Inert gas

These methods rely on the pressure of the gas to move the wine from one container to another.

7.1 Transferring wine from a barrel or small container

The most common way this today is by making use of what is commonly known as the Bulldog Pup (Boswell company, 1990). The device is used to transfer wine from a barrel or stainless steel drum to a receiving vessel.

As can be seen on Fig. 9, it consists of a stainless steel wand with a expandable silicone bung which seals the vessel. Inert gas is then pushed into the vessel via a tube connected to the wand. This then pushes the wine out of the vessel that is being emptied.

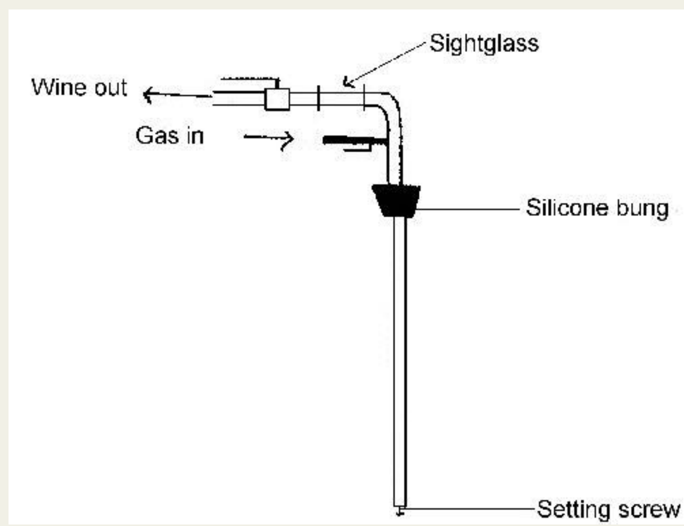


Figure 9. The Bulldog pup

When used to empty a 225 L barrel it takes about 6 minutes at a pressure of about 1.4 bar. Nitrogen gas is preferred because it is cheap and the least soluble of the gases. This method of transfer has the advantage that air contact is limited and that it is very gentle.

The wand has a adjustable screw at the bottom to adjust for different lees levels and is therefore excellent for racking wine out of barrels. Besides it's use for racking and transfer, it is a wonderful way to top up barrels. Stainless steel kegs are well suited for this and besides the obvious advantages, the wine that is left in the keg is also protected by the gas.

7.2 Transferring wine from a tank to another container

The positive pressure a normal tank with a diameter of 1250 millimeters is able to handle before it starts deforming, is as low as 0.04 kPa and that of a tank with a diameter of 2500 millimeters as low as 0.01 kPa. A tank with a diameter of 1250 millimeters would only be able to handle a negative pressure of 50 kPa before it starts deforming, while a tank with a diameter of 2500 millimeters would only be able to handle a negative pressure of 10 kPa. It is therefore not possible to put a normal tank under pressure and thereby transferring it's contents. Special tanks like those used for the making of Charmat wines however, are suitable.

These tanks can handle pressures of higher than 2 bar and can be used for transferring of wine to other tanks or for putting wine through filters. Unfortunately these tanks are very expensive and not worth the expense if not already available.

8.0 Sparging of wine

The purpose of this technique is to either increase the level of a certain gas in the wine or to decrease the level. The technique relies on the principle implied by Dalton's extension of Henry's law which states that the amount of any one gas dissolved in a mixture of gasses is proportional to it's partial pressure, when the gas has reached equilibrium in the liquid.

The effectiveness of the technique depends on several factors namely
•The gasses bubble size
•Contact time of the gas
•Temperature of the wine
•Pressure
•The flow rate of the gas relative to the liquid (volume/volume)
•Number of operations
•Equipment and system design
•The initial amount of gas present

The best way to sparge is to have a sparger that forms the smallest possible bubbles. Spargers with a porosity of 0.2 to 0.5 micron are commercially available. The bigger the surface area, the more efficient the sparging process will be, provided the volume of gas is enough to make use of the surface area.

The contact time between the wine and the gas can be lengthened by using a pump that is connected to the tank and has a long hose on the outgoing side where the sparger is fitted. The temperature of the wine should ideally be as high as possible, but this would also promote flavor loss. A good compromise is a temperature of 60 degrees Fahrenheit.

The sparger is put inline with a pump on the outgoing side. Because the effectiveness of these methods are highly dependent on temperature and the system, there is no recipe and the ideal should be found with trial and error.

