

the lowering of vapor pressure brought about by surface-tension effects. From mechanical analysis the size distribution of the pores can be calculated and the relation between relative vapor pressure and moisture content can be worked out. This assumes a roughly spherical shape for the particles, which has not been found to be true by direct examination of clays. The "capillarimeter" is used to determine the moisture sorption at various applied tensions ("pressure deficiency"). Percentage saturation is plotted against pressure deficiency. The curve is related to that calculated from mechanical analysis and thus to the pore size.

The book is based primarily on the author's own research. Only slight mention is made of other work and in most cases direct literature citation of both the author's and other work is omitted. Among the important aspects of soil chemistry not covered are the determination of availability of plant nutrients, fixation of phosphorus and potassium, and mineralogical analysis of soils. Availability of soil moisture to plants and soil structure is not covered. In the 243 tables of data the many soils under study are referred to only by number with no reference as to location, color, texture, organic matter content, or other properties. Thus it is impossible to correlate the results with other soil properties. Some of the graphs are difficult to read. The book is rather empirical in nature and would tend to confuse the beginning student in soils. The lack of reference citation and omission of other work would also limit its use as a reference book.

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● THE POLAROGRAPHIC METHOD OF ANALYSIS

O. H. Müller, Associate Professor of Physiology, State University of New York Medical Center, Syracuse, New York. Second edition. Chemical Education Publishing Co., Easton, Pennsylvania, 1951. xii + 209 pp. 51 figs. 10 tables. 13 × 20 cm. \$3.50.

This is the second edition of a well-known text in the Contributions to Chemical Education Series. As in the first edition, published in 1941, the authors stated the purpose is "to present a simple account of polarography in a form which can be used by teachers and students of physical chemistry as well as in advanced courses in analytical chemistry."

The material covered and its arrangement in the book make it well suited for use as a text. Polarography is developed, in Chapter I, as a special branch of the more general field of electro-analytical chemistry.

Polarographic apparatus is described in Chapter II. Details for the construction and operation of a simple, inexpensive, yet adequate manual instrument are given. Many of the current-voltage curves used as illustrations in the book were obtained with an instrument of this design and all of the 26 suggested experiments can be performed with it. The principles of recording polarographs are discussed but details of commercially available instruments are omitted.

The quantitative and qualitative aspects of polarography are brought out in Chapters III and IV. The suggested experiments in both of these chapters are well designed and provide an excellent practical demonstration of the variables that must be considered if the polarograph is to be used as a precise analytical tool.

Much of the material of the first four and the seventh chapters has been carried over from the first edition. However, much new material has been added, illustrative of the developments in the field during the ten years separating the two editions.

Chapters V, VI, and VIII are new in this edition. In the first of these, Polarometry, the uses of the dropping mercury electrode for purposes other than to obtain current-voltage curves, are discussed. Included are the techniques of "polarometric titrations" and the use of the dropping electrode in the study of reaction kinetics.

An extremely useful addition to the present volume is Chapter VIII, entitled Suggestions for Practical Polarography. The discussion of the capillary constant and the radius of the capillary orifice together with the author's plea that m and t data be included in reports of polarographic investigations should be read not only by teachers and students but also by "advanced practitioners" in the field.

The book should be a welcome addition to the literature by all interested in the practice and teaching of this modern method of chemical analysis.

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● CHEMICAL THERMODYNAMICS

Irving M. Klotz, Professor of Chemistry, Northwestern University. Prentice-Hall, Inc., New York, 1950. xiii + 369 pp. 15.5 × 23.5 cm. \$6.

PRESENTED from the "classical" standpoint, this textbook is a worthy attempt at a consistent exposition of thermodynamics.

The numerous concrete examples should be welcome to most students. However, a few things in the book may be confusing to some readers. Terms are not clearly defined as they are used; the word *system* is introduced without ever being defined.

Another common source of confusion is repeated in this book: the failure to make a clear distinction between a given spontaneous change and the various methods (processes) by which it may be carried out. For example, on page 119 it is stated that a process which may occur spontaneously is *not* reversible. Then, with the reaction between hydrogen and chlorine as an illustration, the rest of the page is devoted to showing how the change *may* be carried out reversibly.

Actually, the formation of one mol of hydrogen chloride is a spontaneous *change* (not a process) which, under the same initial and final conditions, always has the same $-\Delta F$ associated with it. However, the change may be carried out by an infinite number of processes (methods), one of which is theoretically reversible. The other processes are irreversible.

Despite these minor flaws, which an instructor using the book could easily correct, the text, as a whole, is well written and should give good service in class.

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● COLLOID CHEMISTRY. VOLUME VII

Collected and edited by Jerome Alexander. Reinhold Publishing Corp., New York, 1950. xi + 736 pp. 15.5 × 23.5 cm. \$15.

THIS volume of the well-known series edited by Alexander is a curious collection of good and bad, relevant and irrelevant essays. Some represent serious efforts on the part of the authors to make substantial contributions to the colloid chemical literature, some are perfunctory rehashes of subjects better treated elsewhere, and at least one is an effort to stake a claim as a charter member and contributor in a field that has grown away from and left the author far behind.

In general, it is the reviewer's opinion that the book could not readily be used as a text, and as a reference work would have been materially improved by a substantial reduction in the number of topics covered and a corresponding elaboration of the subjects retained. Some chapters would appear more appropriate as articles in a current periodical.

The volume is divided into three main parts: "Theory and Methods," "Biology and Medicine," and "Technological Applications."