



Figure 4. Viscosities of water-methanol mixtures,  $\eta$ , vs. mole per cent methanol

$$\eta \text{ (Millipoise)} = \sum_{i=0}^4 a_i t^i \quad (10)$$

This empirical representation by a power series is more precise, within this range of temperature, than that predicted by the theoretically based equations suggested by Gutmann and Simmons (5) for viscosity of liquids in general or by Kampmeyer (10) and by Innes (7) for water and mercury. It is also more precise than that predicted by the equation:

$$\eta = a/(b + t)^n \quad (11)$$

used in the International Critical Tables (9) for methanol. A simple theoretical temperature dependence equation for viscosity of mixtures of liquids has not yet been derived.

#### LITERATURE CITED

- (1) Bates, H.H., Mullaly, J.M., Hartley, H., *J. Chem. Soc.* **123**, 401 (1923).
- (2) Cannon, M.R., Fenske, M.R., *Ind. Eng. Chem., Anal. Ed.* **10**, 297 (1938).
- (3) Clifford, G., Campell, J.A., *J. Am. Chem. Soc.* **73**, 5449 (1951).
- (4) Dorsey, E.N., "Properties of Ordinary Water Substances," pp. 183-5, Reinhold, New York, 1940.
- (5) Gutmann, R., Simmons, L.M., *J. Appl. Phys.* **23**, 977 (1952).
- (6) Hartley, H., Raikes, H.R., *J. Chem. Soc.* **127**, 525 (1925).
- (7) Innes, K.K., *J. Phys. Chem.* **60**, 817 (1956).
- (8) International Critical Tables, vol. **III**, p. 25, McGraw-Hill, New York, 1928.
- (9) *Ibid.*, vol. **V**, p. 11, 1929.
- (10) Kampmeyer, P.M., *J. Appl. Phys.* **23**, 99 (1952).
- (11) Lewis, G.N., Randall, M., "Thermodynamics and the Free Energy of Chemical Substances," p. 33, McGraw-Hill, New York, 1923.
- (12) McKelvey, E.C., *Natl. Bur. Standards, Bull.* **9**, 364 (1913).
- (13) Manufacturing Chemists Association. Selected Values of Properties of Chemical Compounds, MCA Research Project. Washington, D. C., 1960.
- (14) Subnis, S.W., Bhagwat, W.V., Kanugo, R.B., *J. Indian Chem. Soc.* **25**, 575 (1948).
- (15) Swindells, J.F., Coe, J.R., Jr., Godfrey, T.B., *J. Research Natl. Bur. Standards* **48**, 1 (1952).

RECEIVED for review November 10, 1960. Accepted June 13, 1961.

#### CORRECTION

In "Critical Properties of Mixtures of Normal Paraffin Hydrocarbons" [Doyle O. Etter and W.B. Kay, *J. CHEM. ENG. DATA* **6**, 409 (1961)], the legends for Figures 2 and 3 should be reversed.

Equation 5 should read:

$$P_c = P_{cL} + \left[ 9400M_L^{-1.71}x_L^{2.06}M_L^{-0.115} - 557M_L^{-1.265} \right] (M_{av} - M_L)$$

Equation 31 should read:

$$\phi_4(P_{c4}, x_4) = a_4 \left( \frac{x_4}{1 - x_1 - x_2 - x_3} \right)^{b_4} \left[ \frac{M_{av} - M_1W_1 - M_2W_2 - M_3W_3}{1 - W_1 - W_2 - W_3} - M_4 \right] (1 - x_1 - x_2 - x_3)$$