8.1 Increasing CO_2

CO_2 can be increased if necessary to add freshness to wine. The ideal amount of CO_2 in a wine will depend on the balance of the wines components and should be determined by taste.

Weik found that Riesling and Muller-Thurgau wines with low CO_2 levels were noticeably improved by the addition of CO_2.

In Germany sparging is being practiced by applying little gas at a time and by repeating the operation several times with less gas at a time. It is known as the pulse system.

8.2 Removal of O_2

Nitrogen sparging can be used to get rid of O_2 picked up during juice handling and has particular use during reductive wine making where the juice going to the settling tank is sparged. The oxygen content of wines before bottling should be 0.5 mg/L or less to insure that the wine will not oxidize excessively after bottling. The excess oxygen can then be sparged away using nitrogen gas.

Table 3. shows the oxygen levels after sparging a wine. It can be seen that double sparging method was the most effective and that doubling the sparging rate did not proportionally increase the removal of oxygen.

INITIAL LEVEL	Sparging @ 100 L/min	Sparging @ 40 L/min	Double sparged @ 40 L/min
10.3	3.2	4.2	1.7

Table 3. Oxygen levels(mg/L) after sparging at a wine flow rate of 11000 L/hr and a wine temperature of 10,7°C

8.3 Removal of other gasses

The wine can be sparged to get rid of excess CO_2, H_2S and SO_2 by sparging with nitrogen.
Huge amounts of gas is sometimes necessary and it should be remembered that just as there is a huge loss of desirable compounds during fermentation this would also happen to some degree when sparging.

9.0 Practical considerations

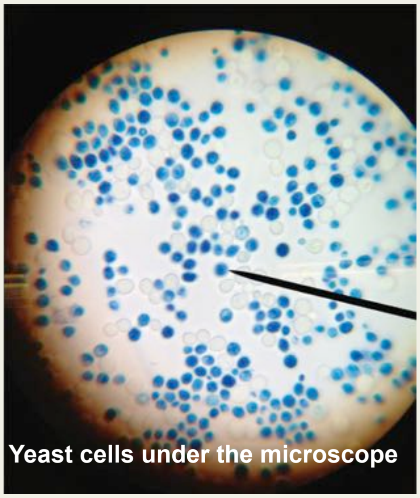
Many of the above uses require quite a large amount of gas. Gas is normally acquired in cylinders but bulk tanks and gas generators should also be considered. The use of these different forms of gas will depend on the amount of gas on the site and a gas company should be consulted for the best option.

10. Conclusions

From this paper it is clear that there is no such thing as a heavy gas and that the gas or mixture of gases chosen for a task is very important. Argon looks as if it will still make great headway in the future and it's use should be studied more carefully.

Yeasts: do you know what's flavoring your wine?

Benjamin Lewin August 1, 2014



Yeast cells under the microscope

There's not much about a wine's aroma, taste or texture that isn't influenced by yeast. But could bespoke yeasts change a grape's inherent character or risk homogeneity of flavor? Benjamin Lewin MW reports...

It might seem that the character of wine is a simple matter of grape variety, influenced by terroir and conditions of winemaking, but there's an unseen hand in every wine – the yeast that fermented the juice. The gooseberry aromas of Sauvignon Blanc, the lychee of Gewurztraminer, the strawberry notes of Pinot Noir – none of these are found in the grapes, but they are released or created by yeast during fermentation.

Of the thousand or so compounds that determine the flavor and aroma of wine (most present in vanishingly small amounts), very few can be tasted or smelled in the grape, which is why wine does not taste like grape juice plus alcohol. (Almost the only exception is Muscat, where both the grape and wine have the same 'grapey' smell, due to specific compounds called terpenes.) So, how far are yeasts responsible for what you smell and taste in wine?

"A selected yeast can account for about 10% of the sensory definition of wine".' Michel Feuillat used to say at the University of Burgundy. This is a good way of describing what yeast does – all yeasts convert sugar to alcohol, but particular yeasts may make more or less of certain aroma and flavor compounds during fermentation. However, Ann Dumont, a yeast producer at Lallemand, says: "Yeast cannot create new flavors out of the blue. It will transform what's in the berries, not only into alcohol, but also into aroma compounds. Yeast will work from the raw material that it is supplied with".

The effect of yeasts also lives on after them – during the process known as autolysis, when wine is maturing on the lees, the remnants of the yeast release compounds into the wine that contribute to mouth feel. So there is not much about the character of wine that isn't influenced by yeast. One big divide in winemaking is whether to let fermentation happen naturally, by the indigenous yeasts in the winery, or whether to add cultured yeast to control the process.

