David L. Thurmond

From Vines to Wines in Classical Rome

A Handbook of Viticulture and Oenology in Rome and the Roman West

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CHAPTER 1

Prehistory and Protohistory

Biology

Wine in its strictest sense is the product of the alcoholic fermentation of grape sugars to produce, in a reasonably anaerobic environment, a biologically stable liquid that is extremely high in carbohydrates and is thus a rich source of the calories so essential in a pre-industrial diet. Grapes readily ferment because wild yeasts present on the 'bloom', the grayish, powdery film on the waxy surface of the berry, as well as in the air of the vineyard and the winery, are ready and waiting to start this metabolic process as soon as they have access to the sugars. Grapes are one of the few fruits that store carbohydrates primarily as soluble sugars and simultaneously contain significant levels of acids, especially in the form of tartaric acid, which are bacteriostatic and also improve the taste of wine by making it more balanced. It is easy for a modern Westerner to underestimate the value of wine as food in the ancient world, and many of the ancient geoponics are equally myopic. Thus the classical Roman agronomists Cato, Varro, Pliny the Elder, and most notably Columella, speak in some detail about the profitability of wine as a cash crop on the prototype Roman agribusiness, the villa farm, but say essentially nothing about wine as food, perhaps, in their defence, because the fact was so self-evident. They are followed by such modern students of the ancient economy as Duncan-Jones and Carandini who are also silent about this fundamental role of wine. And the modern scholar who has done more, arguably, to advance our knowledge of the prehistory and protohistory of wine, Patrick E. McGovern, can ask, "Why Alcohol and Why Wine?"[1] and then proceed to adduce the role of wine as drug, both therapeutic and psychotropic, as a water purifier, and as a medium for other drugs, but say nothing of wine as a stable source of carbohydrates.

Not to say that these peripheral advantages of wine were and are insignificant. The ancients were well aware of the connection between contaminated water and disease. The fourth-century CE military writer Vegetius, for example, warns soldiers against drinking "bad or marshy water" which he compares to poison, and also cautions that when an army is encamped in one location for too long the water becomes corrupt (*De Re Mil.* 3.2). It has now been

1 Patrick E. McGovern, *Ancient Wine: The Search for the Origins of Viniculture* (Princeton, NJ, 2003): 305-07.

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experimentally demonstrated that wine mixed with contaminated water quickly destroys typhoid, paratyphoid and other typically waterborne pathogens.[2] Water mixed with wine in the proportions typical for Romans (1:1 to 2:1) will have been far safer to drink.

About the medicinal value of wine we are still grossly ignorant, though there is mounting evidence and certainly a great deal of interest. The ancients knew about wine's antibiotic powers as a topical agent and used it habitually for wound-dressing, by itself or as a medium for other bactericides such as enhemes (metal salts), though they were of course ignorant of the operant mechanisms. Otherwise they knew of wine as part of a healthy regimen and as a powerful adjunct in processing other foods.[3] We now know that heavy drinking of wine is implicated in a number of diseases including cardiomyopathy, hypertension, cardiac arrhythmia, cerebrovascular disease, and hemorrhagic stroke, but that light to moderate drinking, especially of red wine, is associated with lower incidence of ischemic stroke, myocardial infarction, coronary heart disease (CHD), and peripheral vascular disease.[4] Wine's role in reduced risk of CHD seems to be linked to the role of flavanoids and other polyphenols as antioxidants in reducing oxidation of low-density lipoproteins (LDLs) to form atherosclerotic lesions. One polyphenol in particular, resveratrol, has generated a great deal of excitement in this regard, and resveratrol is a compound almost unique to the skins of red grapes and the wines they produce.

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2 Vernon R. Singleton, "An Enologist's Commentary on Ancient Wines," in Patrick E. McGovern, Stuart Fleming, and Solomon H. Katz, edd., *The Origins and Ancient History of Wine* (Amsterdam, 1996): 75.

3 Luigi Crispino [*Alimentzione mediterranea e stile di vita* (Acciaroli, SA, 2008): 228], for the role of wine in the now-vindicated Mediteranean diet. Martin E. Weisse and Renée S. Moore ["Antimicrobial Effects of Wine," in Merton Sandler and Roger Pinder, edd., *Wine: A Scientific Exploration* (New York, 2003): 299-313] review the scientific evidence and possible operant compounds in treatment of enteric bacteria, especially Salmonella species, of *Staphylococcus aureus* in wound infection, of cholera and *Helocobacter pylori.* Active agents include ethanol, low pH, sulphites, polyphenols and flavanoids. Cf. Luigi Crispino *Virtu terapeutiche del vino* (Acciaroli, 1997); Catherine Cheze, Joseph Vercauteren, and Robert Verpoote, edd., *Polypheols, Wine and Health* (Dordrecht, The Netherlands, 2001 [= *Proceedings of the Phytochemical Society of Europe vol. 48*]; Harry W. Paul, *Bacchic Medicine: Wine and Alcohol Therapies from Napoleon to the French Pardox* (Amsterdam, 2001). The therapeutic use of wine in ancient medicine was pervasive and has generated a vast amount of scholarship. A good introduction is found at Jacques Jouanna and Laurence Villard, edd., *Vin et Santé en Grèce ancienne. Actes du colloque organisé à l'Université de Rouen et à Paris (Université de Paris IV Sorbonne et ENS) 28-30 Septembre 1998* (Paris, 2002).

4 Arthur L. Klatsky, Gary D. Friedman, Mary Anne Armstrong, and Harald Kipp, "Wine, Liquor, Beer, and Mortality," *American Journal of Epidemiology* 158 (6) (2003): 585-95.

