WINE & MEAD

Wine, as we all know, is the fermented juice of the grape. To some, the term may also include the more generic form of fermented juice of any fruit, though the purists among us would certainly beg to differ. Be that as it may, wine, from grape juice or otherwise, has been made and enjoyed throughout the ages. The following quotes, covering a span of about 2000 years will plainly testify to this. (I feel quite certain that the original authors of these lines would in most cases agree that the same could be said about virtually any form of alcoholic beverage):

I like best the wine drunk at the cost of others.
Diogenes the Cynic (Greek philosopher c. 412 BC)

No poem was ever written by a drinker of water.
Horace (Roman poet & satirist 65BC - 8BC)

In wine there is truth.
Pliny the Elder (Roman Scholar 23 - 79)

Wine seems to have the power of attracting friendship, warming and fusing hearts together.
Masurius Athenaeus (The Diepnosophists c.185)

I wonder what the vintners buy one half so precious as the stuff they sell.
Omar Khayyam (Persian astronomer & poet 1048 - 1131)

And lately, by the tavern door agape, came stealing through the dusk an "angel shape," bearing a vessel on his shoulder; and bid me taste of it: and 'twas the Grape!
Omar Khayyam (Persian astronomer & poet 1048 - 1131)

Our poets of the thirteenth century never speak of piments but with rapture and as an exquisite luxury.
Le Grand (La Vie Privee des Francois)

Good wine praises itself.
Arab Proverb

Water separates the people of the world, wine unites them.
Anonymous

Never did a great man hate good wine.
Francois Rabelais (French writer 1483 - 1553)

Mead! Melomel! Metheglyn! Drink of the ancients. Nectar of the gods! By any name, we are still talking about the same beverage, or family of beverages; honey wine and its many varia- tions.

The ingredients of a true mead are only two -- honey and water. This mixture, however, is slow to ferment and also slow to age. Honey lacks the acids and tannins which yeast needs to thrive. There are, however, several ways around this problem. A melomel is a fermented beverage from any fruit juice with the addition of honey. By using a fruit juice base instead of water, many of the required nutrients and acids which honey lacks are supplied by the juice. Several fruits were used so often for this purpose within the period of our study that specific names were developed for melomels made from them. Among these drinks are piment[2], made from grapes, cyser[3], made from apples, morath[4], made from mulberries and perry[5], made from pears.

Another additive which will supply tannins and other trace elements, although not the acidity required, are various spices, thus creating the drink known as metheglyn. I have found that by using both of these methods, combined, along with one or two ounces of lemon juice per gallon of acid deficient juice, it is usually unnecessary to alter the must (juice used to make wine or mead) with other additives.

History of Wine and Mead

The history of wine and that of man are invariably and inseparably intertwined. Most archaeologists agree that grape wine has probably been made for the last 10,000 years[6], and that mead has probably been around for even longer[7]. Mead and beer, were drunk by Man prior to his learning of wine[8]. These were also the drinks of the gods[9]. This discovery came to the Greek islands at about the 16th century B.C.. It is speculated that some other wines, namely palm and date, which originated in the region of Mesopotamia[10], may also predate grape wine. We do not know exactly when and where wine first was discovered. What we do know is that even in times considered ancient by ourselves, wine was considered

ancient, and a gift of the gods. The origins of the word wine date back to the Greeks, whose word oinos referred, not only to fermented grape juice, but to the fermentation of any other fruit, as well[11]. The Greek contribution to winemaking, the amphora, is one which should not be forgotten. Most regretably, after the fall of Rome, as we shall see later, it was, to the detriment of all wines from that time until the seventeenth century. Having the amphora and the ability to create aged wines, the Greeks and Romans put a much greater emphasis on this process than did later peoples. This also allowed them to put a greater emphasis on clear wines, rather than cloudy beverages[12]. Another contribution of the Greeks which has also fallen into disuse (and fortunately so, in the opinion of this author) is the addition of sea-water to their wines. This was done in order to 'sweeten' the wine[13], and, according to Pliny's Natural History, 'to enliven the smoothness of their wines'. I, personally, do not see how this would make a sweeter or better tasting wine, but the practice was continued by the Romans, who mention the dilution with sea water in their recipes for 'Greek wine'[14]. Traces of this practice were not uncommon even in Medieval times, when it was common practice to wash wine and beer casks with sea water between uses[15]. Although this did not actually add salt water to the wine, some salt was no doubt left behind from the washing which would then find its way into the next batch of wine or beer.

