and he is very much aware of the difficulties that beset students, especially as regards symbols and the intricacy of algebraic expressions, particularly in the early stages of study.

Many books on this subject at this level have now been published, and any new book must offer either new material or a new approach if it is to make any impact. Young's contribution is to show that both thermionic valves and field effect transistors are field controlled devices and that consequently the circuitry previously only associated with the valve has taken on a new relevance with the development of the field effect transistor. The first reaction of one whose undergraduate and early industrial work was concerned with the valve is that of relief. Modern technological development does not necessarily condemn all the efforts of the past to the museum or the cellars of overcrowded libraries.

Two related but different methods of approach to the physical behaviour of electronic devices seem to be current at the time of writing; one bases its explanations firmly on the potential energy diagram, band structure, Fermi levels, and the like, while the other concentrates on carrier densities and the all important diffusion process and the continuity equations. Perhaps because this book tries to deal with field controlled devices as well as the junction transistor the author tends to the first method of approach.

While the sections dealing with the field devices certainly shed new light on the art, especially for students, the junction transistor sections are a little disappointing. Modern students are far more aware of the network approach to circuits than students in the fifties, and I view with some apprehension the non-standard—though carefully explained--attempts to rationalize the symbols relevant to the h parameters. In particular the use of Z_{ie} instead of h_{ie} and $1/Z_{ie}$ instead of h_{oe} will cause some groans in academic quarters. It might also have been wiser to stick to the conventional inward direction of current flow when setting up h parameter equations. It may be that now most new developments are in the field of integrated circuits a more definitive approach to the junction transistor will soon emerge. In the long term, a book concentrating on the field devices might have served better the needs of the student community.

A particular highlight of this book is its excellent bibliography, and it is a pleasure to see books of this type published at the outset in paperback at a reasonable price.   R. G. NORMAN

HELP FOR PROGRAMMERS

Programming Languages
NATO Advanced Study Institute. Edited by F. Genuys. Pp. x + 395. (Academic Press: London and New York, December 1968.) 100s; $15.

THIS book is a collection of five monographs which contain a mass of information, much of which is so specialized and detailed that one could only discuss the contents at the level of the detail by working with the book, rather than after the necessarily cursory examination which I have had time to give. The five parts are of very differing lengths from 40 to 160 pages.

The first section, by C. C. Elgot, stands somewhat apart. All the other authors demonstrate their points with ALGOL-like programmed examples, but the notation and terminology used by Elgot make this first section very hard to read.

The second section, by E. W. Dijkstra, is full of ideas and examples for the "executive program" writer. Dijkstra has a masterly knack in all his writings of finding just those apt but lighthearted examples which make his points clear. This is the most readable part of the book,

though he is conscious of his lack of rigour and several times mentions his disinclination from it.

L. Bolliet's monograph on "Compiler Writing Techniques" is the largest in the book. It could easily stand alone as a book dedicated to the task of helping programmers in this field. It is not easy going and one feels that the author is compelled to plunge into detail even in his introductory paragraphs.

"Record Handling", by C. A. R. Hoare, would have benefited by having a little more space. Section eight. in which the author tries to summarize five languages, including LISP and PL/1, in twelve pages. is particularly sketchy. There is much of value here, but one is less aware of the authoritative assertions of the two previous sections. It is a pity that this was written before the publication of the ALGOL 68 report, for it gives the impression of much less ALGOL development than has transpired. Much of the ALGOL 68 report includes many of the things in this section, such as references and overloading.

Although Ole-Johan Dahl's description of simulation languages is a short section of only 50 pages it nevertheless is an important one. This is one of the most important and least developed areas of software. It is disappointing that the author, like others, dismisses analogue computer aspects in the first few words. Analogue computer specialists are sadly lacking the software strength of their digital colleagues, and many of the ideas given here would be of direct value to them if slanted towards their problems.

It is a pity that time overtakes everyone associated with the introduction of a valuable book, even the humble reviewer. The original lectures on which the book is based were given in the summer of 1966, and the book took more than two years to publish. If this review helps to further an important and valuable book, it does so after an even longer time.   R. J. ORD-SMITH

HISTORY OF IRON AND STEEL
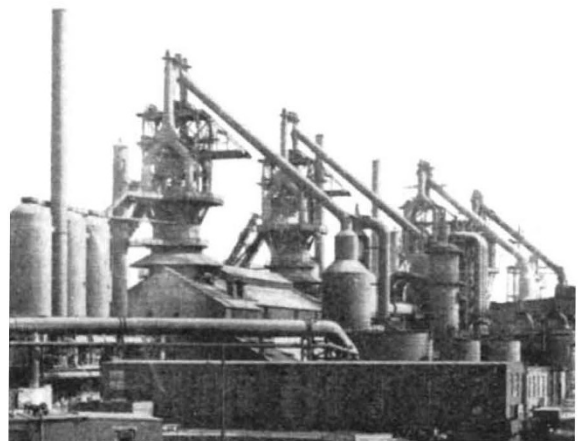
Four modern blast furnaces, the "Iron Queens"—Queen Mary, Queen Bess, Queen Anne and Queen Victoria—at the Scunthorpe works of the Appleby-Frodingham Steel Company. From *Iron and Steel*, by W. K. V. Gale (Longmans: London, 1969, 45s), one of the first three titles in Longmans new "Industrial Archaeology" series. Aimed at the general reader, the book sets out to describe, without too much technicality, what iron and steel are, how they were and are made and used, why the many techniques and products of the industry developed as they did, why some processes succeeded while others failed, what the furnaces, mills and other machinery were like and how they worked and so on, not forgetting some of the inventors and pioneers who contributed to the development of the industry.