Book Reviews

Classical Mechanics. Herbert Goldstein. Cambridge, Mass.: Addison-Wesley, 1950. 399 pp. $6.50.

This admirable text will be welcomed with enthusiasm alike by teachers of advanced mechanics and by students in search of an adequate preparation for the study of modern theoretical physics. The author is concerned primarily with an exposition of those methods and associated mathematical tools of classical mechanics employed in the formulation of quantum mechanics, statistical mechanics, and field theory. This material, hitherto available only in scattered chapters of more extensive treatises, is here for the first time collected and presented with commendable clarity and order in a single volume.

The first five chapters, about half the book, are devoted to the development of the Lagrangian method (from Hamilton's Principle) and detailed applications of this method to the problems of two-body motion under central force, including scattering, and the dynamics of a rigid body. Noteworthy features of the treatment are the early introduction of the elements of the calculus of variations, the attention given to the Caley-Klein parameters, and the extensive use of matrix algebra. Chapter 6 contains an excellent review of the modification of classical mechanics, introduced by the special relativity theory. In this, as occasionally in the earlier chapters, reference is made to the velocity-dependent forces and potentials associated with the electromagnetic field.

The outstanding contribution of the book is the clear and comprehensive development of the Hamiltonian method which follows. The student will enjoy the stimulating manner of the presentation as well as its content; canonical transformations, Poisson brackets, action-angle variables, and the like are discussed as far as possible in relation to the use that is to be made of them in the student's later work. A brief treatment of the theory of small vibrations of a dynamical system about a stable equilibrium configuration, in which the matrix algebra is employed throughout, is given in Chapter 10, and the book concludes with an introduction to the Lagrangian and Hamiltonian formulations for continuous systems and fields.

A number of problems, 119 in all, are supplied at the conclusion of each chapter, as is also a bibliography of relevant references—which, incidentally, is alone worth the price of the book. The announced purpose of the problems is to amplify the material of the text rather than to drill the student in application of the theory. A unique feature of the bibliography is a useful comment or evaluation by the author concerning each item. A tabular index of symbols includes a page reference to the first appearance of each symbol. This ingenious and highly satisfactory device permits the unambiguous use of the same symbol with different meanings in different parts of the text.

Apart from its value as a reference work, this is a satisfactory textbook for use in a lecture course intended simply to prepare students for the study of quantum mechanics; the brevity of the treatment leaves ample opportunity for supplementation by the lecturer. On the other hand, it is not so well suited to the need of a course designed to teach advanced analytical dynamics. Too much of that subject is omitted entirely, the principles are not related to the problems of applied mechanics, and the pace of the text does not permit facile enlargement of its scope.

The publishers are to be highly complimented on their achievement in format, typography, and binding. This is by far the most attractive textbook on its level that the reviewer has encountered in recent years.

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Cold Spring Harbor Symposia on Quantitative Biology: Amino Acids and Proteins, Vol. XIV. Cold Spring Harbor, L. I., N. Y.: Biological Laboratory, 1950. 217 pp. $7.00.

The Cold Spring Harbor symposia have long been regarded as among the most important of the annual meetings at which biologists and chemists discuss their mutual problems. During June, 1949, the group of invited guests heard and discussed 22 papers on various phases of amino acid and protein chemistry which have now appeared in print in an attractive format, liberally illustrated with line drawings and half-tone engravings, and interspersed with tables of data and numerous formulas and equations. Taken together, these papers provide a most comprehensive and authoritative treatment of the present position of protein chemistry; many of them are of a quality to make them essential reading for both graduate students and teachers. In general, little space is devoted to the technical methods employed, and reference to original journal publications is essential if one is interested in how the data described were obtained. The emphasis is placed squarely upon the results achieved and the interpretation of these results in terms of current theoretical approaches to the general problem of the proteins.

The range of topics dealt with may be suggested by an outline of some of the titles. The hydrolysis of proteins is discussed by H. B. Bull, the results of the quantitative determination of the amino acids in certain proteins by C. Fromageot and by W. H. Stern and S. Moore, and preliminary evidence on the determination of the relative order of the amino acids in the peptide chain of insulin is given by F. Sanger. The fractionation of proteins by electrophoresis-convection is described by J. R. Cann and J. G. Kirkwood, of polypeptides by L. C. Craig, G. J. Delafield, and G. T. Barry, and of gramicidin by R. L. M. Synge.

The interaction of proteins with metals is discussed from different points of view by E. L. Smith and R. Lumry, who deal with metal peptidases, and by W. L.