The book must be reviewed as a collection of papers presented as an extension course to listeners who have a wide range of backgrounds and interests. As such, it should not be faulted for review material and references less extensive than Darwin and Buddery's *Beryllium*, a definitive review and critique of the beryllium literature to 1960. Nor is H. H. Hausner's book to be judged as a text, which it is not.

For a survey volume, several authors should have been more diligent in including material other than their own and should have concentrated on telling rather than selling. Trade names have become traditional, for lack of industry standards, but they detract from readability and usefulness. More ruthless editing might have pruned some excessive detail and questionable data. The most serious criticism is lack of an index, without which such references are most difficult to use effectively. Note should be made of possible obsolescence, since this is a survey as of March, 1963, and technological advances since that date are numerous.

*Norman P. Pinto, Vice President of The Beryllium Corporation, graduated from MIT and has been active in the beryllium field since 1943. He conducted research on the fundamentals of beryllium powder metallurgy and later managed a major beryllium refinery and production plant. Currently, he is responsible for research and development in beryllium and beryllium alloys. He has contributed significantly to the literature on beryllium metallurgy.*

## A PAINLESS PILL

*Title*  Sampling

*Author*  Morris James Slonim

*Publisher*  Simon and Schuster, 1966

*Pages*  xiii + 143

*Price*  $1.45 (paperback)

*Reviewer*  Margaret K. Butler

The author has based this book on notes originally published in a US Air Force Statistical Services Technical Letter written to instruct Services personnel in sampling and the value of the sampling technique. It is essentially a sales pitch for the use of sampling, prepared for those unfamiliar with this statistical tool.

The paperback consists of an expanded glossary of sampling terms—universe, sampling with and without replacement, tolerance, confidence limits, sampling error—and methods including random sampling, stratified, cluster, and systematic sampling. Even interpenetrating replicate subsamples are defined, all in a highly palatable style accompanied by humorous examples and drawings. Brief descriptions of polls, television program ratings, quality control, and acceptance sampling

procedures are also included as well as a wide variety of case histories giving the reader the impression of having covered the sampling waterfront albeit in a somewhat breezy fashion.

The book is an interesting extracurricular evening's reading. If after this sugar-coating one elects to swallow the pill and use sampling it would be wise to devote a few additional hours reading more substantial tests on statistical methods. If not, he's had an enjoyable experience, painlessly acquiring an overview of the subject.

*Margaret Butler is a mathematician in the Applied Mathematics Division of Argonne National Laboratory. After receiving her BA degree in mathematics from Indiana University, she served as a statistician with the US Bureau of Labor Statistics in Washington, D. C., and the US Air Forces in Europe. She has been a member of the Argonne staff since 1948, except for a two year break when she headed a Minnesota-US Bureau of Labor Statistics payroll project in St. Paul, Minnesota.*

## FORMULAS - HUNDREDS OF THEM

*Title*  Formulas For Stress and Strain (4th Ed.)

*Author*  Raymond J. Roark

*Publisher*  McGraw-Hill Book Company, 1965

*Pages*  xiii + 432

*Price*  $12.50

*Reviewer*  M. M. Lemcoe

This book brings together, in working-reference form, basic definitions, assumptions, formulas, and principles pertaining to strength of materials. Part I comprises two chapters which contain definitions of pertinent terms used in strength of materials or materials technology, and the symbols and units used in formulas appearing later in the book.

The four chapters of Part II deal with the general behavior of materials under stress, failure criteria, and effects of materials properties on the static, dynamic, and fatigue behavior of materials. In addition, the basic principles, analytic and experimental methods or tools used in stress and deformation analysis are described, including brief sections on dimensional analysis, equations of motion and of equilibrium, principle of superposition, and strain energy methods.

Formulas for calculating the combined stress at a point are presented in Part III, comprising eight chapters. An introduction to the theory of the bending of straight or curved beams is given, along with formulas for shear, moment, and deflections of: beams and reactions in rigid frames; beams of great depth or width; beams subject to simultaneous axial and transverse loading; circular rings and arches. Shear lag, beams

with very thin webs (diagonal tension field beams), un-symmetrically loaded beams, beams on an elastic foundation, beams of variable sections, and plastic design of beams, are also discussed. Formulas for computing the flexural centers of beams of special shapes are included.

