Soil Testing for Engineers. T. William Lambe. New York: Wiley; London: Chapman & Hall, 1951. 165 pp. $5.00.

Fourteen soil tests in common usage in soil mechanics laboratories are described in detail and discussed in this book. The text is meant primarily as a guide for student laboratories, but it will also be useful as a reference source to engineers and research workers concerned with the mechanical properties of soils and soil materials. The organization of the material, its pleasing reproduction, the excellent illustrations, and the appendices containing useful data and derivations of all formulas used in the main text are certainly a credit to the author. Unfortunate is the incidence of several undesirable colloquialisms and even grammatical lapses, which should not be found in a scientific book.

Each test is introduced with a short indication of its meaning and connection to field practices and behavior of soil *in situ*. These introductions are the least satisfying part of the book, which is probably more a matter of lack of knowledge about the mechanical behavior of soils than anything else. The reviewer, as a soil physicist, regrets that the author has not drawn on the vast source of information accumulated in the field of soil physics. This is particularly true for the sections on movement of water. Discussion of the energy concept of soil water, the idea of capillary potential, and a more detailed discussion of Darcy's law would have added to the value of this material. As a study text for students the book should be used with discretion and should be supplemented with discussion of other findings and theories than referred to in the text.

Missing, in a book with the purpose of teaching students how to measure soil properties and to distinguish on the basis thereof between different soils, is a discussion of the statistical treatment of the data. The question of adequate sampling is briefly mentioned but not with sufficient clarity. Anyone dealing with mixed populations (such as soils) should be familiarized with the fundamentals of the distinction between arbitrary classifications and with the essentials of estimating the proper number of samples and determinations on each sample. At least reference should be made to texts that consider the problem of interpretation of data containing unaccounted-for variation.

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Isoperimetric Inequalities in Mathematical Physics. G. Pólya and G. Szegö. Princeton, N. J.: Princeton Univ. Press, 1951. 279 pp. $3.00.

The classical "isoperimetric inequality" states that for any closed plane curve with given perimeter the area is not greater than the area of the circle with the same perimeter. There are many other interesting inequalities of a similar type concerning geometrical or physical quantities that depend on shape and size of curves or solids. Such inequalities are the subject of this book. The general aim is the possibility of estimating certain physical quantities, in which physicists or engineers are interested, by means of geometrical or other easily accessible quantities. Much work has been done in this direction during the past few decades and, in particular, the authors themselves had already made valuable contributions. In the present book a careful and systematic discussion and a well-organized presentation of these questions are given.

The first chapter (41 pp.) gives a lucid and readable summary of the definitions, methods, and results. Many of the results are given here in the form of comprehensive tables and at the end of the book. Chapter II discusses the principles of Dirichlet and Thomson, which in Chapters III and IV are applied to estimation of capacity C. Here the Dirichlet principle yields upper bounds for C, and the Thomson principle furnishes lower bounds for C. In Chapter V other methods (such as conformal mappings) are used for estimates of torsional rigidity and principal frequency, and in Chapter VI nearly circular and nearly spherical domains are discussed. Chapter VII contains diverse remarks of symmetrization, which is also discussed in the Notes A–F; Chapter VIII elaborates the cases of ellipsoids and lenses.

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Linear Polymers. Elizabeth M. Frith and R. F. Tuckett. London–New York: Longmans, Green, 1951. 355 pp. $3.50.

The authors of this book have undertaken the difficult but necessary task of presenting the general physical chemistry of high polymers in a form suitable for a graduate in chemistry who intends to start research in the subject either in industry or at a university. And for such a person they have produced a valuable book. On occasion he might find the pace rather slow, for the authors adhere to the advice given to Alice, and start at the very beginning. A lengthy chapter is devoted to general principles of thermodynamics, for example, in which the whole content of an undergraduate's training in that subject is reviewed, and developed along lines leading to its application in the solution properties of amorphous polymers. Few readers would object to that. The authors have generously provided an account of the background they expect from the reader.

Although the particular subject of thermodynamics is well done, the authors are not uniformly successful in their treatment. Inevitably, when so many different subjects are dealt with, practical considerations of space will make it impossible to give a preliminary elementary discussion of each. Consequently, some readers may feel that too much time is spent in telling them what they already know, whereas other topics are introduced at an advanced level. Occasionally a subject is presented in so condensed a form, as in the

sections on the applications of x-rays to polymer chemistry, that it arouses admiration not so much for its usefulness as for its display of skill in packing so much into so little space. But the authors deserve praise for covering so wide a range with such dependable accuracy.

The emphasis of the book is on physical chemistry rather than on technology, and on a broad treatment of the subject rather than on a few topics of interest to specialists. It has apparently been the particular concern of the authors to relate the chemistry of high polymers to the classical physical chemistry of small molecules (as is explicit in the preface). If they succeed in doing that, they will remove for many the uncomfortable feeling that the arcana of high polymers constitute a science all their own.

