

This article has tended to emphasise the more complex aspects of PIRL, and indicates that an effective program of user education is necessary before the full range of facilities in the language can be properly applied. Nevertheless, the average retrieval task uses the more simple features which

can be understood with a minimum of tuition. PIRL undoubtedly has limitations, but we feel it has gone a long way to providing the statistician and lay user of the PRISM system with a powerful and yet not too difficult to use interrogation tool.

References

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Book review

Computers in Medicine Series: Digital Filters, by H. M. Ackroyd; *Automation of a Biochemical Laboratory*, by G. E. Sims; *Hospital Activity Analysis*, by R. G. Rowe and W. Brewer; *Computing and Operational Research at the London Hospital*, by B. Barber and W. Abbott; *Computers in Radiotherapy—Clinical Aspects*, by R. J. Deeley; General Editor, D. W. Hill 1972 and 1973. (Butterworths, about £2.00 each.)

The above titles represent the first five in what promised to be an exciting series. It will be necessary to await the further volumes before one can fully judge whether this desirable objective will be achieved. The General Editor, Dr. Hill, sets as his aim a series of accounts of both the clinical applications and the computer science aspect of computing in medicine with the series forming a coherent whole. He does not state whether the intention is to introduce computer people to the areas of medical applications or to introduce computing to the medics. From the five volumes examined so far it would seem to be the latter since no author has attempted to explain any clinical terms or procedures.

Dr. Ackroyd in his book *Digital Filters* has provided a valuable service to would-be users in the field of EEG, ECG, radiographical analysis and also medical physics. Although not an absolutely essential pre-requisite, a reader would benefit considerably from a knowledge of analogue filtering techniques not only on account of the methodology but also because of the presence of block diagrams of filter circuits. Certainly the use of 'fast Fourier transform' is not preceded by a description thereof. The book does not do much in the way of selling the use of filters to the clinicians: mention of EEG and ECG are little more than superficial. However, the book is clearly written, the development follows a logical sequence and the author clearly recognises the role the computer has to play in this field. He is to be complimented on providing, in the Appendix, the FORTRAN listing of all the computer subroutines referred to in the text. The subroutines leave their results in array variables and hence, although they have been tested on a 1900 series machine, are immediately available for use elsewhere. The text describes recursive filter design by both the Butterworth and Chebyshev techniques in great detail, non-recursive design is illustrated by the 'Window' method, by analytical techniques, and by successive approximation techniques although only the 'Window' method is described in depth. This book with its five pages of up-to-date references represents a good start to the series.

The book by G. E. Sims is written so as to introduce computer personnel to applications within a biochemical laboratory—much the same techniques would apply, although to a narrower extent, in the haematological laboratories. The book will also serve to demonstrate to laboratory workers what help a digital computer can be in the routine work within a laboratory. There is no description of a computer, no discourse on computer hardware, and no glossary. It is thought by the reviewer that this is an advantage since their absence leaves more pages devoted to the matter in hand and these items are dealt with in other volumes in the series. The book is very readable but only serves as an introduction to the problem and to the value to be derived from a computer solution. It makes no reference to CUSUM techniques in quality control, perhaps hardly surprising since the subject of quality control merits only one sentence in Chapter 6 and four pages (the whole) in Chapter 7. The author, in referring to 'normal ranges' mentions that hospital populations have different acceptable ranges from healthy individuals but could have mentioned also the variation with age in many

of the values handled in the laboratory—a factor which a computer can readily take into account. It is surprising that the book does not go deeper into the subject especially since so much is now in routine use and has been described at several BCS symposia. The single page of references makes no mention of these.

Hospital Activity Analysis referred to as HAA by those 'in the trade' is adequately described in this book, both through its historical development going back to 1969 (and through its antecedents to 1949: the SH3 form), and its value at both a local and national level. The SH3 form gave details of hospital throughput, in terms of patients, and an indication of the demand made on the various disciplines, such as surgery, medicine, by those patients. The HAA form was developed to collect details on an individual patient and resulted in a new form HMR(1) being adopted nationally. The authors describe the use made of the information on a clinical plane by examples of the national trend in tuberculosis and neoplasm of the lung, the former falling and the latter rising. In contrast, whilst devoting a chapter to Management Implications and Objectives, they do not demonstrate its value in the area. The book is a good introduction to those who might venture into the field of medical data processing be they administrators or computer personnel. The bibliography is adequate and up-to-date and the Appendix contains a glossary of terms used in the field of Medical Records and also one of ADP terms. Readers might get quite excited about the title of Chapter 7—The application of computer techniques—but there is little substance in the four pages comprising the chapter: it being best summed up in the words of the authors 'It must be obvious that this chapter skates lightly over a well established controversy: the choice between real time and batch processing systems'. The authors might have mentioned examples of each within the Health Service especially since the next volume deals with the Univac system in the London Hospital. The book is an illuminating account of HAA but the mention of computers is quite minute.

The fourth book, by Barber and Abbott, is exceptionally well written and to be commended as an account covering the activities at the London Hospital from its founding in 1740 to the installation and introduction into service of its Univac system. The hospital's first computer, the Elliott 803 is described, perhaps to serve as a datum line for the advances which follow. The story continues with the steps leading up to the big real-time system. These comprise the setting up of a proper management structure, instructions to tender, evaluation of tenders and a description of the hardware eventually delivered. It is somewhat regrettable that the authors, without disclosing the names of the four manufacturers who tendered did not give more examples of the factors which influenced the final choice—what is now four pages on the subject comprising Chapter II could well have been many more. Although the greater part of the book traces the development of computers at the London Hospital, there is a fairly lengthy (for this series) chapter on operational research and quite appropriately since Dr. Barber has done so much to advance the use of OR techniques in the Health Service. Shortage of space no doubt prevented him expanding the descriptions of his outpatient clinic simulation, the load on dialysis machines, and the very valuable work on anaesthetic service times. However, the book gives a full list of references and an appendix contains a useful list of Health Service computer installations, their source of funding and the machine installed. The two authors have produced a worthwhile publication.

