# The Social Implications of the Australian Computer Society

*By* W. N. Holmes*

This paper notes the development of the Australian Computer Society, the discussion of its adoption of formal qualifications for entrance, and the problems encountered by the Society, and by overseas computer societies.

The paper then questions the wisdom of basing a professional society on specific machinery, doubts the existence of a profession embraced by the Australian Computer Society, and suggests that social rather than professional objectives should be adopted by the Society.

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## Computer Societies

In many parts of the world, groups of people with a common interest in the use of computing machinery have formed Societies devoted to fostering the use of computers, much as Societies have in the past been formed to foster the use of horses.

Several professional or quasi-professional organisations exist in the United States for people who use computers to earn a living.

The IEEE Computer Society was formed in 1971 as a development of a group within the Institute of Electrical and Electronics Engineers, Inc., and concentrates on the computing machinery itself – "The Society shall strive to advance the theory and practice of computer and information processing technology." (McCluskey 1970).

The Association for Computing Machinery was formed for early computer users, and now seems to be strongly influenced by academic members – indeed, most articles published in its Journal (though not in its Communications) are incomprehensible without advanced study and continuing interest in academic subjects like mathematical logic. The A.C.M., as it becomes more like the IEEE Computer Society, is working with it and nine other similar organisations to establish a Computer Foundation. These efforts have not been without problems, but have finally been "rewarded" by the formation of the Institute for Certification of Computer Professionals. The A.C.M. itself has prescribed ethical behaviour, but is silent on enforcement of the prescription.

The principal body in the United Kingdom is the British Computer Society (for history see Douglas 1972) though unions are starting to take an interest in representing programmers. This Society has set up professional qualifications, and is actively laying down ethics and guidelines.

Taylor (1972, in an article which should, as a duty to their Society, have been closely read by all Australian Computer Society fellows, members, associates, affiliates and students) gives some history of the Australian Computer Society "as a background to the movement taking place within the Society towards the development of professional membership status and qualifications. These have been one of the principal aims of the Society for some time and have led to present controversies on the level of qualifications required for professional status and on the setting and conducting of entrance examinations for that purpose . . .".

Nevertheless, the thesis of this present paper is that Computer Societies, particularly the Australian Computer Society, are misguided in trying to create an profession out of a common interest of their members in computers, and that these Societies should pay more attention to seeking, fostering, and nurturing the existing common interest.

To support this thesis, the nature of professionals and professions generally, the nature of the "computer profession" in particular, and the basis of the "computer profession" will be examined in turn. Then future patterns of use of computers by various professions, and, finally, social objectives for a Computer Society will be suggested. These objectives will not be suggested in implication that none is held or pursued by Computer Societies, but in substitution as a body to correct a misplaced emphasis.

## Professionals and Professions

Because there are professional footballers, there is a footballing profession. Here the adjective "professional" indicates that the footballer is actually being paid for playing football, and the epithet is used to distinguish him from the very many more of his fellow sportsmen who play football merely for enjoyment.

In this paper, such saliently monetary professions are not considered, but the so-called "learned professions"

are meant when professions are discussed. However, it should be borne in mind that this important distinction is not always applied as it is in this paper. For instance, "the new American definition of professional is 'super-competent' – that's what a computer professional is, in some well defined area." (Stone 1972).

Professions are based on disciplines, though not necessarily directly. Engineering is a profession in this sense, though definitions often used may seem rather wide-ranging – "Engineering is the art of applying the resources of nature, scientific principles and the accumulated experience of its practitioners for the use and convenience of mankind." (Storr 1972).

To be professional is not the same as being a member of a profession.

The three important aspects of being a member of a profession are, firstly the practice of a profession, secondly the attainment by education and experience of proficiency in that profession, and thirdly the acceptance by other members of the profession. Thus, "Professional Engineering is the responsible practice of engineering by persons who have attained a level of education and experience accepted by a consensus of its practitioners." (*ibid.*).

Persons of such attainment formally become members of a profession when they are accepted into membership of the appropriate recognised professional institution. Often, such professional institutions are recognised by legislation, or Royal Charter.