Unfortunately, the dramatic *in vitro* effects of the compound have not yet been replicated *in vivo*, apparently because the human gut is so inhospitable to the survival of the compound, and so the jury is still out on this one. But in general the antioxidant role of wine polyphenols, flavanoids, phenolics, flavanols, coumarins, and phytoalexins in reducing the risks of CHD and macular degeneration are now well attested.[5]

All strictly academic, of course, since the ancients scarcely knew of such diseases, much less their etiologies and treatments. And though we are beginning to discover that atherosclerosis may have been more common in antiquity than previously thought,[6] in an age when, we suspect, the average life expectancy was something less than thirty years, it is questionable how serious an issue CHD and macular degeneration will have been in any case for the majority of Romans, since these diseases are so closely associated with aging. But to reiterate: the role of wine as *food* in the preindustrial Mediterranean can hardly be overestimated. The single most critical element of the preindustrial diet is caloric intake, and wine provides calories in spades. But how much per person? The typical Roman subsistence farm, we are told, was two *iugera* (.52 ha = 1.3 acres), and such a farm, even granted the polyculture practiced by Roman farmers, could have easily produced some 2,650 liters (700 gallons) of wine per year. Given the average caloric potential of wine of 875 calories per liter, this amount would provide some 6,350 calories per day, or enough to provide ten people some 635 calories per day. Thus, regardless of how profitable a small vineyard may have been in antiquity, assuming a crop could be made with family labor and perhaps a few slaves, the wine produced would have been a vital subsistence food crop.

In the city of Rome, the food role of wine was, if anything, even more critical. The leading modern authority on the economics of Roman viticulture, André Tchernia, has estimated the average consumption of wine in Rome at some .8 liters (27 oz.) per adult per day, an estimate based on conservative premises about production and importation and perfectly consonant, Tchernia

5 David M. Goldberg, Joseph Yan and George J. Soleas, "Absorption of Three Wine-Related Polyphenols in Threee Different Matrices by Health Subjects," *Clinical Biochemistry* 36(1) (2003): 79-87; J. E. Kinsella, E. Frankel, J. B. German and J. Kanner, "Possible Mechanisms for the Protective Role of Antioxidants in Wine and Plant Foods," *Food Technology* 47 (1993): 85-9; Martin Bobak and Michael Marmot, "Wine and Heart Disease: A Statistical Approach," in Sandler and Pinder (2003): 108-39; Michael Aviram and Bianca Fuhrman, "Wine Flavanoids, LDL Cholesterol, Oxidation and Atherosclerosis," op. cit. (2003): 140-59; Thomas O. Obisesan, "Wine: Protective in Macular Degeneration," op. cit. (2003): 285-98.

6 Adel H. Allam et al., "Atherosclerosis in Ancient and Modern Egyptians," *Global Heart* 9.2 (June, 2012): 197-202.

demonstrates, with comparative evidence from Medieval Europe. Such an amount will have provided some 600 calories per adult per day, roughly one-third the minimum caloric requirement for a typical adult. Whatever else it was in Rome (and it was many other things, as we will see), wine was food.[7]

The success of the European grapevine as a food crop is tied to its physiology and evolution. For one thing, the vine is incredibly productive. Though the European wine grape, *Vitis vinifera vinifera*, takes several years to bear even a passable crop and several more to reach full productivity, thereafter it is remarkably hardy and productive for many years and, ironically, will have been even more so in antiquity, before the ravages of the phylloxera root louse, an accidental exotic from the New World, necessitated the grafting of *Vitis vinifera* scions to American rootstocks which were resistant to these pests. Grafted vines are intrinsically weaker than ungrafted vines. We moderns may suspect an ancient author like Pliny of carelessness or exaggeration when he classifies vines as trees (*NH* 14.9) and illustrates with some examples of prodigious vines. In Sicilian Panormus (Palermo), for example, was an archaic statue of Jupiter made from the wood of a single vine trunk; the Temple of Juno at Metapontum (Metaponto) was supported by columns of vine wood, and the Temple of Diana at Ephesus, we are told, had a staircase made from a single vine trunk. And in Rome itself a single vine shaded one portico of the Porticus of Livia and produced 12 amphorae (314 l. = 83 gal.) of grape must per year. There is no exaggeration here; these were ungrafted vines, obviously of great age. For comparison, Winkler[8] in his seminal work on viticulture has a dramatic picture of the so-called Carpenteria vine, an ungrafted vine planted in 1842 in California, which bore eight tons (7.28 metric tons) of fruit at fifty-one years of age and had at that time a trunk 2.8 m (9′) in circumference. Likewise, an ungrafted vine in Santa Barbara County, California, covered 1115 m² (12,000 sq. ft) and bore a crop of 4.5 metric tons (5 tons) at age 65. The Great Vine at Hampton Court Palace, London, was planted in 1769. The vine is some 1.2 m (4′) in diameter at its base and average yield after more than 240 years is some 270 kg (600 lbs) or grapes per year.[9] Vines on their own rootstocks may live to be 150 years or more and still bear fruit. Furthermore, the vine is hardy in most temperate regions of the northern and southern hemispheres, even in areas where arable

7 André Tchernia, *Le vin de l'Italie romaine. Essai d'histoire économique d'après les amphores* (Rome, 1986): 41-56.

8 A. J. Winkler, James A. Cook, W. M. Kliewer and Lloyd A. Lider, *General Viticulture* (Berkeley, 1974): Fig. 1.

9 Ian Hornsey, *The Chemistry and Biology of Winemaking* (Cambridge, UK, 2007): 73.