Cultured yeasts

Cultured yeasts are selected from natural yeast populations; sometimes they are used specifically to help to bring out the character of their region of origin, or to emphasize specific aromatic properties. Character is sometimes reinforced by cross breeding. (Although there have been research experiments with genetically modified (GM) yeast, almost none is available commercially; 'GM yeast is completely ruled out by public opinion,' says Dumont.)

"I'm not trying to manipulate the wine, I just want the vineyard to show the best aspect it can," says Jeff Cohn at JC Cellars in California, explaining how he came to isolate the RP15 yeast (now a commercially available strain). "I had a vineyard at Rockpile for Syrah. I was doing bin fermentations and a few of the bins had a special flavor profile, so I isolated the yeast from those ferments. It brings a lot of minerality to the wine; it emphasizes red fruits rather than black."

Estimates for the use of cultured yeast in worldwide winemaking range from 70%-90%. Most often, the reason is probably simply to avoid the risks of spoilage that can occur with indigenous fermentation; sometimes the reasons are technical, such as using special yeast to ferment in high alcohol. The most striking examples of wine styles influenced by yeast come from aromatic varieties, where small changes in the concentrations of key components can greatly affect varietal character. The best-known example of a yeast with aromatic influence is strain 71B, which was selected for use with nouveau wines because it increases fermentation esters (usually esters evaporate before wine is consumed, but they are still present in nouveau wines that are drunk soon after bottling). Strain 71B increases formation of isoamyl acetate, which gives a strong impression of bananas. Critics said that for some years the consumers of Beaujolais Nouveau, especially in Japan, were under the mistaken impression that the natural aroma of Beaujolais was banana.

Enhancing aromas

The gooseberry and passion fruit aromas of Sauvignon Blanc come from sulfur-containing compounds that are released during fermentation from non-odiferous precursors in the grape. Cultured yeasts vary widely in their effectiveness in freeing the odors, but winemaker Marcia Monahan at Matanzas Creek in Sonoma says that the grapevine clones and canopy management are more important in determining style.

"Yeasts are in third place; they are important because the more enzymes they have, the more aromatics will be released, but the precursors have to be there." She selects yeasts to match the properties of the grapes from each block.

How commonly are yeasts used to increase aromatics? "Two-thirds of the wines here are made using aromatic yeasts," says one Sancerre producer. "People must be using aromatic yeasts – there are flavors that wouldn't be there otherwise," says another, who uses a cultured yeast from Champagne that his grandfather introduced because of its neutrality.

Yeasts that increase the aromatic intensity of Gewürztraminer work by increasing the release of terpenes. Here there's a novel alternative – a winemaker can buy preparations of the enzyme from those yeasts and add the powder to the must. Is this crossing the line of manipulation?

Petrol is one of the most striking aromas caused during fermentation of Riesling. Not everyone likes this. At the Rheinland-Pfalz research centre in Germany, Dr Ulrich Fischer is trying to develop a yeast that will make the less odiferous vitispirane instead. Is this changing varietal character?

The classic description of Meursault is nutty and buttery. Want your Chardonnay to taste more like Meursault? Use CY3079 yeast, which increases the impression of hazelnuts and brioche. According to the authorities in Burgundy, it "reinforces the aromas coming from the barrel and gives Chardonnay wines a rich hint which balances and melts wood tannins".

Is using yeast to balance aromas and flavors a counterpart to choosing specific clones of a grape variety? "Very much so, especially in cases where there isn't much heterogeneity in the vineyard block – using different yeasts is a way of building complexity," says Christopher Christensen at Bodkin Wines in California. "I may use one yeast for mouth-building properties and another for aromatics," he says, '"and sometimes it pays to use multiple yeasts that compete with one another."

Increasing alcohol in wine is a major concern worldwide. Since yeasts create the alcohol, can they help by making less of it? In principle, yeasts don't have to convert all the sugar into alcohol – some could be diverted. But here's the rub – the carbon atoms have to go somewhere. One recently developed yeast strain makes as much as 1.5% less alcohol: but it makes more glycerol and lots more ethyl acetate (nail polish remover). It's not easy to find alternative targets to alcohol that don't radically change the flavor and aroma spectrum of the wine. "That's what yeasts do – create alcohol. If you change that, you change the whole story," says Charlotte Gourraud at yeast producer Laffort. Yeast is best for making adjustments to minor components rather than looking for major shifts. I would be surprised if a low-alcohol yeast could be found without a profound homogenizing effect.