Professional behaviour, on the other hand, is collo-quially ascribed to persons who consistently and reliably discharge technical duties within their self-interpreted sphere of competence. Ideally, "To pursue or to do the task for its own sake, to have it well and faithfully done, to be to no small degree a perfectionist, to engage to the full the talent, the skill and the knowledge in the daily task, usually in the service of some other human, seem to me the very heart of the concept of a profession." (Sir Garfield Barwick, quoted in Corbett 1973 p. 171).

The law views professional responsibility more practically, and it does not strictly relate duty to monetary reward. "Every person who practises a learned profession owes a duty quite irrespective of any contract and quite irrespective of the receipt of any fee to possess and to exercise reasonable skill and care in the performance of his professional work." (Hughes 1972 p. 9). But, "The law does not require that such a person should possess and exercise the highest standard of expertise or else be found liable for damages for breach of contract if something goes wrong. Generally speaking, the relevant standard is the ordinary skill of the average practitioner of the particular profession." (*ibid.* p. 8).

Computer Societies are moving to guarantee professional behaviour by adopting codes of ethics, and to establish a profession by prescribing qualifying examinations. Both these movements are placeboes.

Firstly, professional behaviour cannot be guaranteed simply by defining what it is and what it is not, and Society mechanisms for enforcing a code of ethics are absent or feeble. "Ethical behaviour is a state of mind, not rules and regulations imposed by some outside group or professional body." (Groves 1972). At worst, "If patriotism is the last refuge of the scoundrel, professional ethics is the last refuge of the professional scoundrel." (Pryor 1973).

Secondly, a profession cannot be established simply by a Society constructing barricades against latecomers, particularly when the earlycomers have nothing more in common than a confessed interest in a certain category of machinery. Indeed, it might be considered presumptuous when a Society recommends to itself "that the Society should become the leading established body in the field of computer technology . . ." (Hinde 1972), and "that the Society should be the national authority on these matters and deferred to as such by other national bodies and business concerns." (*ibid.*).

## The "Computer Professional"

In their strivings towards recognition as professional institutions, the various Computer Societies have concentrated on prescribing professional behaviour and on prescribing professional qualifications.

The first and most fundamental aspect of being a member of a profession – the practice of a profession – has usually been ignored by Computer Societies, in favour of the aspects of educational attainment and acceptance by Society members through some form of initiation.

The assumption is usually made that anyone whose work is centred on computers is practising in the "computer profession". Taylor (1972) seems to feel that ACS members are programmers, but "by programmers (he) mean(s) this in a general way to include systems analysts and designers, software specialists, programming managers, coders, etc.". To a very large degree, all these categories are tentative job designations, not professional offices. The U.S. government found some dispute when it attempted to define the job of a programmer, and positions such as systems analyst are often used to keep ambitious programmers in hand or entice other employers' programmers. Job advertisements show this clearly.

For at least the programming manager, whose next step up the inevitable ladder is probably to some position such as EDP manager, whatever programming capability he might have is of increasingly limited benefit. "Of course, a good understanding of the trends of computer technology is still essential for a successful EDP manager; but it is only one ingredient, and he need not have so high a level of expertise as his computer scientists. The managerial ingredients he needs are more in number, and each is just as important as the technical." (Nolan 1973 p. 145).

Even in the apparently straightforward calling of programmer *qua* programmer, many species are found – system programmers, application programmers, commercial programmers, scientific programmers, software programmers, firmware programmers, maintenance programmers – but the entire crew may be obsolescent.

In writings on data processing, followers of a wondrous farrago of trades and occupations cluster under the sign of "the computer professional", including not only people who use computers or advise other people how to use computers or advise other people who advise other people how to use computers, but also people who design, manufacture, sell and maintain computers digital and analogue, electronic and hydraulic.

The only common link between the great variety of people said to be practising the "computer profession"

is their dependence on computing machinery.

Perhaps this is due to the youth of the "computer profession". Perhaps the efforts of Computer Societies to establish a profession will result in their members becoming proficient in some discipline implied in the aspirations of their Society.

## Computer Science and Informatics

The most frequent name for the professional patronage of Computer Societies is *computer science* or, in defiance of the standard definition of *information* (Tootill 1968 p. 3), *information science*. It is therefore appropriate to investigate what is meant by computer science.

