

the liquor to the boiling point prior to applying the lime, taking care to remove the scum as soon as it shows signs of breaking, and continuing the boiling until the scum thrown to the surface becomes inconsiderable, we shall find that the albumen and gluten, in coagulating and rising, have carried with them the small particles of woody fibre, the wax, and a large proportion of the colouring matter, and that the lime will now throw down the starch, and any other little impurities remaining in suspension in the liquor, leaving it perfectly clear and bright. Tempering is an exceedingly delicate *chemical* operation, and we have no hesitation in saying that *on its proper performance depends the quality of the produce*; whether, as it is now generally performed, it is chemical or mechanical, we will leave our planting friends to determine. The following simple experiments, however, which they all have it in their power to try, will, if they give themselves the trouble, fully satisfy them of two important points—the *superiority of the hot over the cold mode, and the necessity for great attention to the operation of tempering*; let them take a tumbler of cane-juice and a bottle containing lime-water, add the latter to the former by drops, pausing and stirring between each, and they will find that, after the addition of a certain quantity, the opaque gummy appearance of the liquor undergoes a change, and the impurities contained in it separate into flakes, which increase in size with each drop of lime added, until they become distinct, and the supernatant liquor perfectly transparent; this is the precise point at which the liquor is tempered, and each drop of lime added after this, causes the flakes to diminish rapidly in size, at last entirely to disappear (being re-dissolved) and the liquor to resume its former gummy appearance; it is, therefore, evident that there should be no such expressions as tempering high or low.

The reason why some liquor is so difficult to clean is, that it is either tempered high or low; if it be exactly tempered, the impurities contained in it being entirely separated and thrown out of solution, rise to the surface immediately on the application of heat, and are easily removed; but if there be too little lime, a great portion remains in solution, and if too much, a proportional quantity is re-dissolved; and in either case cannot be removed by any mechanical means. It is, therefore, necessary to have *some precise test* for the application of lime; and we have no hesitation in saying, that *such a desirable test is now in our possession*, and that we can, by its assistance, walk into any boiling-house and temper the liquor, without asking either the quantity it usually takes, or the soil from which it is produced.

As regards the superiority of the hot over the cold tempering, let any one take, in separate vessels, two gallons of cane-juice, and temper one, adding the lime in small quantities—say, of three grains at a time—and keeping an account of the quantity used; he will find that the first portions produce no effect whatever, and that it is only after the addition of a considerable quantity that the desired precipitation of the impurities manifests itself. Why is this? Because albumen, gluten, resin, and chlorophyle, *being soluble in lime*, lime is equally so in them, and they must first be saturated before it will produce any other effect; let the