

should be expressed by the laws of Henry and Raoult. Combined with general thermodynamic relations, these laws permit us to calculate all the properties of solutions - both volumetric and thermal.

We recall, however, that Mendeleev /4/ in "Basic Chemistry" wrote: "It should be noted that the Henry-Dalton law belongs to a group of approximate laws, similar to the gas laws (Gay-Lussac and Mariott) and many others, i.e., it describes only a part of a complex phenomenon, a limit to which the phenomenon tends. Here the complication arises from the influence of the degree of solubility and the degree of affinity of the solvent gas to water!".

The untenability of Henry's Law, both in its classical form, and in its strict thermodynamic form, given to it by Lewis and Randall /5/, has been established by numerous experimental investigations.

The dependence of the Henry coefficient on pressure was first studied by Krichevskii et al /6/. In another paper Krichevskii et al /7/ showed that the limiting Henry law could not give correct values of partial molar volumes of a dissolved gas.

It has been established that the study of volumetric properties of solutions is a delicate method which permits detection of the deviation from the laws of infinitely dilute solutions in the region of extreme dilution /8/.

Accordingly, we also have set up our problem of obtaining experimental data on the volume and phase relations in gaseous solutions.

Because of the considerable experimental difficulties there have been as yet no such investigations for gas-liquid systems.

The present work represents the first attempt to overcome these difficulties, and to create an equipment which would allow reliable measurements of partial molar volumes of liquids dissolved in compressed gases, over a wide range of concentrations. In addition to the volume relationships, the equipment permits a study to be made at the