the normally perforated walls exhibit differential characteristics of the undesired kind. It is apparent that, although the original intent, based on studies of model flow fields at low supersonic speeds (pp. 169–172), was to produce a differential-resistance wall by the use of inclined perforations, the actual characteristics of such walls were found to be truly linear with the desired property of outflow from the test section against a higher pressure in the surrounding plenum chamber. Hence it would be more appropriate to refer to such walls as "linear." The reader is referred to a paper, "Effects of Boundary Layer and Geometry on Characteristics of Perforated Walls for Transonic Tunnels" (*Aerospace Engineering*, vol. 20, no. 4, p. 22, April, 1961), for a discussion of these aspects of transonic tunnel design. Owing to the classification, this information was not available in the open literature at the time of preparation of the book here reviewed.

Limit Analysis and Design

Plastic and Elastic Design of Slabs and Plates. By R. H. Wood. Ronald Press, New York, N. Y., 1962. 6 × 9 in., 344 pp. $12.

REVIEWED BY D. C. DRUCKER[6]

DIRECTED primarily to designers of reinforced concrete slabs, the book can be recommended highly to all concerned with the theory and application of limit analysis and design. The author combines a firm grasp of theory and experiment with a knowledge of design details of composite and simple slabs. Careful attention is paid to fracture line theory and other proposed procedures for slabs or plates in terms of the upper and lower bound theorems of plasticity. Membrane strengthening is discussed in considerable detail as is minimum weight design.

Gyrodynamics

Gyrodynamics. By R. N. Arnold and L. Maunder. Academic Press, New York, N. Y., 1961. Cloth, 6½ × 9½ in., x and 484 pp. $14.

REVIEWED BY R. E. ROBERSON[7]

EMPHASIS on gyroscopic devices and interest in gyroscopic principles have mushroomed in modern technology, particularly in aeronautical, missile, and space-system applications. This has resulted in a pressing need for a modern treatment of gyrodynamics which, without slighting principles or ignoring traditional applications, embraces the newer gyro problem areas and develops them in a thorough and scholarly way. The reviewer feels that the present text is an important contribution to the satisfaction of these needs and a worthy supplement to the best of the classical gyro literature.

The book is a text, not a reference, and concerns analytical dynamical principles, not gyro design practice. Chapters form three groups: 1–5 develop principles, 6–7 treat free bodies and the classical "top under gravity" problem, 8–16 concern applications, the latter, specifically, are: 8, Aerodynamics of Machines; 9, Gyroscopic Vibration Absorbers and Stabilizers; 10, The Ayro-Compass; 11, Suspensions for Gyroscopes; 12, Gyro-Verticals; 13, Rate and Integrating Gyros; 14, Inertial Navigation; 15, Gyroscopic Effects in the Whirling of Shafts; 16, Gyroscopic Effects in Aircraft.

In all cases, treatment seems sound, choice of topics and level of presentation well made. Reviewer feels references are weak in some areas, although adequate in others. Other personal feelings; introduction of dyadics in connection with inertia tensor would have been advantageous; the error treatments are entirely adequate for text treatment, but not for such application as weapon error analysis because of the omission of some small effects and absence of stochastic considerations; major gap exists in omission of gyro effects in space vehicles. The reviewer does not criticize authors for any of these omissions except, perhaps, literature references—all are for understandable reasons, which cannot be discussed for lack of space.

Gyrodynamics should be on the personal bookshelf of every person concerned with gyro applications.

Engineering Mechanics

Handbook of Engineering Mechanics. By W. Flügge. McGraw-Hill Book Company, Inc., New York, N. Y., 1962. 6 × 9 in., xxvi and 1632 pp. $27.50.

AS STATED in the Preface: "There is no lack of good textbooks and monographs on the many subjects which, together, are called engineering mechanics or applied mechanics . . . . . so far, engineering mechanics has not had its own handbook. The present book has been written to fill the gap—the emphasis is on advanced subjects; however, some frequently needed information of an elementary character has been included for convenience . . . all proofs had to be omitted."

The broad subdivisions of the Handbook, to which 88 authors contributed, are: mathematics, mechanics of rigid bodies, theory of structures, elasticity, plasticity and viscoelasticity, vibrations, fluid mechanics.—*Ed.*

Aeronautics and Astronautics

Design Data for Aeronautics and Astronautics. Edited by R. B. Morrison and M. J. Ingle. John Wiley & Sons, Inc., New York, N. Y., 1962. Cloth, 8¼ × 11 in., x and 581 pp. $18.