"The *computer* and the phenomena surrounding it are the main objects of study in computer science." (Amarel 1971). This is a simple statement (not a definition), and the idea underlies all definitions or explanations of computer science. There are inconsistencies. Amarel gives, with his "global" explanation quoted immediately above, a "local" observation. "The concept of a *procedure* – an algorithm – is of primary significance to computer science." Yet Euclid's algorithm preceded Babbage. Algorithms do not need computing machinery, nor procedures a compiler.

It has been said that "Computer science might variously be called the science of algorithms, the science of computing machines, or the science of digitized information. However none of these is satisfactory. I prefer to think of computer science as the science devoted to the extension of the uses of (computing?) machines in the service of mankind." (Hammer 1970).

However, if one is precise, the two terms *computer* and *science* are incompatible because *computer* is not an adjective to be applied to a discipline. Grammatically, computer science should be contrasted to physical science, natural science, and medical science.

As well as grammatically, the ill-usage can be seen by considering why there is not a telescope science embracing astronomy, surveying, and fire-spotting, or a microscope science embracing biology, metallurgy, and philately, or a telephone science embracing salesmanship, management and espionage. In other words, a science should not be circumscribed by the applicability of one of its instruments.

The situation is not improved by adopting *computing science* as the basis for a professional body, for such a body would most appropriately embrace mainly actuaries, statisticians, and numerical analysts. Very few "systems analysts and designers, software specialists, programming managers, coders" spend much time doing their own computations.

The use of the word *science* can also be questioned. Draffan (1973) believes the title *computing science* "best conveys the technological and, practical nature of the subject", and Jueneman (1972) proposes splitting of "the programming profession" into "Computer Science" and "Information Engineering".

Insofar as computer science is "the science of algorithms", "the science of digitized information" . . ., it is not necessary to base it on machinery. Only the name forces it to be so.

A better name for such a machine independent science would be *data science*, and its companion technology would be *data engineering*.

*Information science* is not a suitable term to replace *computer science*, because information is "in automatic data processing the meaning that a human assigns to *data* by means of the known conventions used in its representation." (Tootill 1968 p. 3). From this viewpoint, information science is properly the stamping ground of librarians, psychologists, and patent attorneys.

The term *data processing*, applied to the industry, has held sway much longer than the narrower term *information processing* (*ibid.* pp. 4-5), which term has probably been pushed into favour by mathematically trained people who have heard of information theory during their formal education and who link this to the *information retrieval* (not in Tootill 1968) of librarians, and do not take the necessary step of calling what computers sometimes do for librarians, *data retrieval*.

In Europe, a discipline called *informatics* is being developed. Sometimes informatics is equated to computer science, sometimes informatics is defined for its own sake. Zemanek (1972), for example, sees informatics as having four basic generalised theories – of formal description, of process organisation, of programming, and of computer application, though the second two theories should perhaps be considered as special cases of the first two.

Clearly, some science or other (and maybe a technology or two) lurks behind the computer. The fatal mistake is to directly amalgamate the science with the machinery. This mistake was quite clearly seen by Papert in the context of computer use by small children. "Thus in its embodiment as the physical computer, computation opens a vast universe of things to do. But the real magic comes when this is combined with the *conceptual power* of the theoretical ideas associated with computation." (Papert 1970).

## Use of Computers in Various Professions

However the discipline supporting and using algorithms, procedures, and general problem solving techniques might be viewed or named, two contrasting attitudes to the discipline can be taken by professional users of computers – an attitude of aparthood from professionals who don't use computers, and an attitude of togetherness with other workers in the field of study being aided by computers. The question is whether the computer is an end, or a means to an end.

The first attitude seeks to separate the discipline from other disciplines. For example – "At this time computer science is a distillate from mathematics, engineering, and language. The reasons that it is a separate field are numerous. Among these are the withdrawal of mathematicians and engineers from the rest of society. Mathematicians have declared themselves independent, engineering schools ignore their responsibility for education of non-engineers and so it is up to computer scientists to develop and teach cogent theories which technically are mathematical, to teach computer languages which neither engineers nor mathematicians seem to comprehend, to increase the relevance of computers to man, and to guide their future designs." (Hammer 1970).