Mead, as probably the most ancient of all alcoholic beverages, was mentioned in such writings as Beowulf, the Mabinogion, and the writings of Taliesin[16]. The Celts, from all over the world (they were not restricted to the British Isles) drank mead, as did the Norse. The ancient Greeks and Romans drank hydromel which was, in all probability a drink much like the mead of the Celts and Anglo-Saxons. Theophrastus writes in his book Concerning Odours that the Greeks used honey in their wines because it gave a 'pleasanter taste' to it. 'For they put into the jar a lump of dough which has been kneeded up with honey, so that the wine gets its fragrance from itself, but its sweet taste from the honeyed dough.'[17] It is not at all surprising that honey, being the oldest of the natural sweeteners known to man, should also be the basis for the oldest fermented drink known to man. In fact, it would be much more surprising if this were not the case. Wine is mentioned many times in the Bible, including the stories of Creation and of Noah. In Numbers XIII,23 the large and fruitful grape vines of ancient Palestine are mentioned. According to the Babylonian Talmud the ancient Jews made wine, not only of grapes, but of raisins and pomegranates as well. Records of wine and laws concerning it, date back easily to the ancient Egyptians and Babylonians[18]. The Egyptians attributed wine to the god Osiris and paintings on their tombs such as that of Phtah-Hotep (c.4000 BC)[19] show grape vines trained on high, arched trellises, much as they are today except that the trellises[20] of today are generally not built so high. These paintings also show the harvesting[21] and making of wine from these grapes[22]. Inscriptions on the stoppers of amphorae also provide us with information on wines of ancient Egypt[23]. Wine labels, too, provided such information as the year of bottling, the quality of the wine, where the wine was bottled, and who the chief vinter was.[24]

The Laws of Hammurabi in ancient Babylon (c. 1790 BC) are quite explicit (including loss of limb, or life)[25] when it comes to the making, selling and purchasing of wine.[26]

The Phoenicians, wherever they went in their travels, took the grape vine with them. When they, in 600 BC, built the foundations of what was to become Marseille, however, they had no need to do so, as the vine was already growing wild, as it did throughout much of Europe.[27]

The way in which wine is stored dictates much more than just appearance. Both the Greeks and the Romans stored their wine in airtight, ceramic amphorae[28]. By doing so, they were able to store their wines for long periods of time and aged vintage wines were both possible and valued. The Greeks would often preserve or flavor their wines by the addition of herbs and spices[29] and the Romans had devised a method of chaptalization (the addition of sugar to the must to increase its potential alcohol) through the addition of either honey, or boiled down must.[30]

With the fall of Rome, however, also came the loss of the amphora as a storage vessel. Wine, thereafter, was stored in wooden casks which allowed for evaporation of wine and the admittance of air and bacteria. This caused wines to age too rapidly and if stored too long to turn to vinegar from the action of the bacteria. The keeping of mature wines had come to an end and would not return until a suitable replacement for the amphora could be found. This turned out to be the glass bottle and cork, which was not used for the storage of wine until early in the 17th century.[31] The use of sulfur as a sterilizing agent for wine and other alcoholic beverages, which would have allowed for more stable, longer keeping and clearer beverages, was known during the Medieval period, but was strongly frowned upon and often forbidden by law. It was not until the eighteenth century (and, therefore, out of our period of study) that its use became at all regular.[32] (This, however, should not stop you from using sulfites for proper sterilization!) Wine, therefore, throughout the Middle Ages was usually made from a single vintage and would be drunk young, rarely older than one year, so that it had no a chance to turn to vinegar.[33] The ageing of wine was often forced by airing the wine during its initial racking (siphoning of the wine to leavebehind the sediment).[34] The additional oxygen at this time would increase the rate of oxidation of esters and higher alcohols which occurs during normal ageing, and, thereby mellow the wine much quicker. Without proper sterilization, however, this can lead to acetification of the wine and caution should therefore be taken.