A discussion of torsion in circular and non-circular members with formulas for torsional deformation and stress, including methods for calculating stresses in helical springs, is followed by formulas and tables for calculating stresses and deflections in flat plates for a variety of loading and boundary conditions, including a procedure for dealing with plates of variable thickness. Formulas for taking into account the deflection due to shear are also given.

Procedures and formulas for analyzing columns and other compression members subject to varying end conditions, eccentric loading, initial curvature, combined loading, local buckling, etc., are given for both solid and built-up members.

Next, formulas are presented for calculating the stresses and deformations in thin- and thick-walled pressure vessels and piping subjected to internal or external loads. General calculational procedures are presented for the determination of the discontinuity shears and moments in thin-walled vessels. Formulas for calculating stress and strain between two contacting elastic bodies are given for spheres, cylinders, knife edges, rivets, pins, gear teeth, and other miscellaneous gases are followed by formulas for calculating the elastic stability of bars, rings, plates and shells, along with a discussion and formulas for calculating dynamic and temperature stresses in bars, plates, and shells. Finally, formulas for calculating stresses due to impact and natural frequencies of beams for various end conditions are presented.

Sufficient examples are worked out and adequate references are provided to enable the analyst or designer to readily apply the formulas. The book is highly recommended as a reference for anyone involved in structural design or analysis.

*M. M. Lemcoe is a Senior Technical Specialist at Atomics International, specializing in experimental mechanics and high temperature structural analysis of power reactors. He was formerly with Southwest Research Institute, where he headed the Strength Analysis Section in the Structural Research Department. His special fields include pressure vessel research, high temperature strain measurements, model analysis, and high temperature materials behavior. He has written numerous publications in his field and is a member of Sigma Xi and the Scientific Research Society of America. His PhD in engineering is from the University of Illinois.*

## BOOK ANNOUNCEMENTS

Although the following books will not be reviewed, they may be of interest to some of our readers:

*Glass-Ceramics*, P. W. McMillan, Academic, 1965, 229 pp, $7.50.

*Albert Einstein and the Cosmic World Order*, Cornelius Lanczos, Interscience, 1965, 139 pp, $3.95.

*Introduction to the Theory of Relativity and the Principles of Modern Physics*, Huseyin Yilmaz, Blaisdell, 1965, 217 pp, $8.50.

*An Introduction to Radioactivity*, E. N. Jenkins, Butterworth, 1964, 193 pp, $5.95.

*Current Topics in Radiation Research*, Vol. I, M. Ebert and A. Howard, eds., 1965, 272 pp, $8.40.

*In-Pile Dosimetry*, International Atomic Energy Agency, 1965, 107 pp, $2.50.

*Relativity and the New Energy Mechanics*, Jakob Mandelker, Philosophical, 1966, 84 pp, $4.00.

*Non-Destructive Testing in Nuclear Technology*, International Atomic Energy Agency, 1965, Vol. I, 391 pp, $8.00; Vol. II, 446 pp, $9.00.

*Pulsed Neutron Research*, International Atomic Energy Agency, 1965, Vol. I, 698 pp, $14.00; Vol. II, 917 pp, $18.00.

*Physics and Chemistry of Fission*, International Atomic Energy Agency, 1965, Vol. I, 635 pp, $13.00; Vol. II, 469 pp, $10.00.

*Report on the Elevated-Temperature Properties of Stainless Steel*, Ward F. Simmons and John A. Van Echo, American Society for Testing and Materials, 1965, 208 pp, $6.00.

*Radioiostope Techniques in the Study of Protein Metabolism*, International Atomic Energy Agency, 1965, 258 pp, $5.50.

*Advances in Insect Population Control by the Sterile-Male Technique*, International Atomic Energy Agency, 1965, 79 pp, $2.00.

*Protection of the Public in the Event of Radiation Accidents*, International Atomic Energy Agency, 1965, 370 pp, $7.25.

*Public Health and the Medical Use of Ionizing Radiation*, International Atomic Energy Agency, 1965, 41 pp, $1.00.