It is quite difficult to retain, digest, and extract the significance of these many studies. The brief summaries at the end of each chapter do not accomplish this function.

The foregoing are minor flaws, however, in an otherwise commendable book. On the positive side, the author's thorough treatment of the technical and difficult subject of scale analysis, his chapter on the applications of attitude measurement to industry, and his review of indirect methods of measurement are excellent.

Extensive bibliographies at the end of each chapter are helpful for those interested in a more detailed exploration of the subjects treated.

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Ion Transport across Membranes. Papers presented at a symposium at the College of Physicians and Surgeons, Columbia University, Oct. 1953. Hans T. Clarke, Ed.; David Nachmansohn, Assoc. Ed. Academic Press, New York, 1954. xi + 298 pp. Illus. $7.50.

The papers presented at a symposium on *The Role of Proteins in Ion Transport across Membranes* are collected in this volume, together with six other contributions. In the first paper, Ussing gives a useful summary of the results of ion transport studies. In the second paper, by Hodgkin, electric processes in nerve conduction are described for the benefit of physicists and chemists rather than for physiologists. The summary is a highly abridged version of the explanations offered by the author for the relationship between membrane potential changes and transfers of Na^+ and K^+. "The generation of bioelectric potentials" is the title of a paper by Wilson and Nachmansohn, and this, perhaps more appropriately entitled "Studies on acetylcholine," contains the well-known views of these authors. Friess, Blum, and Morales, in an interesting note, show that a reacting mixture of ACh and its esterase has a greater ultraviolet absorption than the sum of its components, and that light-scattering measurements fail to demonstrate a change in the shape of the protein when it interacts with ACh.

Parpart and Hoffman in "Ion permeability of the red cell" provide an up-to-date summary of the various problems existing in this field. A paper by Mudge on "Renal mechanisms in electrolyte transport" contains much interesting material, especially at the cellular and histochemical level. Two very interesting theoretical contributions follow, the first by Parlin and Eyring on "Permeability and electric potential" and the second on "Transport of ions through biological membranes from the standpoint of irreversible thermodynamics" by Kirkwood. The use of ion-exchange membranes to secure electrodes where neither oxidation nor reduction takes place is discussed by Scatchard and also by Sollner, Dray, Grim, and Neihof. These latter authors also present a large amount of experimental data on collodion and other types of membranes, A paper by Hill, "Theory of protein solutions," is an application of statistical-mechanical considerations to the thermodynamic properties of protein solutions. "The interaction of proteins and ions, with special reference to mercury derivatives of mercaptalbumin," by Edsall, "The specificity of metal-protein interactions," by Gurd, and "Equilibrium and sedimentation of uncharged particles in inhomogeneous electric fields," by Debye, complete the volume.

By way of general comment, although the contributions are all of high quality, there seems little homogeneity to the subject matter of the volume. The original title of the symposium has been dropped as a title for this volume, presumably because none of the contributions deal with this problem; indeed, it has not been possible to connect proteins with the transport of sodium or potassium ions. Only four papers out of 14 deal with ion transport from an experimental point of view, two papers deal with theoretical problems in ion transport, and the rest are contributions to protein chemistry or high polymer chemistry.

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Histopathologic Technic and Practical Histochemistry. Rev. ed. of *Histopathologic Technic.* R. D. Lillie. Blakiston, New York, 1954. ix + 501 pp. $7.50.

This is a very personal book, in which a distinguished and able pathologist makes available to his fellow-workers the methods that he has found helpful or interesting during his many years of experience. The author has been a pioneer in the application of histochemical procedures for the study of pathologic tissue. His interest in histochemistry has been largely within the realm of those reactions that can be applied to sections or tissues on a slide rather than in exploitation of fragmentation and differential centrifugation methods or microchemistry of a test-tube nature applied to tiny tissue fragments or sections.

Within his chosen area Lillie has included many methods useful for localizing compounds, groups, or enzymes in tissue sections. These are presented more or less in cook-book fashion, each accompanied by a brief statement of the author's evaluation of and experience with the method and by adequate bibliographic references. The extensive citing of histochemical procedures is a feature of this new edition, which preserves from the previous edition the presentation of numerous methods for staining, fixing, sectioning, injecting, or otherwise preparing tissue for microscopic examination. The result is an impressive collection of methods, each presented in the light of Lillie's personal experience.

