almost obsolete in favour of method 3, which is given on p. 329. Editorial cutting to remove such surplus information would be advantageous.

As regards the contents, there are chapters on surface dressing and the methods of preventing wet-weather damage to it, together with details of the plant and technique required. The method of working out the rates of application, however, does not entirely agree with that favoured by the Association of Road Surface Dressing Contractors, who prefer to decide first on the size of chipping necessary to carry the traffic on the particular road surface in question, and then to adjust the rate of spread of tar or bitumen binder to suit. This book tends to transpose the emphasis on these two variables. Both methods should, however, produce the same result.

The most important part of the contents, however, deals with asphalt, dense tar surfacing and coated macadam, and the bulk of thirteen chapters (out of twenty-seven) is very rightly devoted to these materials. It is on this particular subject that dissemination of knowledge is at present so badly needed. The text covers details of the specifications available, including the latest types of coated macadam which must be laid hot, together with methods of manufacture, control, laying, sampling and testing. There is a good section on the plant necessary for mixing the materials and for laying them successfully.

This book should be of great value to universities and technical colleges, who hitherto have had no text-book from which to work, and have thus been unable to devote much of their curricula to the subject of flexible road construction. The fact that more than 90 per cent of all roads in Great Britain are of this type clearly shows the need for this book.

It is very much easier to criticize than to originate a work of this nature, and such minor comments as have been made are heavily outweighed by the excellence of the book as a whole, the writing of which must have been an enormous task. It is good value at 42*s*. for a book of 611 pages, very fully illustrated with photographs and diagrams, and no design office or professorial desk dealing with roads should be without one. S. A. Stewart

## DATA FOR ENGINEERS

### Kempe's Engineers Year-Book for 1963

Edited by C. E. Prockter, under the direction of B. W. Pendred. Vol. 1: Pp. xiv + 1324. Vol. 2: Pp. viii + 1394. (London: Morgan Brothers (Publishers), Ltd., 1963.) 92*s*. 6*d*. the two volumes.

EVERY engineer has to deal occasionally with a problem which is outside his experience; for example, the electrical engineer can be confronted with the design of a simple structure for supporting equipment, and civil and mechanical engineers might have to deal with problems concerning minor electrical plant. A variety of hand-books is available which can be useful to engineers in these circumstances and which provide guidance for the non-specialist generally. Indeed, some of the contents of hand-books, such as mathematical tables and formulæ, tables of properties of materials, steam, steel sections and standard manufactured components, as well as summaries of British Standards and codes of practice, is exceedingly useful to all engineers at all times. On the other hand, the value of the abbreviated theory as provided by most hand-books is doubtful: it can serve as a reminder but is unsuitable for the uninitiated. The details of plant and equipment which are usually featured in hand-books, to a greater or less extent, are useful provided they are revised frequently.

It is believed that hand-books would be more useful for one of the purposes for which they are apparently intended if more formulæ representing solutions of standard problems were provided, with appropriate diagrams and clear statements of assumptions and limitations as well as references to authoritative texts. For example, in the field of structures symbolic solutions exist for a wide variety of beam systems and frameworks subjected to various loading conditions. Such material would be far more useful in a hand-book than an attempt at a brief summary of theory of structures, which might in fact be misleading.

*Kempe's Engineers Year-Book* is, perhaps, one of the most complete, regularly revised hand-books in English which is available to the engineer. Its contents are provided by specialist contributors and include general data, theoretical matter, design data and details of plant, materials and equipment relevant to every branch of engineering. Some of the less-obvious aspects considered are plastics, grinding, abrasives and polishing appliances, forging plant, powder metallurgy, ropeways, lifts, handling equipment, railway signalling, industrial safety, fire protection, public health engineering, paints, patents depreciation and law.

The standard of the theoretical matter varies widely: for example, that included in the sections on gas, steam and water turbines is of high standard and many useful data are provided. On the other hand, some of the sections devoted entirely to theory, such as those on thermodynamics and theory of structures, are pedestrian and of little value.

Important aspects which receive little or no attention in the book include flexibility of piping systems, plastic theory of collapse of structures and the design method derived therefrom, water hammer, experimental stress analysis and steam-power plant cycles.

There are extremely useful sections on many topics, including nuclear power, aerodynamics, electrical engineering, internal combustion engines, marine engines, fuels, naval architecture, surveying, concrete and water engineering to mention but a few. It is interesting to compare the approaches in the sections on nuclear power and steam engineering; that of the former is entirely in accordance with the enthusiasm which attends a new subject while the latter seems somewhat out of date and provides little information about large, modern steam power plants.

Most sections of the book contain a bibliography. It is a pity, though, that all are not as extensive as, for example, that of the water turbine section.

It is believed that much of the adverse criticism which can be made of this book would be remedied automatically by fairly frequent changes of contributor on any subject. Nevertheless, the editors and publishers are to be congratulated on this new edition of a comprehensive, well-indexed work which is of great value to the engineering profession and industry. T. M. Charlton

## LIQUID-PROPELLANT ENGINES

### Liquid-Propellant Engines

By N. I. Malek-Pashayev. Translated by W. E. Jones. Translation edited by Dr. B. P. Mullins. Pp. v + 175. (London and New York: Pergamon Press, 1962.) 20*s*. net.

RUSSIAN achievements in rocketry have been so prodigious that when a book with this title emanates from the U.S.S.R. one naturally expects to learn something of the equipment and techniques which have made them possible. The dust-cover shows pictures of four large rocket missiles. Was it one of these, the prospective purchaser may wonder, which launched the first Earth satellite or put the first man into orbit? He would do well to turn to p. 28; there these rockets are revealed to be our old friends: *Atlas*, *Thor*, *Jupiter* and *Corporal*. In fact the only Russian rocket motors which he will