The four years that have elapsed between the writing of the book and its publication have, in so rapidly developing a field, resulted in some gaps in the account. Even today, however, there is no other volume that answers the important purpose for which this one was written. As for the gaps, they can be taken care of by the use of recent review articles which, without the prior preparation given by this book, adopt too advanced a tone for most chemistry graduates.

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Preparation of Organic Intermediates. David Allen Shirley. New York: Wiley; London: Chapman & Hall, 1951. 328 pp. $6.00.

This book is a compilation of procedures for the preparation of a variety of organic compounds. These procedures have been taken from readily available published literature. Confronted with these facts, it is of more than passing interest to examine the author's reasons for believing this compilation to be of value and in what fashion he has tried to avoid the shortcomings of similar compilations such as Vanino's *Handbuch*. These reasons are set out in a one-page preface. In view of its importance, it is unfortunate that the author did not devote more space and effort than this in an analysis of the problem.

The compounds included were selected on the basis of the following criteria:

(1) The compound either is not available commercially or if available is relatively expensive; (2) directions for preparation of the compound had not been included in *Organic Syntheses* through Volume 28; and (3) the compound is one whose structure is simple and contains reactive functional groups which make it useful as an intermediate, or its preparation involves a generally useful type of organic reaction and the directions may be applied to the preparation of related compounds.

In addition, the starting materials meet the following criteria:

(1) The material is available commercially at relatively low cost; (2) the preparation of the material has been given in *Organic Syntheses*; or (3) the preparation is given in another place in this book.

The following comments on these criteria occur to this reviewer. Although it is not so stated, a great many of these preparations involve safety hazards that would probably make them unacceptable for *Organic Syntheses*. In the text the author italicizes safety precautions in over 25 instances. Also, many of the preparations are so like those already given in *Organic Syntheses* for closely related compounds that they would probably never be included. Examples are the preparations of *p*-fluorobenzyl bromide, 6-methylquinoline, *n*-octadecyl iodide, *n*-valeronitrile, *p*-bromobenzoyl peroxide, and α-furil. There are many others.

In many instances, the reactions described are either lacking in novelty or strikingly similar to other preparations also included in the volume. Examples of the first type are the straightforward esterifications (pp. 148, 157, 162), the formation of acid chlorides using phosphorus trichloride (p. 156), the malonic ester synthesis (p. 154), and the preparation of an alkyl cyanide from an alkyl bromide (p. 298). Examples of the latter are the preparations of acrylyl (p. 3) and crotonyl chlorides (p. 89) from the corresponding acids by interchange with benzoyl chloride. Many other examples will be obvious to the reader.

This reviewer believes that the author has undertaken a task for which the expenditure of any conceivably rational effort is grossly disproportionate to the value of the results. In the face of this situation, the author has presented as commendable an account of his efforts as can be expected.

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Scientific Book Register

The Theory of Atomic Spectra. Reissue. E. U. Condon and G. H. Shortley. New York: Cambridge Univ. Press, 1951. 441 pp. $11.00.

Statistical Design and Analysis of Experiments for Development Research. Donald Statler Villars. Dubuque, Iowa: Brown, 1951. 455 pp. $6.50.

Materials Technology for Electron Tubes. Walter H. Kohl. New York: Reinhold, 1951. 493 pp. $10.00.

The Black Carib of British Honduras. Viking Fund Publications in Anthropology, No. 17. Douglas MacRae Taylor. New York: Wenner-Gren Fdn., 1951. 176 pp.; 7 plates. $2.50.

Agricultural Chemistry: Practical Applications of Agricultural Chemistry, Vol. II. Donald E. H. Frear, Ed. New York: Van Nostrand, 1951. 588 pp. $9.50.

Vertebrate Sexual Cycles. W. S. Bullough. London: Methuen; New York: Wiley, 1951. 117 pp. $1.50.

The Temporomandibular Joint. Bernard G. Sarnat, Ed. Springfield, Ill.: Thomas, 1951. 148 pp. $4.75.

Les Conditions Ecologiques et le Peuplement des Vases d'Eau Douce. Encyclopedie Biogeographique et Ecologique, Vol. VI. Franklin Pierre. Paris: Paul Lechevalier, 1951. 104 pp.; 8 plates. 1800 fr.

Theory of Perfectly Plastic Solids. William Prager and Philip G. Hodge, Jr. New York: Wiley; London: Chapman & Hall, 1951. 264 pp. $5.50.

Handbook of Basic Microtechnique. Peter Gray. Philadelphia: Blakiston, 1952. 141 pp. $3.00.