Though wine was rarely aged throughout the Dark and Middle Ages of Europe,[35] there was certainly much of it. With the spread of Christianity came the need for much wine to be used during mass,[36] particularly in the monasteries. Often, these monasteries were endowed by the ruling nobles with plots of land and vineyards of their own.[37] These same monasteries also kept bees for their wax in order to make the candles which were necessary to monastic devotions. The honey which was derived from these bees was also put to use in the making of mead and its many derivitives. These monastic plots were often the basis for the great wines which have come down to us through the ages. Many of these vineyards, too, are still in existence today, although in most cases, the ownership has changed since Medieval times.

How Wine is Made

The general process for the making of wine is quite simple. All that is required, strictly speaking, is fruit juice containing sugar and yeast. Left to their own devices, these ingredients will of their own accord ferment and form wine. While the previous statement is true, the result will often leave something to be desired by those who have grown to appreciate good wine. The basic process does not change. The specifics, however, of how the yeast is allowed to ferment the sugar into alcohol and the amount of sugar, itself, is what makes the difference between a murky beverage of low alcohol content which may rapidly turn to vinegar and a beverage which can rightfully take its place on the tables of kings. (Many wines of the former variety did, however, make it to the tables of kings.)

In the book Wines of the World, by Andre Simon, he states that the art of winemaking consists of the following three stages: crushing ripe grapes into juice, fermentation, and maturation in cask or bottle.

The growing and harvesting of grapes has undergone very little change from its earliest times. Viticulture was practiced in ancient Egypt and wine was made from the grapes grown there since at least the 1st Dynasty in the beginning of the 3rd millenium B.C. according to Mercer in The Pyramid Texts[38]. Osirus was titled 'Lord of the wine at the Inundation' by 3000 B.C.[39] and tomb painting of the 6th Dynasty and the 18th Dynasty portray the harvesting of grapes. One of these, which shows men treading grapes, each with outstretched arm and hand on the shoulder of the man in front of him, is almost identical with the methods currently in use in modern Portugal as they have made Port and other wines in their mountain and valley vinyards for hundreds of years. The sack press, which was in use during the 1st Dynasty of Egypt is described by W. M. F. Petrie in his book, Social Life in Ancient Egypt. It consisted of a pourous sack, much like burlap, filled with fruit. A pole was inserted into straps at each end of the sack, turned in opposite directions and stretched apart, thus squeezing the juice from the fruit. As can be seen, various methods of extracting juices from fruit have come down to us from antiquity and we may use any of these methods in any combinations, in the preparation of our wines. I do not, however, recommend the pressing of grapes by foot due to the quantity of grapes needed for this method and the required hygene that our modern tastes dictate. Although this was certainly a period practice and is still in use today it is not adviseable for the modern home vinter. A small press can be purchased if the volume of your production warrants it, or a variation on the sack press can be easily constructed. (I have used a loose weave muslin bag, myself, and squeezed the juice out of it by hand. This works tolerabley well for small quantities.)

As has been said, fermentation is the action of yeast, or, more properly, enzymes present in yeast, on sugar, converting it into alcohol and carbon dioxide. This is a simplification of the actual process. During fermentation some of the sugars are converted into other substances, such as glycerine, aldehydes and esters. The majority of the sugars, however, are converted to alcohol.[40] The final result of this fermentation is that all substances present in the original must are also present in the finished wine, though in differing percentages, as are new substances which were unknown in the original must. The amount of sugar, for instance, is greatly reduced while the various alcohols and related other substances are present in approximately half the concentration as that of the original sugar (the remainder being dissipated as CO2).

