BOOK REVIEWS

Optics by Ajoy Ghatak. Published by Tata McGraw-Hill Publishing Co., Ltd., New Delhi, 1977, Pp. 558 + xx, Price Rs. 31·50.

Though any attempt to write a book on optics including traditional optics as well as modern developments like lasers and holography should be welcomed, it has its own drawbacks. The book starts with an introduction to what is light and proceeds through geometrical optics, vibration and waves, interference, diffraction, electromagnetic theory, particle theory and lasers. The book is profusely illustrated with sketches and plates.

It is not clear whether the book has been directed as a text for the undergraduate student or a book for self-study as the author claims. If it is the latter, then it is expected that the student is quite familiar with advanced vectors and matrices. The essential thrill of optics lies in the fact that experiments in optics demonstrate spectacular phenomena. This has been completely lost sight of in the present book. Students, particularly Indian students, are exposed to treatment of subjects in a theoretical way and this book adds one more to plod his weary way through. It would have been better if emphasis was placed on the design of experiments to supplement theory. To give two examples, the dry way in which lasers and holography have been dealt with, leaves much to be desired.

A few observations which detract from the merits of the book are made here. Concepts like coherence dealt with in Chapter 14 should be explained, physically with sketches and analogies, besides the mathematical representation. The physical appearance of the book could have been better if the print was larger and the figures were bolder with thick lines. A conventional terminology on page 240 for 'non-reflecting film' as anti-reflection film would be better.

This book could be useful as a text in universities and colleges, provided the instructor translates this into an exciting topic. The cost of the book is not so attractive as to encourage students to possess their own copy.

B. S. RAMPRASAD

Quantitative Techniques for the Analysis of Sediments. Edited by D. F. Merriam; Published by Pergamon Press Ltd., Oxford OX3 OBW; Pp. 176; Price: $ 18·50/ £ 9·25.

This is a collection of papers presented at international symposium held at the IX International Sedimentological Congress in Nice, France, on July 8, 1975. All contributions are from Western World, mostly from U.S.A. and U.K. Nearly half

of the papers deal with application of multivariate statistics, clustering procedure for classification of sedimentary environment, lake bottom desiments, petrographic data, etc. All these papers emphasize the final results and their interpretation to sedimentation process. In the process the authors did not even care to explain the special jargon used. With the result, for some one who is not familiar with both areas it becomes difficult to comprehend the rationale behind the application multivariate statistical techniques.

The rest of the papers deal with different aspects of sedimentary data analysis. The first paper describes computer software development for analysis and management of sedimentary data. The software system known as G-EXEC (Geologist Executive) developed at the Institute of Geological Sciences, London, enables any one to make use of a large collection of statistical programs to process his data without becoming a computer expert.

Another paper (10th in the collection) deals with an interesting problem of analysing the Silhouettes of grain outlines. This is done using Fourier transform of digitized grain boundaries. The Fourier coefficients are then clustered to show a bimodal distribution which was earlier found in the grain size distribution. This is interpreted as an effect of two different transport mechanisms. There are two papers on mathematical simulation.

The paper which describes simulation of sediment accumulation in deltaic system is particularly interestirg. The other papers deal with trend surface analysis, identification of discontinuities from areally distributed data and display of multiparameter data.

On the whole the book is very interesting to read. It provides a broad view of present status of mathematical geology as applied to sedimentology. However, the chief drawback is that the book assumes that the reader is familiar with both multivariate statistics and sedimentary geology. Evidently, there are only a few belonging to this set.

P. S. NAIDU

Inviscid Gasdynamics by Pradip Niyogi. Published by The Macmillan Company of India Ltd., Madras 600 002, 1977, Pp. 482 + xix, Price Rs. 40·50.

The book under review is an introductory course on gasdynamics, primarily intended, as the author claims, for post-graduate students of Applied Mathematics, Mechanical Engineering and Aeronautical Engineering. A couple of chapters may prove useful for research students in these disciplines as well. The contents are mainly theoretical in nature and seem to aim to give some of the mathematical techniques, numerical and analytic, for the solutions of equations describing gasdynamic problems. There is a clear reflection of the impact of the German School of thought in the area, which the author acknowledges in his preface.

The book begins with a chapter on thermodynamics that is essentially a collection of some simple concepts in the subject. The next two chapters deal with one-dimensional gasdynamic flows and introduce the basic concepts in wave motion and non-linear phenomena within a simple mathematical framework. The approximation of Oswatitsch for waves of finite amplitude has been explained in considerable detail and is illustrated with the help of an example. It would seem, however, that not much attention has been given to elaborate the notion of a simple wave, nor to its importance as a building block for various other approximations. Nor has the author given any physical interpretation to the exact solution (3.7) — the so called centered simple wave. Again, no mention has been made of Riemann's classical solution for the isentropic equations of gasdynamics.

Chapter IV involves the derivation of equations for unsteady three-dimensional flow and their simplification under different conditions. The setting has also been used to write down the linear perturbation equations for the flow past an aerofoil. This is followed by a chapter in which particular exact solutions to the basic equations are discussed. Due attention has also been given to the hodograph method by which the given equations become linear.

Chapters VI, VII and VIII deal with plane and axisymmetric steady flow at subsonic, supersonic and transonic speeds respectively. The last of these three chapters is particularly interesting as it deals with the specialisation of the author. Here the author has presented an overall view of the various approaches employed by different workers for tackling the problem. Besides enumerating the successive steps in each method of approach, the author has described the manner in which the solution varies with the changing Mach number. He has indicated the way the methods can be modified to account for shocks and finally he has explained how they can be extended to evaluate the solution for lifting aerofoils, axisymmetric bodies and three-dimensional wings. However, this chapter may have proved significantly more useful for research students if the author had taken the trouble to point out the inherent weaknesses or advantages of the respective methods. But this should not be considered a serious lacuna since the author has not particularly directed this book to specialists in any area.

Chapter IX on similarity rule may be considered as an extension of the previous chapter, whereas chapter X on steady hypersonic flow is quite different. The final chapter on subsonic and supersonic aerodynamics of wings and bodies was added primarily for the sake of completeness.

It is unfortunate that this book which is otherwise reasonably well written and probably the first by an Indian Fluid Dynamicist should suffer from a few drawbacks. The definition of transonic flow on Page 262, for example, is rather ambiguous. At times the language does not convey the precise meaning. To cite an instance, the word 'timely', used so often in the text, hardly means 'evolution with time,' as the author purports to say. There are several typographical errors which include some references to authors like Murman and Hayes, some mix-up as regards the references, and in a few cases the latter have been omitted altogether.

However, despite these shortcomings the book deserves all the credit that may be accorded to it. It will serve the needs of post-graduate and research initiates in the area to a large extent and the problems following each chapter will go a long way to help the students in this regard (though at times, one wonders, if so many hints are necessary). As a compendium of all the basic features and even certain 'well referred to' research papers in the area, the book does indeed fill a gap.

P. L. SACHDEV

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