

multicomponent mixtures of gases and liquids. A number of useful solutions for the diffusion equations for steady and unsteady states are given, and attention is paid to systems in which Fick's Law is not applicable, and to mass transfer accompanied by chemical reaction.

The chapter on turbulence will be of considerable interest to those concerned with heat and mass transfer in turbulent systems. It starts with a summary of the theory of turbulence and then deals with a wide range of applications. It is followed by a chapter on mechanically aided liquid extraction which refers to the many recent developments in this field, including the use of agitated vessels, packed columns, pulsed columns and centrifugal extractors.

The final two chapters are likely to be of much less general interest to chemical engineers. The first deals with the use of automatic computers in the control and planning of manufacturing operations, and fields well outside what is generally understood as chemical engineering are entered. The volume concludes with a discussion of the use of ionizing radiations for the initiation of chemical reactions and for the sterilization of foodstuffs.

J. F. RICHARDSON

MECHANICAL VIBRATIONS

Mechanical Vibrations

By Prof. J. P. Den Hartog. Fourth edition. Pp. xii+436. (London: McGraw-Hill Publishing Company, Ltd., 1956.) 67s. 6d.

Practical Solution of Torsional Vibration Problems With Examples from Marine, Electrical, Aeronautical, and Automobile Engineering Practice. By Dr. W. Ker Wilson. Vol. 1: Frequency Calculations. Third edition, revised. Pp. xxxii+704. (London: Chapman and Hall, Ltd., 1956.) 105s. net.

Rayleigh's Principle and Its Applications to Engineering

The Theory and Practice of the Energy Method for the Approximate Determination of Critical Loads and Speeds. By Dr. G. Temple and Dr. W. G. Bickley. Pp. vi+154. (New York: Dover Publications, Inc., 1956.) 1.50 dollars.

MECHANICAL engineers who are interested in vibration will be quite familiar with Prof. J. P. Den Hartog's book. It has been required reading for years, and is one of the few really first-class engineering text-books that are a pleasure to read. Its author obviously enjoys writing books and clearly means his readers to enjoy reading them.

The layout of "Mechanical Vibrations" remains the same in this, its fourth edition. That is to say, it contains eight chapters which deal with kinematics of vibration, systems with one degree of freedom, systems with two degrees of freedom, many degrees of freedom, multicylinder engines, rotating machinery, self-excited vibration and, finally, systems with variable or non-linear characteristics. These subjects are covered lucidly and thoroughly and the book's essential freedom from mathematical sophistication is preserved.

Although changes have been made in every chapter, the most obvious differences appear in the last two. These now contain new material, with interesting

discussions of problems that have come to light in the past ten years. These treatments of self-excited vibration and of systems with non-linear characteristics are very fine pieces of technical writing indeed. Apart from the new material in the text, more than a hundred extra examples (with answers) have been included. This does not mean that the book has merely been expanded; it has had a proper overhaul and has, in fact, been shortened a little. This book is not primarily concerned with the mathematical theory of vibration. It is written for engineers who have practical problems to solve, and to them it can be recommended without reservation. This is engineering literature at its best.

Dr. W. Ker Wilson's book was first published in 1935 and a second edition appeared in two volumes in 1940. The third (revised) edition is again in two volumes, of which the first is here under review. The book has been completely rewritten and is now arranged so that each volume is self-contained. As its title implies, this book deals with a particular type of vibration, and does so in a very down-to-earth fashion. The author has a gift for clear explanation and goes into great detail, so that, for those who have to solve torsional vibration problems, this is an extremely useful book. While it is undoubtedly important as a work of reference, however, it would scarcely serve as a text-book. For one thing, it is too limited in its scope and, for another, its price is too great.

The chapters in the new first volume are devoted to the following topics: simple systems; frequency tabulations; multi-mass systems; simple geared systems; more complicated geared systems; coupling effects in geared systems; effective inertia method—concentrated mass systems; effective inertia method—distributed inertia systems; coupled torsional and flexural vibration in engine systems; equivalent masses; equivalent shafts; official requirements relating to vibration. Those who are familiar with the book will realize that the layout differs quite radically from that of the previous edition. Clearly, a great deal of thought and labour has been lavished on this rearrangement and the great value of the book has certainly been enhanced by it.

Those who are interested in the theory of vibration or in the subject of elastic stability will be glad of the renewed availability of the book by Drs. G. Temple and W. G. Bickley. For it, too, is well known. "Rayleigh's Principle" was originally published in 1933 by the Oxford University Press, but has been unobtainable for some years. It has now been issued by Dover Publications, Inc., as one of its series of inexpensive, but distinctly superior, 'paperbacks'. Although this book is mathematically more demanding than the two mentioned above, the reference in its title to engineering applications is by no means out of place. The authors' purpose is to present a fairly complete account of the principle and of the related theorems of Dunkerley and of Southwell. Ritz's method is dealt with in an appendix.

The Dover Company has done great service to scientists since the Second World War by making otherwise unobtainable books available at competitive prices. At least so far as theoretical mechanics is concerned, the books that have been re-issued by this Company have all been extremely well chosen and that by Temple and Bickley is no exception.

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