It is at the very beginning of fermentation, too, that the color of a grape wine is determined. The juice of the grape, even dark concord grapes, is not red, or purple, but clear white. The coloration of a red or ros, wine comes from the skins of the grape, not the juice itself. If a white wine is desired, the skins are removed immediately after crushing, before fermentation can begin. To make a rose or red wine, the skins are allowed to remain in the must until fermentation has begun. This will draw the coloration, as well as tannins, from the skins. Once the desired coloration has been achieved the skins are removed from the must and fermentation is continued with no difference than in a white wine. Other fruits, too, particularly berries, may also have a clear juice with the coloration confined to the skins. In these cases, the same procedures would be used with these fruits if color is desired in the wine.

In order to create an ideal environment for the action of yeast, allowing it to get off to a good, rapid start, various nutrients are needed in addition to sugar. The necessary acids include malic, tartaric, tannic and citric, which are naturally present in grape juice[41] and can be purchased from wine and beer supply shops in the form of an acid blend. The minerals present in natural grape juice include potassium and magnesium. These can also be purchased from supply shops as a yeast nutrient. When making a grape wine, these additives will rarely be needed. In lieu of using these specialized additives for non-grape wines the addition of 1 to 2 ounces of lemon juice per gallon of acid deficient must will generally supply the required amounts of acid. Magnesium, in the form of Epsom Salts can be added to the must in the ration of about 1/8 teaspoon per 5 gallons. A single potassium tablet per 5 gallons can also be added to the must. A must which contains acceptable amounts of sugar, acid and minerals will likely encourage rapid initial growth of yeast. This can be further insured by using a starter solution of 1 to 2 cups of the must, warmed to about 90ø to which the yeast is added. This starter solution should then be kept warm for a period of up to 24 hours, until it is actively frothing and a head has formed on its surface. At this time it should be added to the remainder of the must, also warmed to about 90ø. The full amount of the must and starter should then be allowed to cool gradually so that fermentation can continue at a slower but steady pace until completed (usually in 4 to 6 weeks. Fermentation by wine yeasts will be effective over a temperature range of 50 F to 90 F depending on the yeast type.[42] Yeast will actually survive temperatures of 100 F to 105 F but will produce the best wines at lower ranges -- 65 F to 85 F for red wines,[43] and between 50 F and 70 F, for white wines.[44]

I have so far spoken several times about the sugar content of the must to be fermented, but have yet to mention just what this content should be. The amount of sugar to be added to the must will vary, depending on several factors, i.e. the amount of sugar already present in the fruit juice, the alcoholic strength required for the finished product, and the sweetness desired in the finished wine.

The first of these factors, the sugar in the original must can be determined through the use of a hydrometer. Three scales are common on modern winemaking hydrometers. One scale is the Brix, or Balling scale, which measures the percentage of sugar in the solution. A second scale shows the potential alcohol, which is the amount of alcohol which will be produced if the entire amount of sugar in the solution is fermented to dryness. The third scale is the specific gravity, or density of the liquid. This is what is actually being measured. The other scales are accurate under the assumption that the solution contains only sugar and water, which is accurate enough for our purposes.

From the reading on the hydrometer it can be determined if there is enough sugar present to create the desired alcoholic strength. If there is, and if

a dry wine is desired, no addition of sugar will be necessary. In most cases, however, it will be necessary to add sugar or honey in order to obtain the desired alcoholic strength. The amount of sugar to be added will be approximately 2¬ ounces per gallon for each 5 points that the specific gravity need to rise. (A point of specific gravity being the third position to the right of the decimal point in the spcific gravity reading.) The amount can also be easily read from the following table which is taken from The Winemakers' Companion,by Turner and Berry.