This aparthood is the attitude usually struck by Computer Societies, though it is not confined to them or always instigated directly by them. They mistakenly view the widespread use of computers as supporting their apotheosis, and ignore the fundamental place of computation in most modern professions.

It will come about that every modern science and

profession will use digital computers extensively as instruments and resources. For example, the Committee on Physics in Two-Year Colleges has approved by unanimous ballot that "Physics faculty members in two-year colleges as well as those in four-year colleges and universities have a professional obligation to: (*a*) become proficient in the application of computers in teaching their own disciplines; (*b*) . . .; (*c*) use computing services in their teaching wherever appropriate." (Taylor 1973).

Thus, to the majority of professionals interaction with computers will be commonplace. These professionals will themselves be trained in the use of computers, and will look to programmers for skills beyond those they already possess. This is the future, and a Computer Society can help bring it about and flourish in it.

Computer Societies are in fact working towards this future, but their vision of it seems blurred, and their pursuit of professional segregation will delay attainment of this future.

## Objectives for a Computer Society

There are several questions which a Computer Society should ask before attempting to establish a profession.

Firstly, what is the profession, and why should there be such a profession?

Secondly, is the Society ready to become a professional institution? Is its membership appropriate?

Finally, is it right to establish a profession, any profession, in the image of existing professions (Pryor 1973)? "As modern professions use the scientific approach, they become increasingly subject to inversion of priorities, instrumentalism, and detachment, even isolation, from humanity. Professions then tend to become increasingly schizophrenic in their conduct, as though the split between the realm of expertise and the social nexus in which it functions were nonexistent or, worse, unimportant." (Haberer 1972 p. 721).

This paper is intended to demonstrate that an appropriate profession has not been, and should not be, defined, that the Australian Computer Society and its overseas bedmates are not ready or fitting to become professional institutions, and therefore that attempts to convert Computer Societies into professional institutions should be given up.

If it is not to be a professional institution, then what should a Computer Society strive to do? (The reader should not infer that the Australian Computer Society, or any other Computer Society, does not hold objectives such as those suggested in the following list – it is rather the complaint of this paper that Computer Societies have been bewitched from the pursuit of their humanistic objectives by the lure of professional status.)

* To act in accord with the motto "The computer must be a common tool, not an oligarchal instrument". This must be the most basic objective, the one on which all the others are founded.
* To encourage and assist the positive and constructive introduction of computers into all levels of education. The emphasis must not be on using computers to instruct (deLone 1971), nor on instructing students to program (Lewis 1973), but on the direct use of computers by students (Berry *et al.* 1970, Papert 1970).
* To encourage trade organisations to take a definite interest in the use of computers. This might be done by offering volunteers to retrain potentially redundant workers, or to assist in solving some of the organisations' problems using computers.
* To encourage established professions to take a definite interest in the use of computers. This might be done by negotiating to have programming or computing skills recognised as part of every professional qualification, particularly accounting qualification, and even as a compulsory part.
* To encourage Computer Society members to take an interest in an appropriate established profession. For example, many programmers in commercial employment should strive to become qualified accountants, or even actuaries.
* To assist public bodies such as legislatures, courts and commissions in applying informed reason to considerations of public use of computers. This might be done by offering a roster of distinguished members experienced in various applications of computers, and who have offered their services in this public duty.
* To await with patience (and eventually sponsor) the emergence of specialist trades or professions (whatever they might turn out to be (Tou 1970, Wegner 1970) directly dependent on the use of computers.
* To review and influence public debate on uses of computers. Often, public discussion of computer-related issues verges on hysteria, and Computer Societies have a duty to see that beneficial uses of the computer are fostered just as much as they have a duty to see that detrimental uses are avoided.

To stress these objectives is surely more worthwhile, human, and satisfying than to pursue ethical behaviour and professional orthodoxy shackled to Boolean machinery.

## Bibliography and References

ACKOFF, RUSSELL L. (1973): "Science in the Systems Age: Beyond IE, OR, and MS" *Operations Research* 21, 3, May-Jun 73, 661-71.

