Calculation of Trimethylene Glycol:

Total acetylated material calculated as % glycerol=

$$\frac{(B-S)\times N\times 3.070}{W}=T.$$

B=ml. alcoholic potassium hydroxide.
S=ml. alcoholic potassium hydroxide to titrate sample.
N=normality of alcoholic potassium hydroxide.
W=weight of sample.
Trimethylene glycol, %=[(T−G)×1.239]−P.
T=total acetylatable calculated as % glycerol.

Note

1. The determinations of trimethylene glycol is limited to solutions containing less than 20% water. The acetylation procedure is not quantitative when the water is in excess of this amount.

Summary:

Procedures have been presented for the determination of glycerol, propylene glycol, and trimethylene glycol in the solutions containing all three and for analysis of sweet water concentrates. The methods are not limited to the products studied, but may be applied to mixtures of other hydroxy compounds which possess similar properties.

Acknowledgment

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Graphical Solution of Andre-Cook Relation for Computing Acetyl Values

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THE commonly used Andre-Cook (1) method for determining the acetyl value of a substance requires the use of a somewhat complex equation in its determination. However, this relation, given below, readily lends itself to a simple graphical solution.

$$A=\frac{S'-S}{1-.00075S}$$

Three nomograms (2, 3) are submitted which afford a straight-forward graphical solution to this relation. Figure 1 covers an extensive range of values from 0 to 500. This nomogram is useful for graphically visualizing the change produced in one variable by changes occurring in one or both of the other two variables; for roughly estimating values; and for spot-checking values numerically calculated. Due to its wide coverage of values, the accuracy with which the scales can be read is necessarily limited.

However, any portion of this "over-all" nomogram can be expanded to give any required degree of precision. Thus, Figure 2 is an expanded section of Figure 1 and covers a limited range of values applicable for the accurate calculation of the acetyl value of castor oil. Figure 3 is another expanded section and covers a range of values applicable for the accurate calculation of the acetyl values of such common fats as tallow, lard, cottonseed, soybean, and peanut oil.

Examples have been worked out on the three nomograms illustrating their use. Given saponification values of 180.0 and 308.0 before and after acetylation, the corresponding acetyl value works out to be 148.0 as indicated by the value at the intersection of the line connecting the two saponification values with the acetyl value scale (see Figures 1 and 2). Given saponification values of 200 and 217 before and after acetylation, the corresponding acetyl value works out to be 20 as indicated in Figure 3.

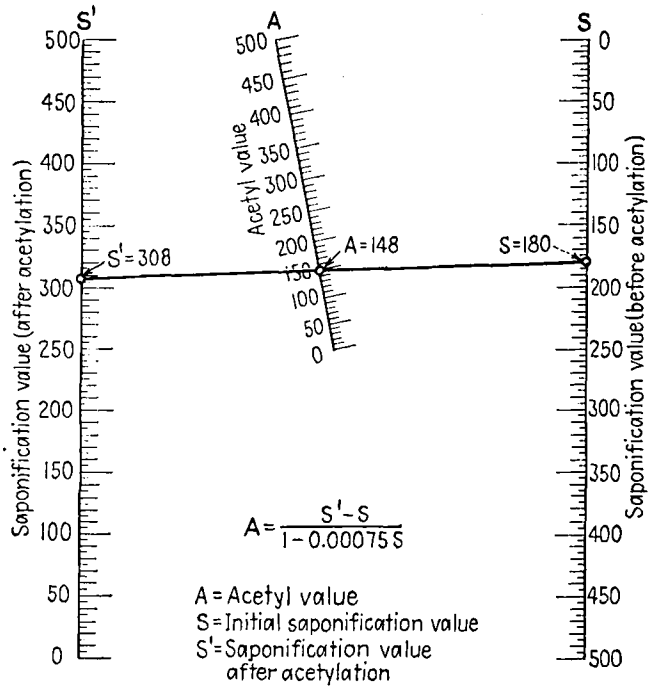

FIG. 1.

