ferentiation and integration) on a computer. A bias towards FORMAC may be forgiven her.

Tom Steel of the System Development Corporation complains, in an article on standards for computers and information processing, that this topic is apt to induce disinterest, boredom and apathy in the reader. He might have added active opposition (have we not heard it said that standardization is not putting right the last fellow's mistakes?). Steel seeks to arouse at least a fleeting fascination for the subject by sketching the history of standardization and its influence on society. He goes on to describe the way in which United States standards are evolved and the various agencies that are concerned. The topic to which he gives most attention is that of standardization of programming languages, a field which he is too modest to point out owes a good deal to his personal efforts.

Dr Naomi Sager of the Institute for Computer Research in the Humanities of New York University contributes an article on the syntactic analysis of natural language. She discusses various methods for grammatical analysis of sentences and gives an example of her own approach to the problem.

The two final papers are more in the nature of research contributions than expository articles. R. Narasimhan of the Tata Institute of Fundamental Research in Bombay presents a unified metatheory of programming languages and computers. This is a theory of the way in which programming languages may be described, and these turn out to be the same as the ways in which computers themselves can be described. The last paper is by L. A. Lombardi of the University of Rome, and is entitled "Incremental Computation". Lombardi outlines a language which accepts problems whose formulation is still incomplete and for which additional information is supplied in instalments. This paper is to be viewed as a contribution to the new type of thinking that is becoming necessary now that we are beginning to achieve what Licklider (quoted by Pyke in the first article in the volume) has termed man-computer symbiosis.

M. V. WILKES

POLISHING METALS

Metallographic Polishing by Mechanical Methods

By L. E. Samuels. (Metallography Series.) Pp. x + 195. (London and Melbourne: Sir Isaac Pitman and Sons, Ltd., 1967.) 70*s*. net.

METALLOGRAPHY is concerned with those crystalline features that manifest themselves in metals at microscopical level, and their significance in respect of the ultimate metallic properties. Conventional metallography primarily utilizes the optical microscope, using the greater resolving power of the electron microscope as a supplement to elucidate where appropriate the finer details of structure.

Metallographic examination of a metal involves, on one hand, the proper preparation of the samples and, on the other, their critical examination under the microscope. Clearly, the success of the latter depends to a large extent on the efficiency of the preparation stage. In recent metallography, two names stand out as having made distinctive contributions to the techniques of preparation. The first is that of the late P. A. Jacquet and the other is that of the author of the present book.

L. E. Samuels cannot aspire to such eminence as Jacquet, who made such unique contributions to electrolytic polishing. Mechanical polishing in one form or another has been with us ever since the science of metallography evolved. Even diamond polishing, with which Samuels's name is associated, was first used by a number of other workers. Samuels's claim to fame is that, from specialized applications, he introduced diamond polishing as the universal technique and, indeed, he took most of the art out of mechanical polishing for optical microscopy. He pioneered the use of a paste carrier rather than a liquid. He studied the variables, and described the optimum conditions. Moreover, he developed confidence both by the superb results obtained in his own work, and by analysing the behaviour of the underlying metal surface during the polishing action. These results have been described in a series of useful papers, but it is fitting and beneficial that he should now incorporate much of his experience into a book.

It might at first be doubted whether the subject of mechanical polishing justifies a book on its own account. Examination of the contents of this volume, however, will soon dispel such doubt, although in my opinion the work would have been better and of wider value had it incorporated at least a general introductory account of etching.

The author deals with sectioning, machining and abrasion, with mounting of specimens, and with their polishing, including the use of fine oxide powders for post-diamond finishing. He analyses the fundamental principles as well as describing the actual practice. Very detailed or subsidiary aspects of preparation are dealt with in a number of appendices. These include such useful items as the manufacture of a conducting plastic, special lap materials, levigation of alumina, diamond paste preparation, factors controlling the resonance of an electromagnetic vibratory polisher, and electroplating methods for edge protection of specimens. In addition, there is a valuable chapter comparing electrolytic with mechanical polishing. The text is illustrated throughout by excellent photomicrographs selected largely from the author's own investigations.

In all, this is a good book, clearly written by an expert, and it will be of great value to all concerned with metallography.

A. R. BAILEY

WORK AND HEAT

Engineering Thermodynamics

Work and Heat Transfer (SI Units). By G. F. C. Rogers and Y. R. Mayhew. Second edition. Pp. xii + 662. (London: Longmans, Green and Co., Ltd., 1967.) 60*s*. net.

THE new edition, in SI units, follows the same successful layout as the first edition in Btu. The primary need for this new edition springs from the declared national policy of changing to the metric system. The authors have gone all the way and chosen what is known as a coherent system. That is to say, they have abandoned the general relationship $p = kma$ in favour of the specific relationship $p = ma$. The fundamental units used are kilogramme, metre, and second, for mass, length, and time, with a derived unit kg.m/s^2 or newton for force. This is the system that will generally be used in scientific work and one can only hope that industry will follow suit.

The book contains all that was best in the first edition, but the authors have brought the work more up to date by some additions. They have, for instance, introduced the concept of availability in closed and open systems. Also, they have gone further than previously in their discussion of the use of the Gibbs function. Latent enthalpies of fusion and of evaporation are studied in greater detail.

The authors, in the new edition, discuss briefly some of the consequences arising from the application of nuclear energy sources to steam cycles, such as restrictions on the maximum permissible temperature that fuel elements are allowed to reach, and from the uses of a secondary fluid to transfer energy from the elements to the steam.

Combustion theory has been newly set in its correct light and is shown to be a particular class of chemical reactions in general. Into the chapters dealing with the internal combustion engine the Wankel engine has been introduced with illustrations and adequate description. A whole new chapter on direct conversion covers thermionic and