ALT, FRANZ L; RUBINOFF, MORRIS; FREIBERGER, WALTER: (Editors 1970) *Advances in Computers—Volume 10* New York: Academic Press, 1970, 313pp.

AMAREL, SAUL (1971): "Computer Science: A Conceptual Framework for Curriculum Planning" *Communications of the ACM,* 14, 6, Jun 71, 391-401.

ARSAC, JACQUES J. (1970): "Informatics and Computer Education" in *Scheepmaker & Zinn* 1970, 69-72.

BERRY, P. C.; FALKOFF, A. D.; IVERSON, K. E. (1970): "Using the Computer to Compute: A Direct But Neglected Approach to Teaching Mathematics" in *Scheepmaker & Zinn* 1970, II/25-31.

CORBETT, ARTHUR HARDIE (1973): *The Institution of Engineers Australia* Sydney: The Institution of Engineers, Australia in conjunction with Angus and Robertson, 1973, 288pp. (subtitled "A History of The First Fifty Years 1919-1969").

CUTBILL, JOHN L.; JONES, KAREN SPARCK (1973): "The Needs of the Pseudo-Pro" *Software — Practice and Experience* 3, 2, Apr-Jun 73, 83-6.

deLONE, RICHARD H. (1971): "Sketching a Context for Instructional Technology" in *To Improve Learning: An Evaluation of Instructional Technology* (*Vol. II*), edited by Sidney G. Tickton, New York: R. R. Bowker Company, 39-49.

DENNING, PETER J.; GLASER, GEORGE; HAMMER, CARL; SALTON, GERARD (1973): "A Statement Opposing the Proposed Code of Professional Conduct" *Communications of the ACM* 16, 4, Apr 73, 268-9.

DOUGLAS, A. S. (1972): "Why I helped form the Society and why I shall go on being a member" *The Computer Bulletin*, 16, 2, Feb 72, 105-6.

DRAFFAN, IAN (1973): "What value a computer degree?" *Computing* 6 Sep 73, 10-11.

EDWARDS, BRIAN R. (1973): "Is DP 'Line' or 'Staff' and does it matter anyway?" *Datafair 73 Conference Papers* London: The British Computer Society, 4-8.

FELLGETT, P. B. (1970): "What is an analyst?" *The Computer Journal*, 13, 1, Feb 70, 118-9.

FINERMAN, AARON (Ed. 1968): *University Education in Computing Science* New York: Academic Press, xvi+237pp. (contains several articles on computer science and professionalism).

FOY, NANCY (1972): "Dismembering the computer societies", *New Scientist*, 55, 813, 28 Sep 72, 569-70.

GROVES, BRENTON R. (1972): "The Ethics of Engineering" *The Journal of the Institution of Engineers, Australia*, 44, 9, Sep 72, 11-14.

HABERER, JOSEPH (1972): "Politicalization in Science" *Science* 178, 4062, 17 Nov 72, 713-24.

HAMMER, PRESTON C. (1970): "Computer Science and Mathematics" in *Scheepmaker & Zinn* (1970), 65-7.

HAWKE, R. J. (1974): "The Professional in Australian Society" *The Australian Accountant* 44, 2, Mar 74, 78-81 (reprinted from *The Chartered Engineer*).

HELLER, ROBERT (Editor, 1973): " 'Profession' progress discussion" *Computing*, 18 Jan 73, 18 (report of London Branch of BCS carrying motion that "there is no such thing as a computing profession").

HINDE, F. G. (1972): "Developments in the administrative structure of the BCS" *The Computer Bulletin*, 16, 2, Feb 72, 111-2.

HOLMES, W. N. (1974): "Data Engineering" *Proceedings of the Conference on Computers in Engineering* Sydney: Institution of Engineers, Australia, May 74, 111-5.

HUGHES, T. E. F. (1972): "Legal Responsibility for Professional Negligence" *The Journal of the Institution of Engineers, Australia*, 44, 9, Sep 72, 8-10, 23.

JUENEMAN, ROBERT R. (1972): "On Criteria for a Programmer's Excellence" *Communications of the ACM 15*, 10, Oct 72, 925.

KING, D. J. (1973): "The Engineer-Programmer Relationship" *The Journal of the Institution of Engineers, Australia*, 45, 4-5, Apr-May 73, 9-12.

