amples have been chosen almost entirely from the field of metals and alloys; ionic crystals are not considered at all, and the chapter on covalent binding is really too brief to be more than the barest outline of a treatment of molecules. These omissions, however, will not prevent the book from being useful to workers in fields other than metal physics, for it accomplishes successfully its major aim of providing a survey of the theory at an intermediate level. This has been done in a clear and compact manner; the mathematics has been kept as simple as possible; and the author has taken pains to stress the nature of the approximations that are such an unavoidable prerequisite for progress in this area. This monograph fills a definite gap in the literature between advanced and elementary accounts of the subject; with its emphasis on fundamentals, this should be a helpful and useful book to a wide range of readers.

The author and subject indexes are adequate, and the printing and production are good; unfortunately one cannot say the same for the proofreading; trivial errors abound, a figure (8.2) has been inverted, and a section of six pages purported to be on "The oxygen molecule" deals in fact with H_2O!

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Substances Naturelles de Synthèse. Préparations et Méthodes de Laboratoire. vol. X, Comportant la Table Récapitulative des Volumes VI à X. Léon Velluz, Ed. Masson, Paris, 1954. 201 pp. Illus.

This series, begun in 1951 and completed with the present volume, has given methods for making about 80 compounds of significance in nature. The editor's selection has not unduly overlapped comparable collections of recipes published elsewhere, mainly because the latter deal with more commonplace compounds. Earlier volumes in the present series have included descriptions of the synthesis from easily accessible materials of, for example, adenosine, chloramphenicol, hydrocortisone, lyxoflavine, phenylalanine, and thyroxin.

The present volume runs true to form in giving instructions for making DL-arginine, vitamin A_1, L-carnosine, β-carotene, ergothioneine, D-glucosamine, DL-penicillamine, and retinene. It also expatiates typically on these subjects: the text includes descriptions of the compounds, expositions on the synthesis of peptides and compounds containing isoprene chains (with recipes for making intermediates useful for the former purpose), and incidental notes on guanidine derivatives, the haloform reaction, Michael-type additions, and the Lobry de Bruyn-van Eckenstein rearrangement. The two expositions are accompanied by useful tables summarizing the application of the methods mentioned. The book ends less aptly by tabulating some properties of common solvents. Instructions for resolving the two DL-amino acids are not given.

Unfortunately, the discursiveness of the present volume bloats it with excessive detail. As either a textbook or a work of reference, it is overloaded with the minutiae of the syntheses, which are translated almost word for word from easily accessible reports in the literature. A few deft pricks from the editorial poniard could have deflated this otiose repetition while sparing the essential fabric of summaries and references; if the free space had then been filled with appraisals of the methods used, the book would have benefited both in readability and as a source of information.

Notwithstanding these shortcomings, this volume is up-to-date and, except for mistakes in the formulas for bufotoxin (p. 6) and anserine (p. 35) and misleading cyclic formulas for the sugars, it seems clear and accurate. It is a pity that, although it is concocted from the elements of recent successes in synthesis, it cannot be recommended either as a steady *vin ordinaire* to sustain the skills of the laboratory or as the quintessential *digestif* to clear and inspire minds surfeited with the rich bulk of chemical literature.

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Variational Principles in Dynamics and Quantum Theory. Wolfgang Yourgrau and Stanley Mandelstam. Pitman, London, 1955 (U.S. distr.: Pitman, New York). viii + 155 pp. Illus. $5.50.

This short booklet is a semihistorical account of variational principles in classical mechanics and in early wave mechanics. As far as the subject matter is concerned, it includes in classical physics the Hamiltonian formalism and Hamilton-Jacobi theory but not Poisson brackets. In quantum mechanics, there is no discussion of the work of Feynman, Schwinger, or Peierls, or of the possibility of a representation-invariant variational principle. To this extent, the book does not appear to be a useful introduction to the variational principles as they appear in the current literature. For a working knowledge of classical dynamics, at least the introduction of Poisson brackets would have been necessary.

The principal purpose of the authors appears to have been an inquiry into the philosophic significance of variational principles. They show that historically many of the discoverers were motivated by metaphysical considerations. Planck (to whose memory the book is dedicated) attempted to discuss causality in physics in terms of the principle of least action. The authors, in a concluding paragraph of perhaps 20 pages, discuss both positivistic and idealistic interpretations of variational principles and appear to steer a middle course between these extremes. It appears that the discussion is not as penetrating as one might wish.

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New Books

Metals Reference Book. vols. I and II. Colin J. Smithells. Interscience, New York; Butterworths, London, ed. 2, 1955. 965 pp. $25 per set.

Adventuring with Beebe. William Beebe. Duell, Sloan & Pearce, New York; Little, Brown, Boston, 1955. 283 pp. $4.50.

Logique et dynamique du peuplement végétal. Phytogéographie, phytosociologie, biosystématique, applications agronomiques. M. Guinochet. Masson, Paris, 1955. 140 pp.

William Herschel. Explorer of the heavens. J. B. Sidgwick. Faber & Faber, London; Macmillan, New York, 1955. 228 pp. $2.50.

Engineering Metallurgy. L. F. Mondolfo and Otto Zmeskal. McGraw-Hill, New York–London, 1955. 397 pp. $7.50.

The Pharmacopeia of the United States of America. U.S. Pharmacopeial Convention, Inc., New York, rev. ed. 15, 1955. 1178 pp. $10.

Our Backward Children. Karl F. Heiser. Norton, New York, 1955. 240 pp. $3.75.

Neurochemistry. The chemical dynamics of brain and nerve. K. A. C. Elliott, Irvine H. Page, J. H. Quastel, Eds. Thomas, Springfield, Ill., 1955. 900 pp. $19.50.

Discoveries and Inventions of the 20th Century. J. G. Crowther. Dutton, New York, rev. ed. 4, 1955. 432 pp. $6.

Quantum Mechanics. International Ser. in Pure and Applied Physics. Leonard I. Schiff. McGraw-Hill, New York–London, ed. 2, 1955. 417 pp. $6.50.

Plant Taxonomy. Earl L. Core. Prentice-Hall, New York, 1955. 459 pp. $7.50.

Grundriss der Gefriertrocknung. Karlheinz Neumann. Musterschmidt, Berlin, ed. 2, 1955. 256 pp. DM. 24.

The Caves Beyond. The story of the Floyd Collins' Crystal Cave exploration. Joe Lawrence, Jr., and Roger W. Brucker. Funk & Wagnalls, New York, 1955. 283 pp. $4.75.

Radio Astronomy. International Monogr. on Radio. J. L. Pawsey and R. N. Bracewell. Oxford Univ. Press, New York–London, 1955. 361 pp. $8.80.

Le Poumon. Stuctures et mécanismes à l'état normal et pathologique. A. Policard. Masson, Paris, 1955. 262 pp. F. 1500.