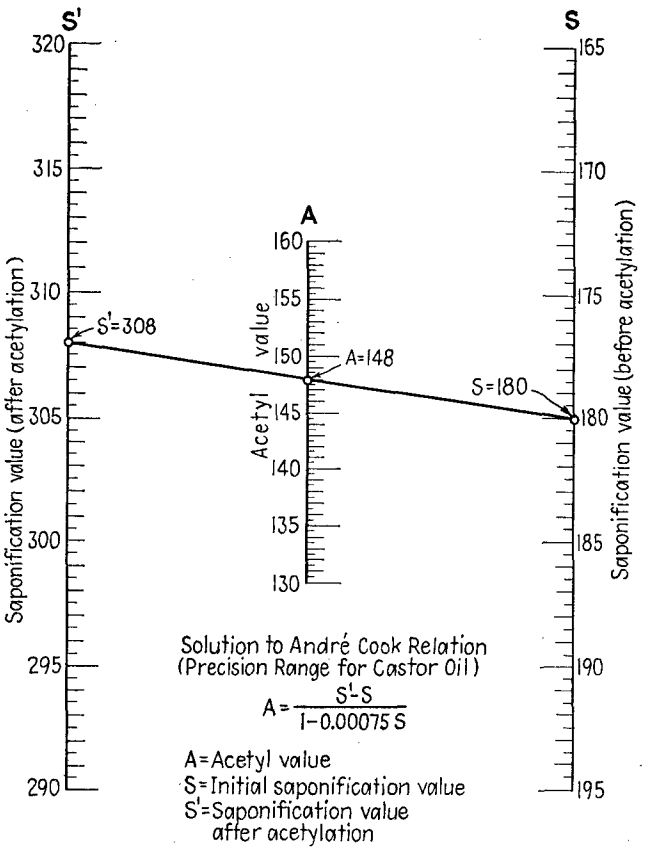

FIG. 2.

For the benefit of those who may desire to expand other portions of this nomogram for routine calculation purposes there is noted below the constructional determinant on which these two nomograms have been constructed.

o	mS'	1
k	−mS	1
$\frac{k(1-.00075A)}{2-.00075A}$	$\frac{mA}{2-.00075A}$	1

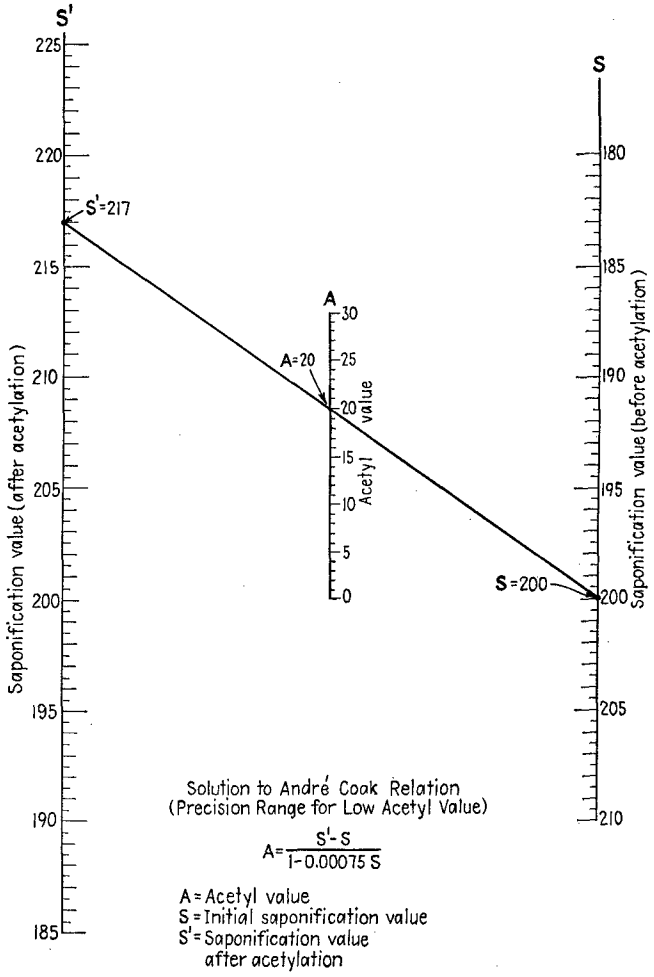

FIG. 3.

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