S.G.	P.A. % by Vol.	Amt. of sugar in 1 gallon		Amt. of sugar added to 1 gallon		Vol. with sugar of 1 gallon	
		lb	oz	lb	oz	lb	oz
1.010	0.9	0	1.7	0	2.1	1	0.8
1.015	1.6	0	3.4	0	4.2	1	2.4
1.020	2.3	0	5.8	0	6.7	1	4.0
1.025	3.0	0	7.5	0	8.3	1	5.6
1.030	3.7	0	10.0	0	10.8	1	6.4
1.035	4.4	0	12.5	0	13.3	1	8.0
1.040	5.1	0	14.0	0	15.0	1	8.8
1.045	5.8	0	15.8	1	0.7	1	11.2
1.050	6.5	1	1.5	1	3.3	1	12.0
1.055	7.2	1	3.0	1	4.8	1	12.8
1.060	7.8	1	5.0	1	6.5	1	13.6
1.065	8.6	1	6.5	1	9.0	1	15.2
1.070	9.2	1	8.0	1	11.5	1	16.0

1.075	9.9	1	9.8	1	14.0	1	17.6
1.080	10.6	1	11.5	1	15.6	1	18.4
1.085	11.3	1	14.0	2	2.2	1	20.0
1.090	12.0	1	15.6	2	4.6	1	21.6
1.095	12.7	2	1.3	2	7.2	1	22.4
1.100	13.4	2	3.0	2	9.6	1	24.0
1.105	14.1	2	4.6	2	12.1	1	25.6
1.110	14.9	2	6.3	2	14.6	1	26.4
1.115	15.6	2	8.0	3	1.1	1	28.0
1.120	16.3	2	9.6	3	3.6	1	29.6
1.125	17.0	2	11.3	3	6.1	1	30.4
1.130	17.7	2	12.9	3	8.6	1	32.0
1.135	18.4	2	14.6	3	11.1	1	33.6

After sugar has been added and allowed to disolve another hydrometer reading should be taken. Since temperature and humidity are variable and will affect the reading, it is impossible to say precisely how much sugar to add. Once this hydrometer reading matches the desired alcohol content, or slightly higher fermenta- tion can begin.

Once fermentation has been completed, the yeast will begin to settle to the bottom of the fermentation vessel, along with other solids and fermentation by-products. After 1 to 2 weeks, a thick layer of sediment will have formed at the bottom of the vessel and the wine should be racked (siphoned) off this sediment. This should be done carefully, so as to remove as much of the liquid as possible, while leaving behind the sediment. The wine should be racked into another vessel of similar size, so that this second vessel will be as nearly full as possible after receiving the wine. If much air space remains in this second jar (bottle, barrel, etc.) it should be filled either with wine or juice set aside for this purpose. In four to six weeks another layer of sediment is likely to have formed, although much thinner than the first. The wine should again be racked off this layer of sediment as it was before. In most cases the wine will be relatively clear by this time. If this is so, the wine should be tasted to determine if the desired sweetness has been obtained. If a dry to semi-dry wine is desired, then in all probability, no adjustments will be needed at this time. If, however, one prefers a sweeter wine, this is the time to add sugar to obtain this desired sweetness. Add sugar only a little at a time and taste after each addition. Remember that once sugar has been added, it can not be taken out. Do not over- sweeten! One word of caution if you do sweeten your wine at this time: it is possible that your wine will re-ferment the extra sugar. Do not stopper your jugs too tightly in case this should occur. If re-fermentation does occur, this is not a disaster. You will simply get a wine with a slightly higher alcohol content than you would otherwise have obtained. Once the wine has had suffi- cient time for further settling (several months may be necessary, particularly if additional sugar was added), it should again be racked. This time the layer of sediment should be very thin and the wine sparkling. If this is so