Preserving diversity

A potential homogenizing effect on flavor is one major argument against using cultured yeasts. "The idea that cultured yeast will homogenize flavors is simplistic. It's putting all the onus of flavor creation on the yeast as opposed to the grapes and the talent of the winemaker," says Dumont. "There are about 200 strains, which leaves good opportunities for biodiversity," says Charlotte Gourraud.

How far can yeast influence the flavor of wine? "You can tailor your product to reach your customer by identifying consumer preferences, the effect that a choice has on a customer, and its genetic composition," says researcher Linda Bisson at the University of California. "Once we've identified the flavor compounds, we can manipulate the taste. We derive flavors from the yeast, not the grapes."

"You can achieve almost any taste through these aromatic yeasts," agrees biodynamic guru Nicolas Joly, but as the most vociferous opponent of using cultured yeasts, he draws a different conclusion. His basic criticism is that "re-yeasting", as he calls it, obliterates local character and vintage variation. "Re-yeasting is the consequence of a series of mistakes. It means you have destroyed your local yeasts," he says. Admitting that cultured yeasts can be used to make good wine (albeit lacking typicity of place and year), Nicolas believes that consumers should be informed. "Using yeast is okay as long as the consumer is not cheated. The label should say that cultured yeasts were used to give flavor."

The alchemist tried to turn base metal into gold. Yeast does something more interesting: it turns grape juice into wine. The winemaker can use the alchemy of yeast to direct development of style, or can take the alternative view that natural variation from indigenous yeast is an essential part of wine's character. There are no half measures here – if you use cultured yeast, you have to choose a specific strain(s), and even an attempt to be neutral (what is neutral, anyway?) is a choice. Using indigenous yeasts lets nature choose. The decision is one of the most crucial that influences wine style.

WHAT IS THE ACTUAL LIFESPAN OF MOST WINE?

Keith Beavers March 21, 2016

For years, wine professionals have been telling us when to drink that expensive bottle that we splurged on or were gifted (drink by this date or hold until that date). But what exactly are they referring to? Does wine eventually die? Is there a peak time to enjoy that bottle? It can be a bit dizzying but generally the life of a wine depends on a few factors, including vintage characteristics, place or origin, and how the wine was made. Was the growing season too hot or too cold? Did it rain too much, did it hail, or was it a perfect year? Where is the wine being made? What kind of soil composition are the vines in and which grapes are being used? Are these grapes even intrinsically destined to age as a wine? And lastly, *how* is the wine being made? Does the winemaker intend to see his or her wine age? Nice and confusing, huh?

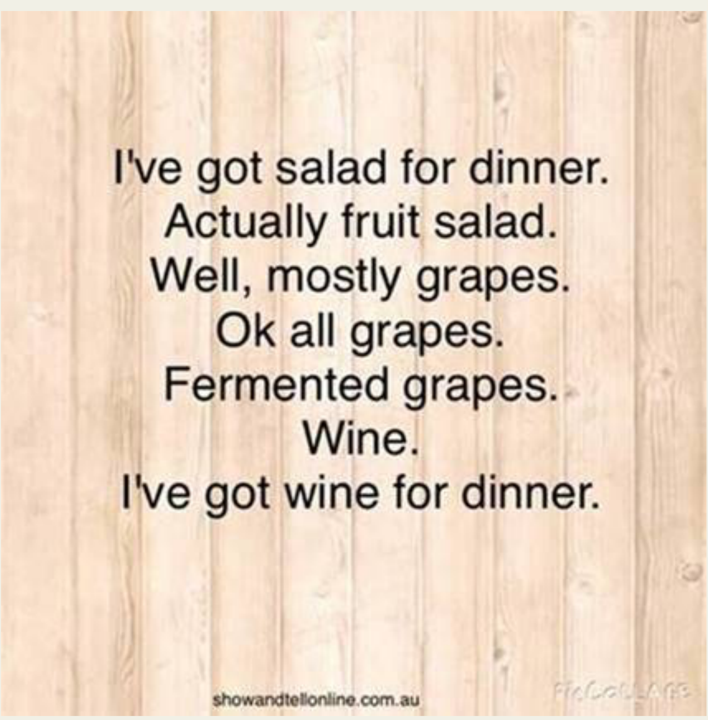
Don't fret. We have the Internet. There is plenty of information out there about the bottle you have and whether it was made in an off year or a "banner" year. There are charts and graphs available to tell you when to drink said bottle and how long to wait until it "peaks." To understand this, let's look at what's happening inside the bottle so that when you do pop it, you have an idea of how it got to this point.