REVIEWED BY J. R. RADBILL[8]

AS THE title states, this book is a collection of design data compiled from NASA and NBS publications, aerospace industry design handbooks, and commercially published books. There is also a number of excellent charts which are original with the authors. Since nearly all of science bears on aeronautics and astronautics, this type of volume might well exclude data readily available elsewhere. The first and last of the ten chapters contain meteorological and miscellaneous physical data which could be left out. Chapters on thermodynamic properties of gases, fluid-flow properties, aerodynamics, aerothermodynamics, performance, and aerothermochemical data contain a large quantity of useful plots and data. A chapter on human tolerances by Kent Gillingham is concise and well written. However, the chapter on the materials as well as sections on piston engines in the performance chapter are too brief to be useful. The experienced engineer in the aerospace field will already have access to most of this material but will find the collection convenient. The engineer just entering the field will find this book particularly useful.

Automatic Control Systems

Dynamics of Automatic Control Systems. By E. Popov. Translated from the Russian by A. D. Booth. Pergamon Press, 1962. Cloth, 6 × 9 in., xiii and 761 pp. $10.75.

REVIEWED BY I. FLÜGGE-LOTZ[9]

IN FOUR chapters, analysis and synthesis of automatic control systems are presented based on the 1956 Russian edition. Therefore, in spite of the fact that the book comprises linear and non-

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linear systems, the reader cannot expect to find recent developments (optimal control, e.g.). Part I, General information about automatic control (148 pages), contains many examples from different fields to familiarize the reader with the problems involved: Linear and nonlinear systems, regulation, follow-up, steady-state and transient response, oscillations. Part II, Ordinary linear automatic regulation systems (253 pages), contains what one usually finds in a book on linear control systems. However, the reader will get procedures under their Russian name (only a very few western names are mentioned). Part III, Special linear automatic regulation systems (62 pages), is concerned with systems with delays, time-dependent parameters, and with sample data systems. Chapter IV, Nonlinear automatic regulation systems (233 pages), contains relay type and saturating controls, Liapunov stability, self-oscillations, harmonic balance method, etc. Some readers will welcome a simplified representation of Lurje's investigations (based on work by A. M. Kats). Chapter V, Methods of plotting regulation-process curve (59 pages), is supposed to help checking results of theories by actually following up the process. Some of these suggestions can no longer be appreciated because modern computers can handle the problem faster and more accurately.

The book is thought to introduce a student into the field of controls, but it is interesting also to others, since it shows how many details are presented in a Russian textbook. The translation reflects the Russian syntax.

Aeroelasticity

Principles of Aeroelasticity. By R. L. Bisplinghoff and H. Ashley. John Wiley & Sons, Inc., 1962. Cloth, 6 × 9½ in., xi and 527 pp. $25.

REVIEWED BY MARTIN GOLAND[10]

Amidst the current furor surrounding efforts to distinguish between the efficacy of scientific and engineering approaches, it is comforting to discuss a field like aeroelasticity. In the solution of design problems, the aeroelastic engineer must display practical skill and judgment of the highest order; yet, any substantial understanding and advancement in the field must be achieved through elaborate theoretical reasoning.

The book under review, authored by two of the most prolific and productive researchers and educators in the field, is a compendium of the current status of aeroelastic knowledge. Principal results are quoted, but in the main the reader is directed to a most comprehensive and valuable list of references for details. Originally, the authors set out to prepare a handbook on aeroelasticity; the present compromise between a treatise and a compilation of design information is a consequence of their conclusion that "there are many modern engineering disciplines for which the only handbooks are texts on fundamentals."

An outstanding feature of the book is the excellent account given of the "typical section" approach to the analysis of aeroelastic systems. For the reader seeking an appreciation of the basic mechanisms of aeroelastic phenomena, this chapter should prove invaluable. The concluding chapter, dealing with systems with time-varying coefficients or nonlinearities, is indicative of the authors' goal of including newer topics which are still largely in the research stages.

Altogether, the book affords an excellent and rewarding summary of the diverse branches of theoretical aeroelasticity. It is highly recommended to applied mechanicians who seek a rapid and sound entry into the field, and as a reference source for those already active in it.

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Gages

Gage Primer. By C. C. Perry and H. R. Lissner. McGraw-Hill Book Company, Inc., New York, N. Y., 1962. Cloth, 6½ × 9 in., xii and 332 pp. $11.50.

Revised and brought up to date by the inclusion of new gages, cements, instrumentation, etc.—*Ed.*