advisory groups, he provides plenty of evidence, circumstantial though it may be, to substantiate his claims. In general, however, his comments are not in the nature of sniping. Rather, they comprise a realistic appraisal of the effects of science, business, and government on one another. He presents a convincing argument against the likelihood of the unlimited ascendancy of technocracy, while recognizing the impact of burgeoning R&D on the economic and political facts of life.

The temptation to preach has been admirably suppressed in a section on the life sciences, neither condemning nor defending the assaults of biology on the so-called "secret of life." If you are looking for answers to the philosophical and moral questions involved, look elsewhere. It was quite clearly Mr. Gilman's intent to avoid giving answers, though he has no hesitation in raising disturbing thoughts, both directly and by inference, throughout this work. He is apparently satisfied (quite properly so, we think) with stimulating his reader to further consideration of the subjects.

In summary, the book comes highly recommended, both to you as a scientist or engineer who wants a quick overview of other fields, and to your reasonably intelligent nonscientific neighbor who expects you to speak with authority on all phases of scientific endeavor. This volume does both for you, and it is cogent and entertaining in the process.

Dudley Thompson is Reactor Operations Group Leader at Brookhaven National Laboratory. He is active in the Reactor Operations Division of ANS, and in January of 1965, was appointed Associate Editor of NUCLEAR APPLICATIONS. *He is a West Point graduate, with an MS from Purdue University.*

MECHANICAL ENGINEERS GO MODERN

Title ASME Handbook, Metals Engineering—Design (2nd Ed)

Editor Oscar J. Horger

Publisher McGraw-Hill Book Company, 1965

Pages *xviii* + 619

Price $22.50

Reviewer Albert R. Kaufmann

This book is a second edition of one volume of a set of four known collectively as the *ASME Handbooks*. The series is sponsored by the Metals Engineering Handbook Board of the American Society of Mechanical Engineers and was first published in the early 1950's. It is not clear to me whether or not the other volumes are to appear as second editions. This is of some importance, since all four books might be needed by a reader to make maximum use of the information in any one of them. For example, the compilation of the properties of materials is to be found in another volume, *Metals Properties*, the first edition of which is somewhat out of date. In spite of this problem, the book being reviewed has much merit by itself.

It may be inferred from the name of the sponsoring agency and from the preface that mechanical engineers (and hopefully all engineers) recognize the complexity of using materials efficiently. In modern structures and machines, it is no longer feasible to ensure satisfactory performance by the simple expedient of using a large factor of safety to cancel out uncertainty in the basic properties, the environmental response, and the product quality of the material being specified. This situation is discussed succinctly in Part I of the book, "Selection of Materials." It is pointed out that many seemingly minor factors in the processing history of the material or in the conditions of use may be important in determining satisfactory performance and that these considerations are further complicated when cost questions are brought into the problem.

The second part of the book, "Mechanical Properties of Metals in Design," consists of almost 40 articles on subjects such as thermal stresses, brittle fracture design, residual stresses, vibration, fatigue, wear, and shock and impact. Each of these articles is an excellent review of its subject and is particularly valuable to a designer in making him aware of the importance of processing or environmental factors, a point which probably was not mentioned when he studied the general subject in college. An attempt is made to arrange the articles under principal topics, but in some cases, the individual subjects are developed so broadly that the connection with the principal topic is almost incidental. Nevertheless, each of the discussions is authoritative and will be useful and interesting to one looking for information on such highly specialized subjects as shot peening, metallic coatings, riveted joints, and shrink-fitted assemblies which all appear under the topic, "Fatigue Considerations Resulting from Processing." Usually there are many references to additional sources of information, often to books authored by the writer of the article.

The first portions of Part III, "Other Physical Properties Affecting Design," review the effects of stress corrosion and irradiation on the behavior of metals and alloys and again caution the designer on unusual sources of trouble. The section on electrical and magnetic properties comprises a straightforward discussion and listing of data that probably can be found in an electrical engineering handbook, but it is notable in that it covers the newest materials.

