PROBLEMS IN THE DETERMINATION OF PHYSICAL PROPERTIES

IN preparing for publication the data on physical properties of chemical substances, the editorial staff of *International Critical Tables* will find from time to time that important physical properties of substances of technical and scientific importance are missing from the literature. As fast as we become aware of missing data of this character, it is our policy to formulate research problems covering such missing data and to endeavor to interest chemists and physicists in undertaking the necessary investigations to supply the required data.

Most of the research problems formulated in this way will be suitable for bachelors' or masters' theses and in a few instances topics sufficiently broad to be suitable for doctors' theses will also be available. Many of them will be suitable for experimental problems in the ordinary laboratory courses in physical chemistry and physics. Thus, for example, the laboratory experiment covering the determination of solubility might to advantage deal with substances whose solubility is needed but is unknown. The average of the determinations made by a class of students, while not as accurate and reliable as the determinations made by a skilled investigator, will nevertheless be very valuable when they constitute the only data available on the subject. Moreover the average student will be more interested in a laboratory experiment the results of which are of actual value and worthy of publication than he would be in repeating for the *n*th time the measurement of a property of some system which has been measured many times before.

International Critical Tables will be glad to submit to interested instructors in universities and colleges lists of problems of this character and to advise as far as it can concerning suitable apparatus and methods of measurement. It may be possible also in some instances to secure moderate financial assistance to aid in the purchase of materials and apparatus for investigators interested in carrying out work of this character. The results of such work may be published by the investigator in any appropriate publication medium and they should also be reported in duplicate to the office of *International Critical Tables* on completion of the work.

A number of problems on the following subjects are available at the present date: Heats of combination: solid oxides; Fe compounds. Specific heats: brass; solid oxides; steels; oils and fats; petroleum products; metals; salts; Fe compounds; asphalts. Latent heats of fusion: brass; metals. Heat conductivity: steels. Latent heats of vaporization: petroleum products. Viscosities: industrial materials; solutions. Kinetics: rates of drying; hydrolysis of industrial materials; catalysis; transpiration of moisture; biochemical. Strength: industrial materials. Thermal expansion: steels; Fe compounds. Freezing-point-solubility diagrams: salts; acids; metals in water; soaps. Boiling points: solutions. Solubility of gases: in molten metals; in water. Chemical equilibrium; dissociation pressures at 1600° C. Electrical conductivity: metals; refractories. Properties of colloidal systems; industrial materials. Vapor pressures: metals; solutions. Specific rotatory power: gliadin. Index of refraction: solids. Density: certain organic compounds; solutions. Flash points. Surface tensions: solutions.

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SPECIAL ARTICLES

GLUE BUBBLES

1. *Introductory.* The improvements which I have recently given to the interferometer U-gauge adapt it for measurements throughout larger intervals. The apparatus requires some experience on the part of the operator, but it gives absolute pressure values directly, and is quite robust, if not abused. Adding the pin hole valve as heretofore, I detected a hysteresis-like phenomenon in the telephone, according as an intermediate intensity of sound was reached from increasing or from decreasing intensity.

But the chief promise which the interferometer U-gauge seems to hold out is the measurement of such small but persistent pressure increments as arise in certain chemical and bacteriological processes. Here, how-