Wine is generally made up of four elements: water, alcohol, acidity and what science calls phenolic compounds, which is all the organic material that adds to a wine's color and aroma profile. One of the wonders of wine is that it is a living thing. And after it's bottled the party doesn't stop. Two of these elements, alcohol and acidity, are pretty much constant. They can actually outlive the life of the wine (water is a constant as well but can evaporate). But over time it's the phenolic compounds such as tannin, natural color pigments and flavor compounds that continue to interact with each other. As oxygen seeps into the bottle through the porous cork it binds with these organic elements, forcing some of them to then bind together. As this happens the phenols gain weight and fall to the bottom of the bottle in what is known as throw off or sediment (one of the main reasons for decanting).

This is the process of aging. The wine is actually fining itself. These phenols are the things that give complexity to a wine, and as they bind and fall, the wine flavor profile changes. A young harsh red wine becomes softer from losing some its tannin structure, making it gentler on the palate and allowing new aromas to come center stage. The color changes from inky red to a beautiful brickish color as the pigments dissolve, allowing the eternal acidity to brighten up the wine a bit more. And at some point during this process, depending on those first three factors, something amazing happens. All the elements in the bottle enter into a perfect harmony. This is what is called the "peak". This is where the wine is at its best. Drinking an age-worthy wine at its peak is what dreams are made of. With white wines it's a little different; there's less organic material, so this process happens a bit quicker.

But wine can be just as enjoyable before and after its peak. If a wine is well made it can be wonderful in the years before perfect harmony sets in. And this is why some people buy a half or full case of age-worthy wine to see how a particular wine evolves. After the peak the wine will still be enjoyable but the years of depth and complexity begin to dwindle. And beyond the wine's peak it doesn't stop fining itself. The organic material in the bottle continues to bind and fall, and at some point there aren't enough phenols to balance the wine and the acidity, a sour, tart element needed to keep all of the structure of the wine in check. The liquid begins to taste thin and too high-toned until all that's left is an old and tired musty wine.

Not all wine is age-worthy, and in fact, the majority of wine out there is not. Wines that benefit from years in the bottle tend to be more expensive and are a bit of an investment. For reds, these include the wines of Bordeaux, Burgundy, Barolo and Barbaresco, averaging a little over two decades. For whites Chardonnays from Burgundy, Riesling and Chenin Blanc are the best to age, averaging about fifteen years (up to twenty for Rieslings). Sure that's a lot of time to wait, but the payback is pretty magical.



Portland Winemakers Club
Leadership Team – 2016

• President: **Phil Bard** phil@philbard.com
• Set agenda for the year
• Establish leadership team
• Assure that objectives for the year are met
• Set up agenda and run meetings

Treasurer: **Barb Thomson** bt.grapevine@frontier.com
• Collect dues and fees, update membership list with secretary
• Pay bills

Secretary: **Ken Stinger** kbstinger@frontier.com
• Communicate regularly about club activities and issues
• Monthly newsletter
• Keep updated list of members, name tags and other data

Chair of Education: **Bridget Lopez** Bfosterpacific@gmail.com
• Arrange speakers for our meetings

Chair for Tastings: **Jon Kahrs & Barb Stinger** jekahrs@aol.com kbstinger@frontier.com
• Conduct club tastings
• Review and improve club tasting procedures

Chair of Winery/Vineyard Tours: **Bill Brown** bbgoldieguy@gmail.com
• Select wineries to visit
• Arrange tours
• Cover logistics (food and money)

Chair of Group Purchases: **Bob Hatt** bobhatt2000@yahoo.com
• Makes the arrangements to purchase, collect, and distribute
• Grape purchases
• Supplies – These should be passed to the President for distribution

Chair of Competitions: **Don Robinson** don.robinson.pdx@gmail.com
• Encourage club participation in all amateur competitions available. Make information known through Newsletter, a-mail and Facebook

Chairs for Social Events: **Bridget Lopez** Bfosterpacific@gmail.com
• Awards Gala / Holliday parties

• Web Content Editor: **Alice Bonham** aliceb@gorge.net Web Host: **Phil Bard**