

## STRENGTH OF MATERIALS

### Resistance of Materials

By Prof. Fred B. Seely and Prof. James O. Smith. Fourth edition. Pp. xvi+459. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1956.) 52s. net.

THE subject 'strength of materials' covers the study of the relations between applied loads and the stresses and strains caused by them in basic structural and machine elements; it is a fundamental part of all undergraduate courses in engineering and there are a large number of text-books dealing with it. When faced with a new book on such a well-documented subject the reviewer must therefore ask first whether the authors are justified in adding to an already extensive literature. The book under review is the fourth edition of a text-book first produced in 1925 by two professors of the University of Illinois; it has been extensively re-written and contains a good deal of additional material—it is therefore appropriate to think of it as a new book.

The book differs in two ways from many other text-books in this field. The authors explicitly define the relation of their subject to the basic subject of mechanics and direct the attention of students to the very important difference between methods of analysis and methods of design; and they do not limit their field of interest to the elastic behaviour of structural components. On these grounds alone the publication of this book is very welcome.

The authors make it clear to the reader, both by explicit statements and by the way in which problems are worked out, that this subject essentially deals with conditions of statical equilibrium and conditions of the compatibility of displacements; that the ultimate purpose is not only to determine the bending moments, shear forces, stresses, strains, etc., in an existing or specified structure, but also to determine the dimensions of structural components, suitable for their purpose: to carry specified loads without collapsing or without exceeding prescribed deformations. This realistic approach leads on naturally to the inclusion of sections on the inelastic behaviour of the basic structural components and, in fact, every chapter in the first part of the book contains separate sections on elastic and inelastic behaviour. The chapters of Part 1 deal with elementary topics: torsion, bending, the deflexion of beams by the moment-area method, combined axial and bending loads, the instability of columns, statically indeterminate members, analysis of stress, fatigue and dynamic loads. Part 2 covers the additional topics of composite beams, unsymmetrical bending and elastic vibrations of structural members, together with chapters on three further methods of obtaining the deflexion of beams: the double integration method, the conjugate-beam method, and the use of the theorem of three moments.

The inclusion of material not usually covered in elementary text-books has led to the exclusion of topics such as the analysis of strain and strain energy methods. In common with all American text-books I have seen (or for that matter most English text-books whose authors were not closely connected with the Department of Engineering of the University of Cambridge), the authors do not appear to be aware of the great economy of effort which is achieved by the use of Macaulay's<sup>1</sup> method when using the double-integration approach for the calculation of the deflexion of beams.

It is a common experience for university teachers to find that the introduction into undergraduate courses of new material based on recent developments is criticized by their colleagues on the grounds that this material involves new and difficult ideas. Fortunately these prophecies of doom are often proved false—the undergraduate to whom all the material is new does not share the prejudices of his elders, who can distinguish between what is familiar and unfamiliar to themselves. There seems no doubt that an elementary presentation of inelastic behaviour on the lines proposed by the authors of this book would enliven the teaching of strength of materials in the many universities where this has not yet been attempted and would not be found unduly difficult even by first-year students.

E. K. FRANKL

<sup>1</sup> Macaulay, R., "Note on the Deflection of Beams", *Messenger of Mathematics*, 48, 129 (1919). See also, for example, Southwell, R. V., "Theory of Elasticity", p. 187 (Oxford University Press, 1941); or Case, J., "Strength of Materials", p. 225 (Edward Arnold and Co., London, 1941).

## FUNGICIDAL ACTION

### Principles of Fungicidal Action

By Dr. James G. Horsfall. (A New Series of Plant Science Books, Vol. 30, issued under the auspices of the International Plant Science Publications Society.) Pp. xx+280. (Waltham, Mass.: Chronica Botanica Company; London: William Dawson and Sons, Ltd., 1956.) 6.50 dollars.

THIS book, by one who has long been the leader of a very prolific group in fungicide research, is a commentary rather than a text-book, although it covers the field remarkably well. It is a development of the author's earlier (1945) book, "Fungicides and their Action", issued by the same publishers, which gave considerable attention to the uses of the dosage-response curve and to problems of protectant fungicide application. The author is still impressed with the *DR* curve, as he calls it, but the four chapters on deposition, coverage and tenacity have been reduced to one. On the other hand, a good deal more can now be said about the mode of entry of a protectant fungicide into the spore or germ-tube of a fungus, and four chapters are devoted to problems of mobilization, permeation and intrinsic toxicity, and a paragraph in the earlier book on Zentmyer's observation of antagonism between oxine and zinc now becomes a chapter on chelation of needed metals, though the term 'chelation' is used rather broadly.

The enormous developments since the Second World War in organic fungicides are reflected in the inclusion of chapters on organo-sulphur compounds; ketones, including quinones; and heterocyclic compounds. In spite of the world-wide efforts to find substances suitable for chemotherapy, by which the author means attacking a pathogen already within the plant, there is suitable material for only one chapter on this El Dorado of biologist and chemist alike, a chapter longer than that in the previous book but concerned mainly with work published during 1950-54.

This stimulating book is somewhat marred by various signs of haste. Thus a little more care in proof-reading could have avoided a number of errors, particularly several misleading references to figures. Re-calculation would quickly have shown that the arithmetic on p. 49 is wildly inaccurate,