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Book reviews

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The reviewer found the last book *Computers in Radiotherapy—Clinical Aspects* somewhat disappointing. It would seem that there is to be a companion volume in the series, by a different author, entitled *Computers in Radiotherapy—Physical Aspects*. The title of the book currently under consideration would lead one to think that one would read of the value to the clinician of having either a computer in the department or access to one. Also the book does not describe the use of the computer in either beam therapy or implantation work. The whole text is really devoted to the problems of introducing a computer into a hospital. It appears to have been written for clinical readers since medical terms are used without explanation but would serve all disciplines as a description of problems in departments ranging from medical research through personnel to radiotherapy. The book was a delight to read, starting as it does with a history of records and clinical observation going back to the papyri of Smith and Ebers circa 1550 BC, passing the first clear description of measles and smallpox by Rhazes in AD 925. The author covers the history of mathematics in two paragraphs, mentioning only Napier by name; and the history of statistics in three. This is followed by a brief history of computers commencing with Stonehenge, mentioning ENIAC and LEO but seemingly terminating before the introduction of SLT circuits. It is a pity that the full reference to Hawkins' work was not given (the author, with this as almost the sole exception, has accurately given references and dates with every name quoted) nor that mention was made of the researches in Manchester in 1947 culminating in the opening of the Royal Society Computing Machine Laboratory in 1951, housing the world's first production-line machine. There follows a chapter (four pages) on research in radiotherapy, one on medical records (six pages) and one on collection of data covering knitting needle sorting, through the 80 column card sorter, to the computer. Mention is made of off-set 'cottage loaf' punching as a means of verification: medical readers could, unfortunately, get the impression that this technique is still used. The computer reader might not understand 'interstitial and intracavity methods', while the clinician reading this text could be confused by references to a memory of 'ferrite wires'. The author credits ALGOL as being in international usage but not FORTRAN although the latter is in fact more widely used in medical computing. It is pleasing to find that the message of computers comes across very clearly: 'Once installed, a computer will free staff from mundane repetitive tasks and make available time for more important work, time to think, time for research'. If one forgets the title of this book one finds an interesting and likeable introduction to computers and computing, to hospital records and to the design of departmental data collection forms. It will not help those with a knowledge of these topics who might wish to know more about computers in the field of radiotherapy. The three pages of references also fail to note sources where this information is available. It will be interesting to see how the related volume deals with the topic.

The series so far is well produced, with clear lucid diagrams and a high standard of proof reading—the word 'vinereal' being the only error in the five volumes being reviewed.

B. RICHARDS (Manchester)

A PL/I Approach to Programming Languages, by Harry Katzan Jr., 1972; 362 pages. (Auerbach Publishers, £4.00.)

This book is another addition to a long list of books on PL/I which possess the common attributes of claiming to cover the full PL/I language, and of failing to do so. I would like to point out that this claim, together with others, appear on the front and back flaps of the book cover. Hence the author may not be held responsible for it. In fact, the title implies and the author comments in his preface, that this book is not intended as a PL/I primer.

The author's objective was to present the structure of programming languages 'in a form that is accessible to the student with a background in programming achieved through actual experience or from a college or industrial course introducing the subject' (page xii). The approach adopted was to 'select the most comprehensive programming language available and to study it, realising that many of the topics apply to other programming languages' (page 4).

There are good justifications for taking this approach; but, how did the author fare? The book is divided into three parts covering foundations, fundamentals and topics in programming languages.

Part I attempts to discuss topics ranging from program preparation and computing systems to postfix notation and extended Backus-Naur form. The treatment of the numerous topics in the first 55 pages is very sketchy, and as a result, it would be hard going for those who do not possess a good command of computing jargon.

Part II contains an exposition of a subset of PL/I, which may be described as typical, that is, ALGOL 60 plus FORTRAN plus (bits of) COBOL. Treatment is again very superficial, especially on concepts, such as that of scope and blocks, which are generally regarded as important and relevant, if not central, to a discussion on programming languages. I wonder what the author had in mind, with respect to application area and methodology of program construction, when he stated that 'Begin blocks are not essential in PL/I programming because the DO statement can be used for grouping statements; however, a begin block does delimit areas of a program for naming purposes . . .' (page 254).

The final part, entitled Topics in programming languages, is an ad hoc collection of chapters covering those features of PL/I which represent 'newer developments' (page xii) towards improving the efficiency of the programmer and system operating procedures. These are dynamic storage allocation, asynchronous processing, conditions and interrupt processing, list processing, and string manipulation and editing.

In conclusion, this book possesses breadth of coverage but it lacks depth. Overall, it is easy to read but only if you have substantial background in programming. It would not be appropriate as a reference text since the index is inadequate. Finally, I quote the following interesting remark—'In the author's opinion, the best introduction and the most comprehensive reference on the subject is: *IBM System/360 Operating System PL/I (F) Language Reference Manual . . .*' (page 62).

A. L. LIM (London)