Book Reviews

Numerical Analysis. Proceedings of Symposia in Applied Mathematics, vol. VI. John H. Curtiss, Ed. McGraw-Hill, New York, 1956. 303 pp. $9.75.

The sixth Symposium in Applied Mathematics of the American Mathematical Society, which was cosponsored by the National Bureau of Standards, took place in Santa Monica in 1953. The delay in publication of the proceedings has not prevented this book from getting on the way to be a best-seller—a second printing was in progress before the book reached me.

Four general points are worth noting. Despite the adjective *applied,* most of the 19 papers included are written by recognized pure mathematicians. Many are genuinely concerned with actual numbers, and only a few are rather out of place. New branches of applied mathematics, for instance, those arising in economic contexts, are well represented. As the editor says in his preface, primary credit for the achievement of interesting so many competent mathematicians in the theory and art of computing must be given to the postwar federal program for the support of science.

Naturally the character of the contributions is variable. There are several research papers, some of which make really notable contributions. There are also reports on the current status of particular problems, or areas of problems, some of which are theoretical, and some practical. Among the topics discussed are systems of linear equations, partial differential equations, conformal mapping, integral equations, elementary, algebraic, and analytic number theory and combinatorial problems (such as occur in the study of geometric configurations). There are also papers on dynamic programming and on the assignment problem, on gas dynamics, and on topics in the theory of approximation, asymptotics, and the calculus of variations.

There is much of permanent value in this volume for the practicing numerical analyst. Apart from this, the volume should do much to reveal the attractions of problems in this field to those mathematicians who are not yet in contact with it. It should also reveal to those responsible for computer organizations, their need for research by highly skilled mathematicians to support the work of the programmers, so that the magnificent engineering creations are safely and fully exploited. Periodical symposia on this topic, at the high level of this one, will, in the long run, do much to draw to the field of numerical analysis mathematicians of the caliber which it must have.

The contributors are Richard Bellman, Stefan Bergman, R. H. Bruck, D. R. Clutterham and A. H. Taub, Joseph W. Fischbach, S. P. Frankel, Cecil Hastings, Jr., Jeanne Hayward, and James P. Wong, Jr., Magnus R. Hestenes, Emma Lehmer, T. S. Motzkin, P. C. Rosenbloom, Arthur Sard, Olga Taussky, C. B. Tompkins, J. L. Walsh, S. E. Warschawski, Wolfgang Wasow, Helmut Wielandt, and David Young.

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Body Measurements and Human Nutrition. J. Brožek, Ed. Wayne University Press, Detroit, Mich., 1956. 167 pp. Illus. $3.50.

Todd and his associates took physical anthropology out of the dissecting room, the charnel house, and the museum into the world of living persons. Brožek and his associates have taken physical anthropology from the outer living man (surface sizes and contours) to the inner living man (composition of body tissues). Physical anthropology, cumulatively, is the richer, the more "dynamic," for this continuing trend. Man is more than bone, more than surface morphology and morphometry; he is an integrated, functioning biophysiological complex.

Certain minimal body measurements are recommended on adults: weight, stature, bicristal and biacromial diameter, upper arm skinfold, scapular skin fold, and upper arm circumference. In children these measurements vary according to age. Maturation stage is an important factor in interpreting dimensionality. In a study, "Physique and nutritional status of adult man," Brožek predicted body weight from height, cristal height, bicristal and biacromial breadths, humeral bicondylar breadth, upper arm circumference and tissue thicknesses, and age. The multiple $R = 0.770$. Robert M. White reported on "Body build and body weight in 25-year-old army men," relating stature and body build. Mildred Trotter, in a study "Variable factors in skeleton weight," reported that "the internal structure of the femur is more highly correlated with the weight of the skeleton than diameters." Russell Newman reported on "Skinfold measurements in young American males," finding a "racial contrast." Young Negro males were lean and deficient in subcutaneous fat over the pectoral and triceps region. There were observable geographic differences.

Pascale, Grossman, Sloane, and Frankel reported on "Correlations between thicknesses of skinfolds and body density in 88 soldiers." They derived the following multiple correlation equation: $\hat{Y} = 1.088468 - .007123X_1 - .004834X_2 - .005513X_4$. Here $\hat{Y}$ is estimated body density and X_1, X_2, and X_4 are centimeters of fold thicknesses at chest midaxillary, chest at nipple, and dorsum of upper arm. Kurlander, Abraham, and Ryan discussed "Obesity and disease," concluding "that some (or all) of the association between weight and disease may actually be due to body build rather than to obesity."

In this review I have limited myself to what seemed the salient conclusions of the majority of the authors. However, I would emphasize that I have omitted much detail by presenting essentials. I was impressed by the logical "flow" of the papers. The Committee on Nutritional Anthropometry, Food and Nutrition Board, National Research Council is to be congratulated on the material selected for the conference that is reported in this book; Brožek deserves commendation for the uniformity of writing and editorial style.

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Currents, Fields, and Particles. Francis Bitter. Technology Press, Cambridge, Mass.; John Wiley, New York; Chapman & Hall, London, 1956. 599 pp. Illus. $8.50.

One consequence of the increased specialization in the average college physics curriculum is the odd fact that the unified field comprising physics as a whole is met by the student only once, during his freshman year; and at that, owing to the level of student preparation in the freshman year, this over-all

view of physics might be more appropriately described as a mere glimpse.

Francis Bitter has attempted, with rather striking success, to treat in this textbook the gross macroscopic or integrated phenomena side by side with the examination of the microscopic processes vitally involved. The scope of the subject matter covered is broad, extending from electricity and magnetism and optics through modern and nuclear physics. For institutions offering an intensive course in physics and the calculus during the freshman year, the level of the present textbook might be placed at the sophomore, or possibly the junior, year.

