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#### FOR MECHANICAL ENGINEERS

*Title* Mechanics of Deformable Solids

*Author* Irving Shames

*Publisher* Prentice-Hall, Inc., 1964

*Pages* vi plus 532

*Price* \$11.95

*Reviewer* Thomas V. Sheehan

Perhaps the most telling observation I am able to make for this book is to say that, during the three-month period in which I delayed writing this review, I used the book as reference material in the solution of several problems that came before us. The work has several characteristics that should appeal to practicing engineers.

1) It contains the classic static mechanics cases as one might remember them from elementary mechanics and, therefore, looks like a familiar friend; yet one is led smoothly into more-sophisticated analytical methods beyond the scope of elementary works.

2) New chapters often contain introductions that remind one of what has gone before and how this may help in tackling the next step.

3) The diagrams and illustrations, on which the analysis are based, are excellent and, more often than not, clearly relate to the everyday situations that engineers encounter.

4) The problems are practical and recognizable as having strong foundations in reality.

The book is divided into three major sections. Part I is concerned with the fundamentals of the Theory of Elasticity. Part II deals with analysis of beams, columns, shafts, etc. with additional references to energy methods. The third subdivision of the text is a series of ten appendices, which are generally designed to enable the user to apply more-advanced analytical methods of the material covered in earlier chapters, if desired. The tenth of these appendices is a well-organized description of properties of engineering materials. It was prepared by F. A. Cozzarelli and describes in a lucid fashion the influence of the nature of the atoms and their molecular

lattice structure on the properties of material. This appendix also treats at length the mechanism of various kinds of physical deformation, including thermal expansion, creep, and static and fatigue slippage.

The reviewer believes this work would be valuable both to engineers who are practicing in fairly advanced stress analysis and to those who do not have the time or duty to carry out this kind of work, but who wish to know, in a general way, the things that need be done to be sure of good solutions.

*Thomas V. Sheehan is a Senior Mechanical Engineer at Brookhaven, where for the past several years, he has been managing the Brookhaven technical group designing the new High Flux Beam Reactor. After receiving the BS degree (mechanical engineering) from the University of Illinois, he spent many years in the oil refining field, in engineering design and operation of processing equipment. With Brookhaven since 1947, he was involved in the mechanical and process design of the Brookhaven Graphite Research Reactor. Later he formed in the BNL Nuclear Engineering Department, an engineering and construction group responsible for design and construction of facilities for the research staff.*

#### A MISDIRECTED EFFORT

*Title* Analytical Chemistry of the Actinide Elements

*Author* Alfred J. Moses

*Publisher* Pergamon Press, 1963

*Pages* vii plus 137

*Price* \$6.00

*Reviewer* L. Newman

As a person intimately involved in the analytical chemistry of the actinide elements, I would not hesitate to purchase a copy of a new book with a name such as this. Surely the same applies to many other people and most libraries. I am sorry to have to report that all who try to use the book will probably be dissatisfied.

Moses has written a very short book, less than 100 pages of text, on what is admittedly a specialized field that might, therefore, warrant a short intensive treatment. However, in this limited space the author attempted to cover all aspects of the analytical chemistry of the actinide elements, including such things as a chapter to introduce the reader to nuclear instrumentation. What results is a very sketchy book, the value of which is reduced still further by the author's frequent selection of methods that are not in general usage.

The author appears to be almost completely misdirected in his selection of topics. It is hardly necessary to devote one quarter of the chapter on separations to graphs of ion-exchange data for all the elements in the periodic table. These fine works are of great general utility but do not particularly pertain to the actinide elements, and a simple reference to them would have been sufficient. The photographs of such items as survey meters, counting room, and sample insertion into a pneumatic tube do not make a worthwhile contribution. An appendix consisting of 12 pages on nuclear data could well have been eliminated from a book as short as this.

A book of this specialized nature should be directed to practicing scientists; unfortunately, it is written more at the level of a college sophomore. The author in writing this book has contributed almost nothing to the field of actinide chemistry. The publishers must also share in this blame for it is feared that, in their desire to have a book with this title on the market, they were not careful enough in specifying what the objectives of such a book should be.

*Dr. Leonard Newman is Leader of the Analytical Chemistry Group of the Hot Laboratory Division of Brookhaven National Laboratory. His research work at Brookhaven has included studies on the complex-ion chemistry and solvent-extraction properties of the actinide elements. He received his PhD degree from the Massachusetts Institute of Technology in 1956 and his BS degree from The Polytechnic Institute of Brooklyn in 1952. He has recently completed a year as a visiting scientist in the laboratory of L. G. Sillen at the Royal Institute of Technology in Sweden.*

## HOW TO MEASURE NOTHING

**Title** Pressure Measurement in Vacuum Systems

**Author** J. H. Leck

**Publisher** Chapman & Hall, Ltd., 1964

**Pages** xii plus 221

**Price** 45 shillings

**First edition** 1957, reprinted 1960

**Reviewer** C. H. Bachman

This book stays close to the subject matter of its title, and it does its job well. As in the first edition the various gauges have been divided into four basic types, and a

chapter has been devoted to each. Bringing these up-to-date in this second edition has required expanding the chapter on mechanical manometers to incorporate new developments in McLeod gauges. Similar expansion is required in connection with ionization gauges, there having been a considerable activity in this area since the first edition.

In view of the remarkable activity presently being experienced in the field of vacuum technology, there is a hesitancy to use the term "up-to-date" in a review such as this. However, remembering that the mechanics of book publishing does introduce an unavoidable delay, it must be concluded that in coverage the author has kept close to a fast-moving field.

The chapter on gauge calibration has been cautiously but solidly enlarged. The problems encountered in gauge calibration are presently being studied by those engaged in preparing calibration standards, and, when this area is in more satisfactory shape, a much larger chapter will be in order. From his remarks closing this chapter it is evident that the author is aware of this state of affairs.

A newly added chapter to this second edition gives recognition to the increasing importance of an understanding of the residual gases in vacuum systems. It would seem to me that a little background material would have been a very useful addition at the beginning of this chapter. On the other hand the title does restrict coverage to measurements. In any case this chapter will be of value to the many vacuum workers who eventually will find themselves concerned with residual gas problems.

All in all I feel that in coverage this second edition is well-done, and in style and organization it appeals to me personally.

I have one adverse criticism, directed not to the author but to the publisher. The quality of reproduction of the line drawings is just plain bad. In the curves of one illustration, lines that had been solid in the first edition had, in the later printing process, become broken lines. In one circuit diagram a solid line has bled laterally so much that it could nearly be mistaken as a resistance symbol. In some cases figure numbers are not clearly discernable. The usefulness of the book is not impaired but there isn't much leeway for further degradation in quality, and one wonders if the traditional pride in craftsmanship of the bookmaker is in decline.

*C. H. Bachman is a Professor of Physics at Syracuse University. He obtained a PhD in physics from Iowa State University, after which he spent a dozen or so years in industry before turning to academic work, although consulting and leaves of absence have kept him in touch with industry. He was a Fulbright lecturer in Calcutta, India for one year. His active interest in vacuum has been continuous. For a number of years he was chairman of the Standards Committee of the American Vacuum Society. He is a past president of that Society and a member of its Board of Directors.*