

## NOTE ON THE DETECTION OF VARIOUS COLOURING MATTERS IN WINE.

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FROM time to time the public is alarmed by sensational statements about the extent to which the fraudulent colouration of wines is carried on, and the poisonous nature of the substances alleged to be employed for this purpose. I am strongly inclined to believe that all such statements are gross exaggerations, and shall be greatly obliged to any one who will send me a bottle of red wine, bought from an English wine merchant, which owes its colour to anything else than the colouring matter of the grape. I have not as yet met with a single sample of the kind. These statements, however, having been made, methods for the detection of foreign colouring matters in wine have to be devised, were it only to allay the fears of the public.

At the meeting of this Society in January last, I read a short communication on this subject. I then showed that, whereas the colouring matter of a pure wine is almost incapable of dialysis through parchment paper, several of the colouring matters, said to be employed for the fraudulent colouration of wine, dialyse readily. When carefully conducted the process yields reliable results, but in practice it is open to these objections. It is not possible always to secure parchment paper of the same substance, and the rate at which one and the same colouring matter dialyses through different papers varies accordingly; besides this, most sheets have spots in which the paper is very much thinner than it is over the sheet generally, and if such spots are overlooked they may seriously interfere with the success of the experiment; lastly, it requires great care to avoid the intermingling of the liquids, in and outside the dialyser, by capillary action. To obviate these difficulties I now adopt the following plan. Instead of putting the wine into a dialyser, I put into the wine a small cube of jelly about  $\frac{3}{4}$  in. square. (These cubes are made by dissolving 5 grms. gelatine in 100 c.c. of warm water, and pouring the solution into a square flat mould made of paper, of such a size as to yield a plate of jelly about  $\frac{3}{4}$  in. thick. From this plate the cubes are cut with a sharp wet knife). After the lapse of from 24 to 48 hours the cube is taken out and washed slightly, and a slice is cut out through the centre of the cube and in a direction parallel with one of its sides. I prefer to cut the slice parallel with the side on which the cube has rested. This slice is now examined either by being placed on a glass slide which is then held up towards the light, or by placing it upon a sheet of white paper. If the wine was pure the colour will be confined almost entirely to the edges of the slice, or will not have penetrated more than from  $\frac{1}{16}$  in. to  $\frac{1}{8}$  in. into the jelly. The case is widely different if any one of the colouring matters given below, under group *b*, was present. It will then be found that the colour has penetrated more or less deeply into the jelly, frequently to the very centre, and may, in many cases, be recognized by its characteristic colour, which is more distinct in the jelly than it was in the wine. Thus rosaniline imparts to the jelly a beautiful red colour, a somewhat similar colour is imparted by the red colouring matter extracted from beet-root and red cabbage. Logwood colours the jelly yellowish brown, indigo blue, &c., &c.

In many cases the nature of the foreign colouring matter present may thus be detected by the colour of the jelly. In some cases the slice may be examined spectroscopically with good effect, in the cases of rosaniline, red cabbage, and beet root, for example. In others again the action of dilute ammonia on the coloured slice will yield

characteristic results, such as decolourising the rosaniline slice, turning the red cabbage slice beautifully dark green, the logwood slice dark brown, &c. In the case of logwood and cochineal the ammonia dissolves much colour from the slice, in the case of rosaniline, red cabbage, and beet root, the ammonia remains almost, if not quite, colourless. Similar tests will readily suggest themselves to every chemist. In some cases it might, for example, be found advantageous to add some chemical, such as alum or borax, to the jelly, and to observe the effect which these have on the colouration of the jelly.

Group *a* Colouring matters that penetrate but slowly into the jelly.

Colouring matter of pure wine.

Colouring matter of Rhatany root.

Group *b* Colouring matters that penetrate rapidly into the jelly.

Rosaniline.                      Litmus.

Cochineal.                      Red cabbage.

Logwood.                      Beet root.

Brazilwood.                      Malva sylvestris.

Indigo.                      Althea officinalis.

An addition of 10 per cent. of any of the colouring matters of group *b*, to a claret of ordinary colour, is sufficient to yield very distinct results, in the case of logwood 5 per cent. is enough, while of rosaniline only 1 per cent. is required. By an addition of 10 per cent. of colouring matter, I understand that  $\frac{1}{10}$  of the intensity of colour in the mixture is due to the colouring matter added. I have not been able to procure any of the colouring matter, or of the flower, of the hollyhock (*althea rosea*), said to be largely used in France for the fraudulent colouration of wines. As I find, however, that the colouring matters from Malva sylvestris and Althea officinalis, the flowers of which I obtained through the kindness of Mr. Holmes, of the Pharmaceutical Society, readily penetrate the jelly, I expect that the colouring matter of hollyhock will do the same. I hope soon to be able to continue these experiments with other colouring matters, and should be greatly obliged to any one who would furnish me with any colouring matter, known, or suspected, to be used in the fraudulent colouration of wine.

In conclusion, I would express the hope that some of our members may be induced to take this subject up and give us their experience at some of our future meetings. Any such process can only be placed on a sufficiently wide and secure basis by being tried and tested by a number of workers.

After a short discussion, Dr. Duprè said, in the presence of wine the action of ammonia on various colouring matters is considerably altered, and by itself is an extremely unreliable test, although in conjunction with the spectroscope it sometimes yields good results. I have not as yet examined the colouring matters from elderberries, or cherries, but hope to do so soon. I am also, I am sorry to say, entirely ignorant of the nature of the wonderful test paper lately brought forward by a French chemist.