INTRODUCTION

The diffusion (interpenetration) of metals into lead was first reported by Roberts-Austen, ¹ who measured the diffusion coefficients of Au into Pb. Since that time, the diffusion coefficients of a number of metals into lead have been measured and tabulated, including that for self-diffusion (see, for instance, Barrer).² Of the many systems studied, the two with the highest diffusion rates are Au in Pb³ and Ag into Pb⁴--the former being the greater.

Although there has been a great deal of data taken for various systems at atmospheric pressure, there has been very little done to determine the effect of high pressures on diffusion. Self-diffusion in lead has been studied to 10 kb. by Nachtrieb and Rice, ⁵ and to 40 kb. by Hudson and Hoffman⁶ with some disagreement in the interpretation of the results.

There have been several theories advanced relating to diffusion that either directly or indirectly involve a pressure dependence. The Dushman-Langmuir equation⁷ is related to a pressure study through its ability to be tested against results for the same system at various pressures. Braune and Van Liempt⁸ and Rice and Nachtrieb⁹ have postulated linear relations between the melting point of the solvent and the activation energy of diffusion which may be compared against a known fusion curve.