wetting and nonwetting, single- and two-component, two-phase fluids.

My comments are not intended to diminish the authors' accomplishments and contributions in this important, complex, and difficult field of experimentation. Rather, they are to show that if we accept the premise that liquid fraction data for all fluids should fit into an orderly scheme, then the enigma posed by single-component liquid metal data challenges us to examine further both the methods of prediction and the experimental data.

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Effect of Surface Alignment on Hydrodynamic Stability in Falling Liquid Films

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Recent communications (*1* to *3*) concerning the properties of falling liquid films, with particular reference to velocity profiles and nature of surface waves, have provided theoretical equations to represent these phenomena. Experimental verification of the theories has not however been conclusive. In studies of liquid film flow over vertical surfaces little reference has been made to the importance of surface alignment.

Friedman and Miller (*4*) have shown that for vertical laminar films flowing over the outside surface of a tube ($N_{Re} < 300$) the surface velocities agreed well with the value predicted by the Navier-Stokes equation. However, when the tube was inclined at an angle of 6 min. from the vertical, the surface velocities measured increased by between 100 to 200%.

We have observed a similar phenomenon when investigating mass transfer of ethanol vapor into vertical laminar water films, which resulted in film rupture due to surface tension differences induced.

Results are presented in Figure 1 that illustrate that deviations from the vertical of more than 8 min. produce large hydrodynamic changes in the system. This underlines the importance of specifying accurately surface alignment in any experimental study and may account for discrepancies in some reported values.

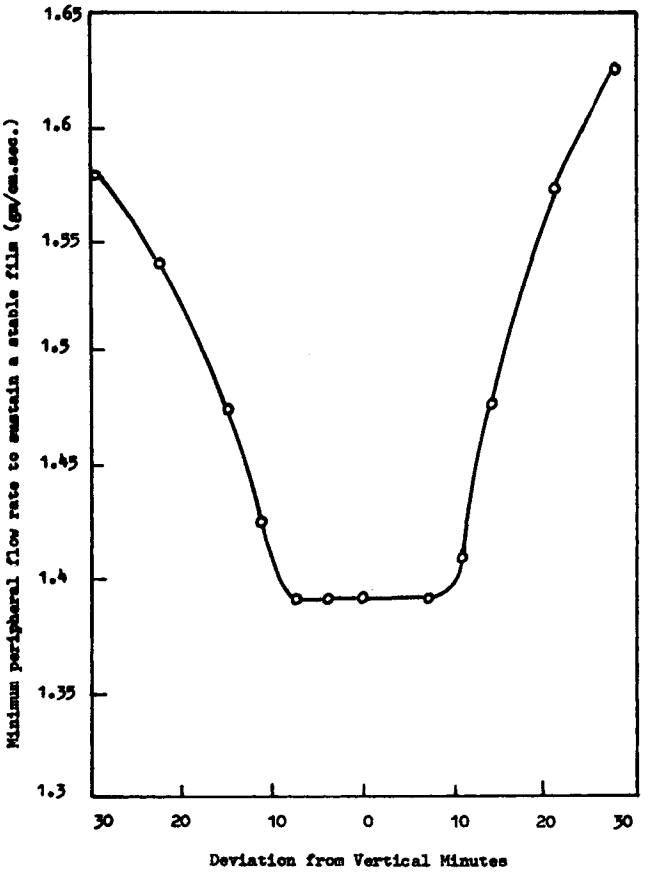

Fig. 1. The effect of surface inclination on the minimum flow rate to maintain a water film in a saturated ethanol-air environment.

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