The comprehensive view presented the student is perhaps best illustrated by citing the topic headings in the chapter on "The electrical properties of matter": (i) electrons and protons; (ii) Rutherford and the nuclear atom; (iii) excitation and ionization; conduction in gases and solutions; (iv) metals and semiconductors; resistivity; (v) polarization; (vi) displacement currents and displacement; (vii) the energy in polarized dielectrics; (viii) electrical measurements; (ix) Kirchhoff's rules; (x) time constants; (xi) impedance—electronics.

The textbook is also provided with an ample number of problems, running through a complete range of complexity. The aforementioned chapter, for example, has 44 problems of which at least ten may be categorized as searching.

A sophomore-year course based on this textbook could be used to lead to the more specialized subjects, with a treatment substantially more advanced than is current practice. This would be particularly true if this year were also spent in increased mathematical preparation.

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A Handbook of Hardwoods. Compiled by the Forest Products Research Laboratory, Department of Scientific and Industrial Research. H. M. Stationery Office, London, 1956 (order from British Information Services, 20 Rockefeller Plaza, New York 20). 269 pp. $3.15.

This handbook brings together the sections on hardwood in two of the laboratory's earlier handbooks, *Homegrown Timbers* (1945) and *Empire Timbers* (1941). The present volume has been considerably expanded to include more species and additional data as well as a tabular guide, for quick reference, to the properties of the more commonly used timbers.

Traité de Pharmacie Chimique. vol. I, **Chimie Minérale.** vol. II, **Chimie Organique.** Série acyclique. Composés non azotés. Série cyclique. Composés non azotés. vol. III, **Chimie Organique.** Série cylique. Composés organiques azotés. Série hydroaromatique. Série terpenique, Stérols et acides biliaires. Vitamines. Hormones. Composés organo-minéraux. vol. IV, **Chimie Organique.** Composés hétérocycliques. Matières colorantes artificielles. Antihistaminiques. Alcaloïdes. vol. V, **Chimie Organique.** Hétérosides. Protides. Produits divers. Antibiotiques. P. Le Beau et M.-M. Janot, Ed. Masson, Paris; Stechert-Hafner, New York, ed. 4, 1955–56. 4978 pp. Cloth, F. 37,000 for 5 vols.; paper, F. 32,000 for 5 vols.

This is a reference work of the first magnitude. From its attractive black, red, and gold covers to its comprehensive indexes, it is a work that is masterfully conceived and skillfully executed. Its two principal authors and their six collaborators, all of whom, with one exception, are members of the Faculté de Pharmacie de Paris, are to be congratulated in bringing out this new edition.

The previous edition, the third, which appeared in 1947, numbered some 4450 pages divided among four volumes; this present opus has an additional 500 pages requiring the introduction of another volume, the fifth. The printing is well done and the choice of type face makes it easy to read. (Those for whom French is not their native tongue should not find it difficult reading because the style is simple and straightforward.)

Of the five volumes only the first is devoted to inorganic substances of medicinal and pharmaceutical interest, the remaining four being concerned with organic compounds. Because of this division the authors have furnished two indexes, one at the end of volume I for the inorganic elements and compounds, and the other at the end of volume V to cover all the material of volumes II to V. These indexes are rather complete, the first numbering 27 pages and listing about 4500 entries for 800 pages of text; the second index includes 157 pages and lists about 22,500 entries for almost 4000 pages of material. In cases where a compound or preparation has several synonyms or trade names, cross references are given, thus making the indexes eminently useful.

The references, indicated by small superscripts in the text, are found at the bottom of the appropriate pages. Although the selection of references makes no attempt at being complete, it seems, for the most part, to be adequate, inasmuch as both the old and newer literature is cited. Since a work of such magnitude could not be readily completed except over a period of time, the authors have provided some 55 pages of addenda, at the end of the first and fifth volumes, containing references to recent publications—for example, the 15th revision of the *United States Pharmacopeia*.

Because the present state of our knowledge does not permit an adequate classification of chemical substances according to their physiological or pharmacological properties, it is necessary to employ a scheme which, in great measure, is based on chemical principles. Thus, this involves, for the inorganic substances, the use of the periodic table, while the division of organic preparations and compounds generally follows functional groupings. A slight departure from this order is made when separate chapters in the volumes dealing with organic compounds are given over to the consideration of antibiotics, antihistamines, toxins, venoms, hormones, and vitamins. A valuable addition to the first volume is a chapter that discusses the natural and artificial radioactive substances.

In the volume dealing with the elements and their inorganic compounds, the basic order of treatment is uncomplicated. Each chapter covers one element and its compounds with a brief introduction, which includes a history of our knowledge of the element, some technologic data such as production figures, natural distribution, methods of commercial preparations, and some economic statistics. For each compound there is given the chemical formula, the percentage by weight of the elements comprising it, synonyms and trade names, methods of preparation, chemical and physical properties, assay, use, physiological and pharmacological properties, and remarks. This pattern is followed, with some variations as needed, throughout the entire set.

The order of the four volumes dealing with the organic compounds is somewhat more involved. Of the several possible methods of organizing the extensive material, the authors chose to follow one based on functional groupings. Volume II deals with the nonnitrogenous cyclic and acyclic compounds. Volume III includes cyclic nitrogenous compounds, aromatic hydrocarbons, terpenes, sterols, vitamins, hormones, and metal-organic compounds. The following volume (IV) covers the heterocyclic compounds, synthetic dyes, antihistamines, and alkaloids. The last volume (V) deals with the heterosides, protides and derivatives, and antibiotics.

In so extensive a coverage one could find items to which exception might be