

Chemical Analysis of Cast Iron and Foundry Materials

By W. Westwood and A. Mayer. Second edition, revised by W. E. Clarke and H. Green. Pp. 586. (London: George Allen and Unwin, Ltd., 1960.) 63s. net.

THE analytical methods presented in this volume have been thoroughly tested in the laboratories of the British Cast-Iron Research Association. Fully detailed instructions are given in each case, and the practical details are accompanied by discussion of the relevant theory. In all cases, a general survey of existing methods is given, and the relative merits of alternative procedures are considered.

In this second edition the revising authors have modified or replaced a number of methods, according to experience and the results of analytical research. Such research has yielded an interesting new scheme for the analysis of cupola slag. A complete analysis of this material can now be carried out in less than one working day, with an accuracy comparable with that obtained by classical methods.

The short section dealing with laboratory practice and apparatus now includes a description of separations by solvent extraction procedures. Instrumental methods receiving brief attention are flame photometry, polarography, spectrography and X-ray fluorescence spectrography. A description of a particular absorptiometer has been replaced by a general account of the basis of absorption spectrophotometry and of spectrophotometric instruments—a particularly sensible modification to the text.

The methods given in this book are capable of wider application than the title suggests. The clarity with which the subject-matter is presented makes it possible for the analyst to assess the applicability of the individual methods to general inorganic analysis, as well as to the analysis of all classes of ferrous materials.

F. L. SELFE

Theoretical Elasticity

By Carl E. Pearson. (Harvard Monographs on Applied Science, No. 6.) Pp. xi+218. (Cambridge, Mass.: Harvard University Press; London: Oxford University Press, 1959.) 48s. net.

THE writer of this book states that its purpose is in part to discuss modern methods in elastic theory, and in part to provide a compact summary of such methods.

The first four chapters contain a detailed account of vectors and Cartesian tensors, and of their use in describing infinitesimal strain and stress. Chapter 5 gives a summary of the basic equations of classical elasticity, and Chapter 6 a useful and interesting account of the general methods of solution associated with the names Somigliana, Betti, Kelvin, Boussinesq, Papkovitch-Neuber, Galerkin and Maxwell-Morera. Chapter 7 describes variational methods, though without illustration or application. Chapters 8 and 9 deal with topics in thermoelasticity and time-dependent problems, and Chapter 10 gives a brief introduction to non-linear elasticity.

The treatment is somewhat uneven; elementary topics are treated at considerable length and advanced topics sketched briefly. Some references are given, but not always enough to enable the reader to find proofs which have been omitted by the author.

J. F. BAKER

Physical Metallurgy of Stress Corrosion Fracture

Edited by Thor N. Rhodin. (Metallurgical Society Conferences, Vol. 4.) Pp. xiii+394. (New York: Interscience Publishers, Inc.; London: Interscience Publishers, Ltd., 1959.) 98s.

AN engineer of great experience has recently stated that in no less than 27 per cent of all cases submitted to him for investigation the primary cause of the failures was ascribable to corrosion in one form or another, and in the majority of instances while the metal was under stress. The papers presented to the symposium recorded in this book give a very good account of the present state of knowledge regarding stress-corrosion and add to what is already known. In view of the important role of the crystal boundaries in leading to such trouble, it is, for example, valuable to have clear proof that the effect can occur even in single crystals. Since, if a solution of this extremely elusive problem is to be found, it can only arise from fundamental work, it is appropriate that more than half the book is devoted to the more theoretical aspects of the subject. Of the more immediately practical papers, although the stainless steels receive most attention, both mild steels and non-ferrous alloys are considered. This is an excellent account of the complex phenomena concerned with stress-corrosion failures and may be recommended unhesitatingly.

F. C. THOMPSON

The Cathode Ray Tube Memory of the High Speed Electronic Computer of the U.S.S.R. Academy of Sciences

By V. N. Laut and L. A. Lyubovich. Translated from the Russian by Ruth Feinstein. Edited by F. A. Sowan. Pp. xi+90. (London and New York: Pergamon Press, 1960.) 35s. net.

THIS book describes the 1,024 word store used in the *B.E.S.M.* digital computer, which operates in parallel with a 39-bit word-length at a pulse-rate of 80 kc./s.

The first two chapters include a block diagram of the store organization, and a description of the storage tube, a barrier grid type using an aluminium back plate which stores 1,024 bits of data as a pattern of electric charges. Chapters 3 and 4 cover the writing and reading circuits used with the storage tube, and the balanced bridge circuit which isolates the reading and writing amplifiers. Chapter 5 describes the decoding of the address digits, the generation of the appropriate storage-tube deflexion voltages, and gives a discussion of the accuracy and stability of the spot position. Chapters 6-8 deal with the control unit, including test facilities, the coupling to the main computer, and the initial setting-up procedure. The final two chapters deal with the mechanical aspect of the store, and its performance in service.

Since the latest reference is dated 1955, the original text was presumably written in 1955 or 1956, and the type of storage described is generally considered obsolete. It has indeed been reported that the *B.E.S.M.* computer was equipped with magnetic-core storage in 1959 to replace the cathode-ray tube store. Thus, although the book gives a comprehensive account of the design and operation of the store, it should be regarded as a contribution to the literature of electrostatic storage tubes, rather than an account of present-day practice in digital computer engineering.

J. C. CLULEY