Useful features included at the end are tables of formulas, buffers, acids, and other data helpful in preparing solutions used in the methods cited. Perhaps useful for beginners is the opening chapter, dealing with Lillie's practices in using the microscope, although this section is not altogether sound from the

viewpoint of optical theory. In general, however, the author's experience and thoughts, as embodied and compiled in the methods presented here, will probably be useful both to beginners and to experienced workers seeking to gain information about tissues with the light microscope.

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Tables Numériques de Physique Nucléaire. Charles Noël Martin. Gauthier-Villars, Paris, 1954. 258 pp. Paper, $5.15; cloth, $6.79.

This book contains 14 tables. The first six are tabulations in various forms of a semiempirical mass formula due to Weizsäcker and modified later by several authors. Similar tables calculated by computing machines under the direction of Metropolis and Reitwiesner were published by the Atomic Energy Commission, as Report NP 1980, several years ago. I do not know whether they are still available.

Tables 7 to 14, with the exception of Table 11, contain simple functions that are easily calculable on a slide rule: for example, $r_0A^{1/3}$ as a function of A with r_0 constant. Table 11, Gamow penetration factors, is useful in several problems, especially of alpha decay, and cannot be calculated immediately on a slide rule.

The author's introduction contains the statement: "All calculations were hand made without using any machine for it is my opinion that mistakes are statistically less numerous when using mental arithmetic than when striking keys of a machine and transcribing the figures." This goes a long way in explaining the contents of a good part of the book. It is doubtful whether people not sharing the author's opinion on calculating machines will have much use for a large portion of the tables.

The typographic presentation is excellent.

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Organic Chemistry. Lawrence H. Amundsen. Holt, New York, 1954. xii + 368 pp. Illus. $4.75.

This textbook is designed for a one-semester course in elementary organic chemistry and, as such, is necessarily limited in scope. In common with many elementary text books, the primary emphasis is on aliphatic chemistry; aliphatics are followed by brief treatments of amino acids and proteins, carbohydrates, carbocyclic aromatics, heterocyclic compounds, and a concluding chapter dealing with natural products. A group of simple exercises at the end of each chapter is essentially a guide to the student in assimilating the contents.

It should be possible, even in a brief treatment, to show that organic chemistry is magnificently systematized, rests on clarifying theoretical foundations, and is a fascinating field. This has not been achieved. Great stress is placed on nomenclature. A large number of syntheses and structures are tabulated with little elaboration and no theoretical considerations, and much weight is given to industrial processes, sometimes resulting in misleading implications about typical reactivities of classes of organic molecules.

Many students who elect a one-semester course in organic chemistry may never again have formal contact with an experimental science. It would seem of primary importance to use this opportunity to further their understanding of the scientific method. This book, with its dry statements of fact, throws little light upon the development of ideas. However, it is liberally sprinkled with discussions of the practical aspects of organic chemistry, photographs, and drawings. And, if the purpose of a short course for nonchemists is to provide some familiarity with names of compounds, with structures, with reactions, and with industrial processes, this treatment will serve.

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Residual Stresses in Metals and Metal Construction. William R. Osgood, Ed. Reinhold, New York, 1954. xii + 363 pp. Illus. $10.

This book, prepared under the guidance of the Committee on Residual Stresses of the National Research Council, is comprised of 22 papers dealing with the present state of knowledge on the effects of residual stresses upon the flow and fracture of metals. The book concludes with an exceptionally good summary, based on the statements made in the papers as well as the opinions of the members of the committee. The conclusions reached are as follows.

1) So long as the behavior at any point in a body is elastic, residual stresses superpose with any other state of applied stress. However, if yielding occurs, the residual stresses are relieved and will have no pronounced effect on the performance of a structure. When plastic flow is restrained, as for example, under conditions of triaxial stressing, residual stresses combine with the load stresses.

2) It is recognized that high reaction stresses in welded structures result in high levels of latent energy. However, the influence of latent energy on the failure of structures is still unknown.

3) The presence of the right type of residual stresses is beneficial for structures subjected to fatigue loadings.

4) Residual stresses may assist in the initiation of brittle fractures in ships and affect adversely the fatigue strength of ship steel. The effect of residual stresses on the propagation of ship fractures is less clear; but unless spontaneous fractures can be explained in the absence of residual stresses, these stresses cannot be considered as unimportant.

Recommendations for further research, both in the various papers and in the summary, emphasize that there is still considerable work required before the effects of residual stresses on the behavior of structures will be fully understood.

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