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Book reviews

An Introduction to Thermogravimetry, by C. J. KEATTCH. Heyden & Sons, Ltd. (in U. S. A. by Sadtler Research Lab.), London, 1969, 59 pp., $4.50.

The introductory booklet on thermogravimetry has chapters on: 1, Origins; 2, Thermobalances; 3, Thermogravimetric Data; 4, Interpretations of Data; 5, Applications — I (Inorganic Chemistry); 6, Applications — II (Organic and Polymer Chemistry); 7. Applications — III (Minerals and Applied Sciences); and an Appendix on commercially available equipment. The booklet is written on an elementary level and is intended as a brief survey of the field. There is an excellent review of the historical aspects of the art of weighing going back to Ancient Egypt of *ca.* 2800 B.C. The early Japanese and French work in this field is adequately described.

The author neglects, in numerous cases, to cite the source of his information. It is apparent that he has borrowed freely from other texts in the field without acknowledgement.

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Experimental Thermodynamics. Volume I. Calorimetry of Non-Reacting Systems, edited by J. P. MCCULLOUGH AND D. W. SCOTT. Plenum Press, New York, 1968, xix + 606 pp., $45.00.

In accordance with its task of establishing and promoting standards and techniques of high precision measurement in its area of responsibility, the IUPAC Commission on Thermodynamics and Thermochemistry has sponsored two volumes of "*Experimental Thermochemistry*". Volume I, Interscience Publishers, Inc., New York, edited by F. D. Rossini, appeared in 1956 and Volume II, Interscience–Wiley, New York–London, edited by H.A. Skinner, appeared in 1962. The present treatise is a continuation of this series. It reviews the current state of the art of measurement of heat capacity and heats of phase transitions of systems of constant composition.

The etymology of the word calorimeter implies that it is an instrument for the measurement of heat. In thermodynamics however, heat refers to the process of irreversible transfer of thermal energy from a high to a low temperature. This heat cannot be directly observed or measured. The quantities actually measured in a calorimetric experiment are work energy and temperature changes. Changes in the internal energy or enthalpy of the system in the calorimeter can then be deduced with the help of the First Law of Thermodynamics. Calorimeters are an indispensable tool for the generation of thermodynamic data of this kind. Quantitative calorimetry

grew from the work of James Joule in the middle of the nineteenth century, and so modern calorimeters are the product of a long period of evolution and refinement.

In recent decades high precision calorimetric measurements of the type considered here have been almost the exclusive province of the English speaking countries. Therefore, these countries are predominately represented among the twenty-four contributors to *Experimental Thermodynamics*. This undoubtedly is a reflection of the fact that modern high precision calorimetry is very expensive and is usually conducted by teams of experts working in special laboratories dedicated to this purpose. The contributors all qualify as experts in their fields of specialization and most of the currently active laboratories are represented.

The first few chapters deal with the general principles of calorimetry and with the associated techniques of thermometry and measurement of electrical energy. The remaining chapters describe specific types of calorimeters. These include adiabatic and isothermal jacket calorimeters for the measurement of heat capacity at low, intermediate, and high temperatures; high temperature drop calorimeters; instruments for the measurement of heat capacity and heats of vaporization of volatile liquids near room temperature; vapor flow calorimetry; high speed measurements at high temperatures; and miscellaneous techniques. Except for a few drop calorimeters recently placed on the market, none of these intruments can be purchased ready-made. Therefore most of these measurements require an extensive period of design and construction of equipment.

Much of the information found in the book has been previously published elsewhere, but it is widely scattered throughout scientific literature. The book is well organized and edited, and the editors and authors have made a highly valuable contribution in bringing all this material together. The book is written for the specialist. For such a person, it contains a wealth of detailed practical information on the design and construction of calorimeters and on measurement techniques. The high cost of the book will further limit its distribution. However, no comparable book has been published in recent years, and this one will undoubtedly serve as a primary reference work in this field for a long time to come.

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