

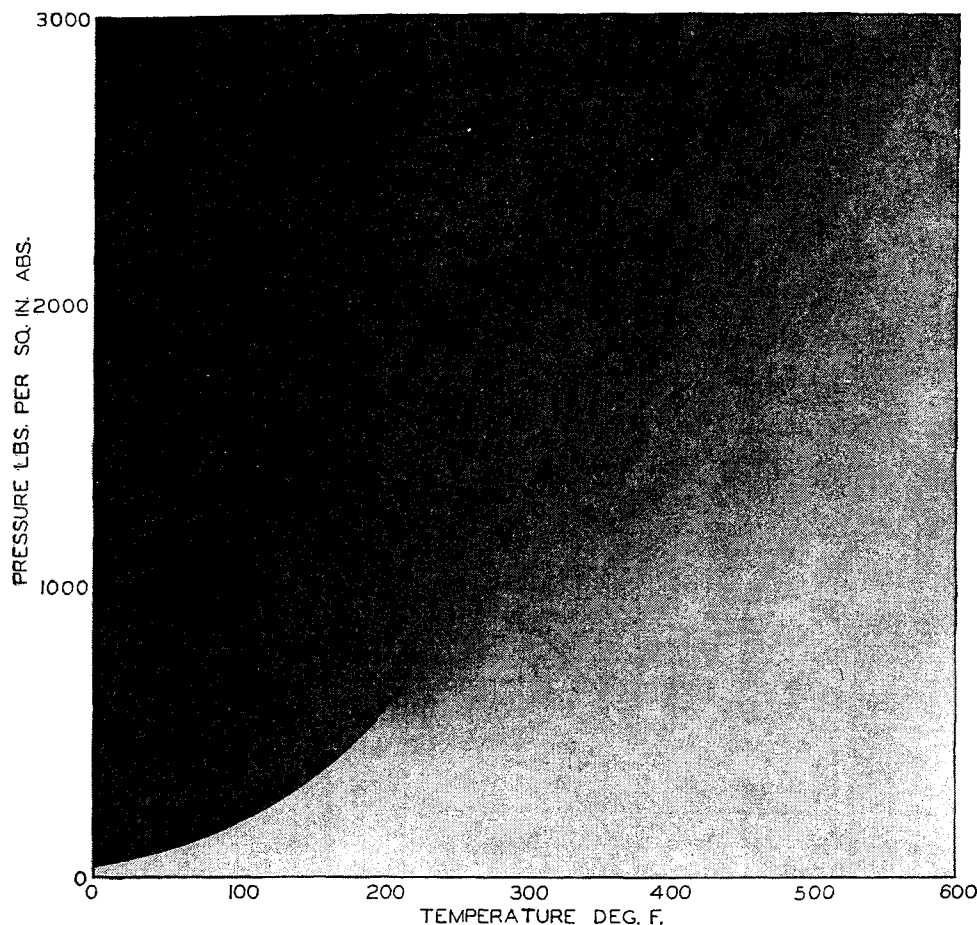


Fig. 3-8. Continuity of vapor and liquid states. (Katz and Kurata, 3-28. Courtesy Ind. Eng. Chem.)

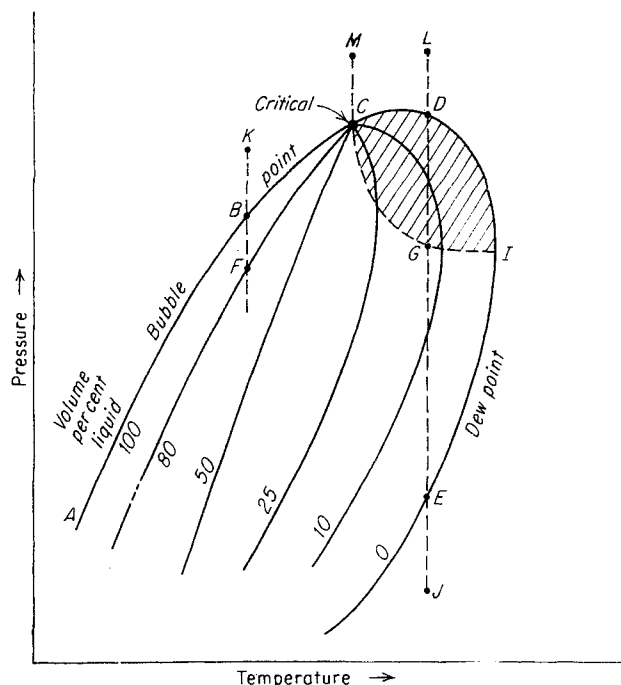


Fig. 3-9. Phase diagram for a mixture.

wise, a pressure reduction from *L* to *D* will cause dew to form.

A pressure reduction on the fluid from *M* to *C* causes the single-phase fluid to change abruptly to approximately 50 per cent vapor and 50 per cent liquid at *C*. It so happens that the properties of the vapor along the dew-point curve and those of the liquid along the bubble-point curve merge at *C*, and this is the critical point for the mixture. Physically, the critical point is very difficult to identify, and the point is more readily determined by plotting the bubble point, the dew point, and per cent liquid lines, and then finding the common point *C*.

Compressing pure substances in the vapor state to the vapor-pressure curve will cause dew to form; therefore, the behavior from *J* to *E* is to be expected. However, anyone unfamiliar with the type of phase behavior from *L* to *D* to *G*—the formation of liquid by pressure reduction on a gas—would be surprised, for this behavior is unlike that of pure substances. The phenomenon of liquid formation by isothermal expansion of a single-phase fluid is *retrograde condensation* (3-28). The expansion from *D* toward *G* yields