Six excellent articles on nondestructive testing comprise Part IV. Each of these first explains the theory of the method and then describes the equipment used, specific applications, and limitations of the procedure. With this information, the reader can decide which technique to explore further for solving his own problems and can better understand the use of testing equipment that he already has in operation. Again there are many references. This portion of the book serves to make the modern engineer aware of the importance of quality control in manufacturing and of the need for routine inspection for incipient failure during use.

The last part of the book, "Design Considerations," covers various aspects of design theory and also of experimental aids to design, such as photoelasticity, strain gages, and even radioactive isotopes. It is useful to a practicing engineer to have this information assembled in convenient form both to make him aware of new techniques and to get him started on applying the knowledge to his own problems.

My general reaction to the book is that it contains a great deal of information on a multitutde of subjects on which a designer of equipment using metals should be knowledgeable. This second edition includes topics brought into existence by the nuclear and space ages. Most of the articles are written in book or lecture style and contain numerical data only for illustrative purposes, but they give the reader a quick education on specific topics and direct him to more detail through the references. The book should be particularly valuable to engineers or scientists who only occasionally need to design equipment and who may not have a large reference library readily available to them. It should be mentioned that the book was printed somewhat carelessly in terms of typographical errors and sometimes crudely portrayed figures, but this amounts only to an occasional annoyance and is not a major detraction from its value.

Albert R. Kaufmann served on the MIT staff from 1937 to 1955, doing research on the magnetic properties of metals and later on the development of nuclear reactor materials, particularly uranium, beryllium, and zirconium. The latter work involved both fundamental studies and applied research on the production of fuel elements for various reactors. He worked on the Manhattan Project, was head of the MIT Metallurgical Project from 1946 to 1955, and since then, has been Vice President and Technical Director of Nuclear Metals. His BSME (1933) is from Lafayette College, and DSc in Metallurgy (1938), from MIT.

BOOK ANNOUNCEMENTS

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

Radioactive Investigations of Oil and Gas Wells, O. A. Barsukov et al, Pergamon, 1965, 299 pages, $12.00

Flow and Fracture of Metals and Alloys in Nuclear Environments, (symposium presented at 67th annual meeting of ASTM, June, 1964), American Society for Testing and Materials, 1965, 470 pages, $24.00

Optical Pumping: An Introduction, R. A. Bernheim, ed., Benjamin, 1965, 272 pages, $9.00

The Use of Radioactive Isotopes in Tuberculosis Research, (proceedings of the International Symposium held in May, 1963), J. F. Pasquier, L. Trnka, and R. Urbancik, eds., Pergamon, 1965, 178 pages, $10.00

The Propagation of Gamma Quanta in Matter, O. I. Leipunskii, B. V. Novozhilov, and V. N. Sakharov, Pergamon, 1965, 222 pages, $15.00

Personnel Dosimetry for Radiation Accidents, International Atomic Energy Agency, 1965, 714 pages, $14.00

LETTER

Letters, unlike papers and technical notes, are for the rapid publications of both fact and opinion on technical subjects and are therefore not subject to the referee review process.

MORE ON STACK RELEASE PROCEDURES

Dear Sir,

With reference to Mr. Brasher's letter (**Nuclear Applications,** October 1965) and Mr. Hull's letter (**Nuclear Applications,** February 1966), it should be explained that the GETR was one of the early test reactors licensed under stack effluent criteria based on concentration limits. Stack isolation occurs when effluent radioactive gas concentrations reach 10^{-4} μC / cm^3. In view of this, the advantages for effluent dilution, described in the original article on "The Evaluation and Measurement of Reactor-Safety Performance" (**Nuclear Applications,** June 1965), are valid. It should be noted that, at this concentration and a maximum stack flow of 18 000 ft^3/ min, the effluent release rate is 850 μC/sec. At present, we are relicensing GETR for 50 MW operation, and the effluent criteria will be based on diffusion techniques. These calculations show that a safe release rate is 400 000 μC/sec. It is evident, therefore, that our present release criteria are very conservative and that, in principle, we are not "Circumventing" release limits. Based on current release criteria, Mr. Hull's comment is entirely correct.

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