their other points should be expected. Their use of a straight line over the range 63–70% seems poorly justified, since there were no experimental points in this range. In the range 70–75% the straight line they used is supported by a number of points. The stock acid used in this work was in this range of concentration. It should be noted that while the difference in density figures at 65% is rather large, it corresponds to a difference in acid concentration of about 0.027%.

DEPARTMENT OF CHEMICAL ENGINEERING
UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON RECEIVED DECEMBER 10, 1940

A Note on the Phase Rule Diagram for a Mixture of Sodium Palmitate and Sodium Laurate with Water

BY J. W. MCBAIN AND S. A. JOHNSTON

The temperatures above which mixtures of soap and water in various proportions form isotropic solutions, T_i, and the temperatures below which they contain soap curd, T_c, have been determined for most of the single pure soaps. It is therefore of interest to see how these are affected when two such soaps are mixed. For this purpose a constant mixture of equal weights of sodium palmitate and sodium laurate has been examined with different percentages of water, using the materials and technique of previous communications.[1]

Briefly, this consisted in preparing sealed Pyrex tubes containing the mixture with varying amounts of water. The contents of the tubes were homogenized by heating to a high temperature, around 300° in this case. If the tube was then cooled slowly a temperature was reached at which another phase separated. This phase is frequently anisotropic and may be recognized even in minute quantities by observing the solution through crossed Polaroids. These points form the T_i curve. The tubes were then cooled to room temperature and heated slowly. The temperature at which the white curdiness disappeared was noted and these temperatures form what is usually called the T_c curve.

The results are given in Fig. 1 for the mixture where also the positions of middle soap, neat soap and curd are indicated. Figure 1 also compares

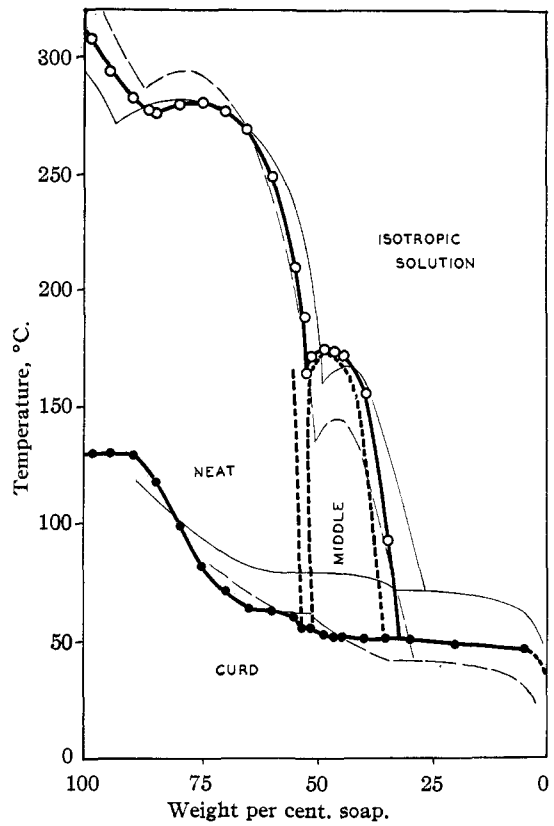

Fig. 1.—○, T_i curve; ●, T_c curve; ———, NaP; – – –, NaL.

these results with those of the separate single soaps, represented by faint lines. A comparison of the curves shows that the mixture tends to follow a behavior which would be an average of the individual curves. Probably the outstanding difference is that the peak for middle soap is higher than either of the individual peaks and if anything is nearer the peak for sodium palmitate. The T_c curve, on the other hand, adheres more closely to the curve for sodium laurate, as might be expected from previous experience.[1a,1c] Mixed micelles of smaller size, less orientation and greater solubility, must be produced by the occurrence of the shorter laurate molecules amongst the longer homologs, an example of mutual solubilization.

STANFORD UNIVERSITY
STANFORD UNIVERSITY, CALIFORNIA RECEIVED NOVEMBER 12, 1940

The Effect of Potassium Oleate upon the Solubility of Hydrocarbon Vapors in Water

BY J. W. MCBAIN AND J. J. O'CONNOR

Solubilization by colloidal electrolytes and other detergents is best studied in systems where there

(1) (a) McBain, Lazarus and Pitter, *Z. physik. Chem.*, **A147**, 87, 116 (1930); (b) McBain, Brock, Vold and Vold, THIS JOURNAL, **60**, 1870 (1938); (c) McBain, Vold and Jameson, *ibid.*, **61**, 30 (1939); (d) Vold, *J. Phys. Chem.*, **43**, 1213 (1939).