then this racking can be into final bottles. Otherwise, continue this method of racking until the wine is sparkling clear. I have found that by this method, by the time a wine is sparkling clear (and I will settle for nothing less) it has also assimilated enough oxygen through its successive rackings that it has aged sufficiently for drinking. The entire process, up to this point will usually take anywhere from six months to one year. Note, however, that while minimal ageing has occurred, it is a good idea to allow for further ageing in the bottles. Using natural cork stoppers and allowing the bottle to lie on its side, keeping the cork moist will promote proper ageing. For those who would forego the process of ageing and drink their wine soon after removal from the fermenter, the Babylonian Talmud has this to say: '...wine is unattractive until it is forty days old.' It should be noted that the number 40 appears quite often in the Bible and the Talmud and is sometimes taken to mean, simply, 'many.' This being the case, the Talmud is not suggesting a specific period of aging time of forty days, but, rather, simply that the wine should be allowed to age and not be drunk while young. So take the proper time and age your wines, you will be much happier for it.

How Mead is Made

The methodology for making mead is virtually the same as for that of winemaking. The main difference is the content of the original must. In the case of wine, you start with fruit juice which may be enhanced with additional sugar. If honey is used instead of sugar, a melomel is made instead of a wine. The same spices which are used in making metheglyns are frequently used when making wines. Keeping this in mind, then, it becomes obvious that all equipment, supplies and practices which are used in wine can be used in the same manner when making meads, melomels and metheglyns.

The Ills of Wine & Mead

Please note, at this juncture, that it is much easier to prevent problems in your brewing and vinting than it will be to correct them afterwards. Proper procedures should make corrections virtually unnecessary. This being the case, always sterilize your equipment by proper cleaning with hot water and soap, followed by rinsing with a solution of sodium bi-sulfite which can be purchased at your local wine and beer supply shop. Always use glass, porcelain, or stainless steel covered containers with an airlock. I, personally, prefer to use glass, as this allows the entire process to be observed. If the must which you are ferment- ing lacks proper nutrients or acidity, correct this problem before fermentation commences. Never rush your wine, and, if something does go wrong, don't panic! Following are some of the most likely problems which you will encounter, and their cures:

Acetification is one problem for which there really is no cure. Once the wine has begun to acetify, your best bet is to sit back and let it become wine vinegar which is not a bad thing to have, but five gallons of it could be difficult to use up. Give it as gifts to your friends and let them believe that it is what you intended all along. Note that once your wine reaches more than about 10% alcohol, the vinegar bacteria can no longer grow.[45] This means that a fermentation which gets off to a good, healthy start using sterile equipment, and continues at a good pace will rarely, if ever, have this problem.

Tourne disease, also known as bitter disease because of its effect on the taste of the wine, is also caused by a bacterial infection. This disease is characterized by the formation of a silky cloud which can be seen when holding the wine up to a light.[46] The cause of this is often excess sugar in a weaker wine. Dry wines and stronger wines will rarely have this problem. If it does occur, however, the use of sulfites (at 100 parts per million [ppm]) followed by stirring vigorously to break up the cloud and filtration to remove it, will generally solve the problem. Bottle in clean, sterile bottles after filtration.[47]

If your wine becomes thicker than it should be and starts to get slimy, this is another disease which is caused by a bacteria and can be cured in the same manner as described for Tourne disease. This is caused by formation of long chains of the bacteria, usually during storage of a young wine.[48] If the wine is properly treated to remove the bacteria it is not, itself, actually harmed in any way and can be drunk without harm.

A non-bacterial disease of wines is casse, or break as it is sometimes translated. This is characterized by a colored haziness and is caused by metallic ions in solution, causing a fine precipitate to form. The best cure here is the simple preventative of not using metal containers (stainless steel should be all right, but I prefer to stick to glass, just in case). If your wine does develop casse, the addition of citric acid will prevent further precipitation.[49] The precipitate which has already formed can be eliminated by aeration, followed by the addition of tannin (a tablespoon of strong tea per gallon of wine will do nicely). The wine should then be fined, allowed to settle, and racked off the resulting sediment.[50] Prevention is much easier than the cure.

