

potentials never reached a steady state during the higher pressure determinations, but instead oscillated with extremely small amplitude about a mean. He attributed this to separation of the gases by thermal diffusion with the result that the rate of circulation varied with time. Keyes' cell consisted of vertical concentric cylinders with a relatively large annulus, and would closely approximate a Clusius-Dickel column.

The present cell is horizontal and the degree of convection and the degree of separation will be much smaller. An analysis (7) following that of Jones and Fury (10), indicates the effect of thermal diffusion to be undiscernible. Experimentally, no diffusion effect could be detected with the cell, i.e. the measured value of the conductivity had no time dependence.

The effect of thermal radiation as a source of heat transfer parallel to that by conduction is taken into account accurately by the calibration equation (1). However, at higher pressures, carbon dioxide and ethane both absorb radiation in the far infrared changing the heat load and temperature profile from that obtained from the Fourier equation. The effect of the absorption of radiation is discussed by Leidenfrost (15) who demonstrates that even if information were available on spectral absorptivity and index of refraction of the gases as a function of pressure, exact corrections would be very difficult to make. "Diffusion" approximations have been made by some authors;