NOTE ON THE THEORY AND PRACTICE OF THE REICHERT PROCESS.

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In a recent number of the *Chemical News* (October 21st), Mr. J. A. Wilson calls into question the accuracy of the Reichert process; in the former paper (*Journ. Soc. Chem. Ind.*, ix., No. 1), he had shown that the rate of distillation of acetic acid was influenced by the salts in the solution distilled, both the nature and the quantity of the salt tending to vary the result; and he argues from the analogy between acetic acid and the acids of butter that the same holds good.

As the Reichert process is now one of our standard methods, it is very important to show that however scientifically correct Mr. Wilson's view may be, in practice the error is quite negligible.

In the *Stazioni Sperimentali Agrarie Italiani*, xxiii., No. 1, I have shown that butyric acid distils according to a parabolic formula; I have pointed out that the distillation is influenced by the amount of acid in solution and by the condensation of the vapour; the rate of distillation is a direct function of the strength of the solution, and the condensation is a direct function of the rate of distillation, or to put it more exactly, of the amount of acid vapour in the total vapour. Were Duclaux's logarithmic formula correct, the condensation would be an inverse function of the amount of acid in the vapour, which is absurd. I have calculated the formula $y = 2{\cdot}22\,x - 0{\cdot}0151\,x^2 + 0{\cdot}000031x^2$ (x = quantity distilled from 100 c.c., y = per cent. of butyric acid in the distillate) for the distillation of butyric acid in the Wollny apparatus. No logarithmic formula can be found to express the results with any degree of accuracy.

From this formula I calculate that when 110 c.c. are distilled from 140 c.c., that 96·3 per cent. of the total acid should pass into the distillate; and that when 50 c.c. are distilled from 75 c.c., that 89·1 per cent. should be found in the distillate.

I find, when these proportions are distilled with the addition of the quantities of alkali and acid used in the Reichert-Wollny or the Reichert processes, that I get 93·9 or 89·6 per cent. (uncorrected for impurities in the alkali and acid); and further when 4·4 or 2·2 grams. of well-washed fatty acids are added, that the figures are 97·2 and 89·7 per cent. respectively.

These figures show that for butyric acid the amount of salts in solution in the Reichert process have no practical influence on the results. My results also seemingly controvert Wollny's statement that the fatty acids hold back the volatile acids; they do not really do so. As Wollny's statement is loosely worded, he actually only shows that

the fatty acids, when not completely decomposed (so-called "melted") or when solid, hold back the fatty acids.

As the higher fatty acids distil even more readily than butyric acid, the conclusions drawn from the latter apply with more force to them.

I have experimented with Leffmann and Beam's modification in which glycerine is used, and thereby the boiling point is raised; the excess obtained (for 2·5 grams. 0·07 c.c.) by this modification is much less than the experimental error.

Mansfeld (*Milch-Zeitung.*, 1888, xv., 281), shows that by the use of potash instead of soda no difference in the results is obtained, and this has been confirmed by many other observers.

Mr. Wilson's objections are from a practical point of view groundless, and are based on the assumption that the volatile fatty acids of butter, distilled in a particular way, are influenced by certain external influences to the same degree as acetic acid is when distilled in another way. A study of the laws of the distillation of these acids will show that scientifically he is correct when he alleges errors, but that these errors are so small as to be negligable.