If fresh fruit, or preserves are used to make the wine, pectin could be the culprit in the formation of another haze problem with your wine. This can be tested for by mixing 3 parts of methyl alcohol with one part of wine. If pectin is present, small jellied clots will appear.[51] Do not return this mixture to your wine! The solution to this is relatively simple. Pectic enzyme can be purchased at your wine supply shop. This enzyme will break down the pectin in the wine and remove the haze. This is a natural product which occurs in all fruits which contain pectin, but not always in enough quantity to prevent the haze from forming. The use of pectic enzyme prior to fermentation using fresh fruit should, in almost all cases, prevent this undesireable situation.

Another natural substance which can cause a haze to form is starch. The test for this is to add a drop of tincture of iodine to a spoonful of the wine. If the solution turns a dark blueish black then starch is present and must be removed.[52] This is done with another naturally occurring enzyme, amylase, which can also be found at your wine and beer supply shop. This particular problem is more often associated with beers, which are made from grain and therefore have significant starch which must be converted to sugar. Apples, however, can also cause a starch haze to

form when using apple juice. As with the test for pectin, above, do not return this tested solution to your wine.

If all else fails to remove a haze from your wine, fining the wine may be your only option. There are several methods available for this purpose. Bentonite is a natural clay that, when mixed in small quantities and then added to the wine, settles to the bottom and takes many impurities with it that would not settle out on their own. Isinglass is another substance which will work in much the same way. For either of the above remedies, follow the instructions on the package when you buy them. While the above methods are acceptable period practices dating back to the time of the Romans[53] if they do not appeal to you other methods, equally acceptable in period, are available. These include the use of stiff, beaten egg whites, or a gelatin solution.[54] In the case of egg whites, every person whom I have spoken to and every book which I have read has recommended different amounts, ranging from one egg white for every ten gallons, to ten egg whites per gallon. Obviously the amount required will vary, depending on the type of wine to be fined and the amount of cloudiness which needs to be removed. Experimentation will eventually lead to an understanding of the amounts needed in each particular instance. In any case, the egg whites should be beaten until stiff and then folded into a small quantity of the wine. Slowly add this to the bulk of the wine, mixing it in with a clean, non-metallic spoon and allow it to settle out, taking the impurities with it. If gelatine is being used it is best to use a product specifically made for the fining of wines and in such a case the instructions for use will be on the packet. But wait, there's more -- another method, and the one which I prefer, is simply the addition of time. Allow your wine to sit, undisturbed for several months and then rack the cleared wine off the sediment. This procedure may be repeated several times if the wine has not become as clear as you would like it. This will do the trick in all but the most stubborn cases. I have once used bentonite and I have used egg whites on two occasions, but in every other case I have found that simple patience will do the trick without having to resort to the addition of anything else. The one advantage that I find to this, in addition to not requiring any additives, is that by the time my wine is clear, it has also aged sufficiently to be drunk. I usually put aside several gallons, however, for further ageing even if some will be consumed over the succeeding few months.

A must which contains too much acid must have these levels lowered. This can be done by the addition of calcium carbonate (chalk) which will react with the acid and then precipitate out. The results of this method, however, are unpredictable and difficult to control. A better method is to blend the must with another which is acid deficient. This blending can also be done with another wine after fermentation has been completed.

A must which does not contain enough sugar also presents a problem, although one easy to correct. Low sugar will result in a wine of low alcoholic content and thus is susceptible to vinegar bacteria as well as simple degeneration and spoilage. An alcoholic concentration of over 10% is necessary for a wine to be stable. A wine of lower alcoholic content will not age well and should be consumed within the first year. To avoid this problem, check the sugar content and the alcoholic potential by using a hydrometer. If the reading from the hydrometer is too low, additional sugar may be added to the must prior to the beginning of fermentation. This is called chaptalization. Another method of chaptalization which was used by the Greeks and Romans is to boil a portion of the must, thereby removing much of the water and leaving behind a concentrated solution of sugar and flavorings.[55] This can then be added to the bulk of the must thereby increasing the sugar content and alcoholic potential. Be careful, however, in boiling the must that the solution is not burned, as this will impart a carmelized taste to the finished product.

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