WINE-MAKING.

The history of wines is both curious and amusing ; and their topography is not less so, if we may apply this term to the several kinds, to their enumeration, and to that of the countries where they grow, and to the variations fol­lowed in their manufacture. This is a subject which would occupy a volume ; and we must therefore pass it over, that we may dwell on what is of more moment, the general mode of making this important article, and the several chemical circumstances connected with it. France is the only nation which has bestowed much attention on the philosophy of wine-making, as it is that which excels all others in the variety and the goodness of its produce.

Vinous liquors, resembling wine, may be made from every fruit, as well as from every vegetable which contains acids united to its extractive matter. The term wine is thus applied to the produce of currants, gooseberries, and many others ; while that of cider is especially reserved for the liquor to be obtained from apples. That term would be a fitter one for many of the vinous liquors in question, and we shall here restrict the term *wine* ito the produce of the vine.

All fruits consist of the following principles: water, sugar, a peculiar combination of sugar and extract, called the sweet principle by the French, supertartrite of potash, malat of potash, and malic acid, superoxalate of potash, ex­tractive matter analogous to mucilage, and vegetable gelatin, tannin, a principle of flavour, and a colouring principle. These however are not all found in any one fruit, and they also vary in their proportion in different fruits. The essential ones to the making of wine are the tartarous acid, sugar or the sweet principle, extract, and water ; and those which are useful, without being indispensable, are flavour, tannin or astringency, and colour. And it is by possess­ing these in right proportions that the grape excels all other fruits for the purpose of making wine.

Tartarous acid, or its combinations, are especially indis­pensable : and hence it is that the grape, which contains it in large quantity, produces wine ; while the apple, and other fruits which contain the malic acid, produce cider. It is essential to the fermentation, as well as to the quality of the produce ; and it is decomposed in the process so as to increase the quantity of alcohol, which the sugar would otherwise yield. Where malic acid is also present, the quality of the wine is bad. Sugar must be considered the fundamental element, and as that from which the alcohol is chiefly derived. Thus the most saccharine grapes pro­duce the strongest wine. But it seldom exists in a pure state in the grape, or in any other vegetable. It appears to be most pure in the sugar-cane ; hut even there it is combined with the extractive matter, and also with some acid, forming the sweet principle of the French. Pure sugar does not ferment in water, it crystallizes ; and whenever fermentation occurs, some other vegetable matter is pre­sent. When sugar, again, has crystallized from a solution of the sweet principle, what remains runs still more readily into fermentation. In the produce of the cane, this is molasses. It is very important to keep this distinction in view, because the fabrication of sweet wines depends ma­terially upon it. It explains many circumstances in the process of fermentation, and some that are often overlooked. It explains, among other things, why wine ferments in a cask when it will not ferment in bottles ; because the sugar derives the necessary extractive matter from the wood. The chemical nature of the extractive matter is not known, but it is supposed to contain azote, as this is the produce of fermentation. Yeast, or leaven, contains the extractive principle in great abundance, and hence its power in indu­cing fermentation in a solution of pure sugar. All vege­tables contain it ; and it is most abundant in those juices which gelatinate in boiling. It is found in the grape, and it is thus the natural leaven of wine, whether existing in a separate state, or united to sugar in the form of the sweet principle. Water is a much more essential ingredient than would at first be suspected. If over-abundant, it is diffi­cult to prevent the produce from running to the acetous stage. Hence weak wines become sour. If deficient, it is difficult to establish the fermentation ; and hence sweet wines. Thus also sweet wines are insured by drying the grapes, or evaporating their juice, both common practices in the wine countries. Colour must be looked on in the light of an ornament, and is found in the husk of the grape. So is the tannin principle, which occasions astringency in Port wine. Of the principle of flavour chemistry knows nothing; it seems often the produce of fermentation, as in Claret and Burgundy wines : in those of Frontignan and Muscat it is the natural flavour of the fruit.

When the process is complete, the wine is dry, or con­tains no sugar, so that sweet wines, which are compounds of wine and sugar, are the produce of an incomplete fermen­tation. When all the elements above described are in due proportion, the product is perfect, a dry wine ; and the elements that require particularly to be balanced for this result are the extract or leaven, and the sugar. If the former is in excess, the wine tends to vinegar, unless means are used to stop the fermentation by abstracting the leaven ; if in defect, the product is imperfect, a sweet wine. Hence the perfection and management of the leaven are among the most important circumstances in the manufacture. It is coagulable partially by heat ; and hence also it is, as well as by evaporating the water, that boiled *must* produces sweet wine. It is also abstracted by precipitation, and by the action of sulphurous acids; whence other processes in use in wine-making.

In fermentation, the superfluous extract or leaven is se­parated in two forms, that of yeast and lees; and these will excite that process in fresh solutions of sugar, or renew it, or continue it, in the mixture whence it was separated; whence racking and fining. There is however one impor­tant difference between the natural or original, and this artificial or secondary leaven. The latter is soluble in hot water, and not in cold ; and hence it is separated in fer­mentation. By restoring this separated matter to wine in the course of fabrication, the fermenting process is pro­longed, or the wine rendered drier ; by skimming, and fining, and racking, the process is checked ; and hence the application of these practices to sweet wines. The *rolling* of wine, or returning on its lees to *feed,* is hence understood ; and hence also the improvement which certain wines ex­perience in long voyages. But the same principle and process which improves Madeira destroys Burgundy, and the reason must now be obvious. The theory of racking, fining, and sulphuring, is hence also apparent; and, of the sulphurous acid, it is a property to combine with the leaven, and form an insoluble separable compound. It is thus that it checks fermentation. Hence also it is that sweet wines do not turn sour: their leaven has been expended. Thus also we may see that the process of fermentation is not an unmanageable and a precarious one ; but that the essential ingredients are in our power, and that we can modify them to the desired result. If it has been stopped prematurely, it may be renewed by fresh leaven ; if in ex­