LEWIS, ROBERT (1973): "Halt dp studies call", reported in *Computing*, 3 May 73, 5.

MALLET, LAURENCE E.; SIZER, RICHARD (1973): "When is one truly a professional?" *Computing* 13 Sep 73, 10 (unfortunately does not distinguish between being a professional and being a member of a profession).

MAYNE, ROBERT (1973): "The 'damn-computer-mob-don't-know-everything' feeling grows" *The Australian Financial Review* 29 May 73, 41.

McCLUSKEY, EDWARD J. (Chairman, 1970): "IEEE Computer Society Consitution & Bylaws" *IEEE Computer*, 3, 5, Sep-Oct 70, 33-8 ("The scope of the Society shall encompass . . . all aspects of design, theory and practice relating to digital and analog devices, computation and information processing.")

MILLS, ROGER L. (Chairman) *et al.* (1973): "Report of Professional Standards and Practices Committee to ACM Council, Anaheim, California, December 8, 1972" and "Proposed ACM Code of Professional Conduct" *Communications of the ACM*, 16, 4, Apr 73, 263-6.

MONTGOMERY, A. Y. (1970): "Some Aspects of Data Processing Management in Australia" *The Australian Computer Journal*, 2, 2, May 70, 71-88.

MYERS, EDITH (1972): "A Professional Is a Professional Is . . ." *Datamation* 18, 3, Mar 72, 97, 99, 102.

NOLAN, RICHARD L. (1973): "Plight of the EDP manager" *Harvard Business Review*, 51, 3, May-Jun 73, 143-52.

PAPERT, SEYMOUR (1970): "Teaching Children Thinking" in *Scheepmaker & Zinn*, 1/73-8.

PRYOR, DENNIS (1973): "The Last Refuge of the (Professional) Scoundrel" *Heresies* Department of Radio Special Projects, Australian Broadcasting Commission, 7 Sep 73, 4pp. (this series of radio scripts is well worth reading).

RALSTON, ANTHONY (1973a): "The Computer Society and ACM" *IEEE Computer*, 6, 1, Jan 73, 1-2.

————(1973b): "ACM and the Proposed Computer Foundation" *Communications of the ACM*, 16, 4, Apr 73, 197-8.

SCHEEPMAKER, B.; ZINN, KARL L. (Editors, 1970) *World Conference on Computer Education 1970* Amsterdam: International Federation for Information Processing, 1970, 136+472+280 pp.

SMITH, BARRY W. (1969): "The 1968 A.C.S. Membership Survey" *The Australian Computer Journal*, 1, 4, May 69, 219-36 ("between 35% and 50% of those engaged full time in systems and programming work in Australia are members of the society" (p. 219); and other figures.).

STONE, MILT (1972): "In Search of an Identity" *Datamation* 18, 3, Mar 72, 52-7, 59.

STORR, E. D. (Ed. 1972): "Policy Review Committee: Extracts from Final Report" *The Journal of the Institution of Engineers, Australia*, 44, 4-5, Apr-May 72, 26-9.

TAYLOR, A. A. (1972): "Professionalism and Apathy" *The Australian Computer Journal*, 4, 3, Aug 72, 104-11.

TAYLOR, EDWIN F. (Ed. 1973): "Computer in Physics Teaching" *American Journal of Physics* 41, 10, Oct 73, 1209-10.

TOOTILL, GEOFFREY C. (Chairman 1968): *IFIP-ICC Vocabulary of Information Processing* Amsterdam: North-Holland Publishing Company, 1968, 208 pp. (see also Australian Standard AS1189 -1972).

TOU, JULIUS T. (1970): "Software Engineering – A New Profession" in *Software Engineering Vol. I*, Ed. Julius T. Tou, New York: Academic Press, 1970, 1-6.

TITUS, JAMES P. (1972): "Wage and Hour Laws Specified for Computer Center Employees" *Communications of the ACM*, 15, 2, Feb 72, 125-8 (with extract from the laws on p. 129).

WALLER, R. R. (Chairman, 1972): "Draft Code of Good Practice" *The Computer Bulletin*, 16, 1, Jan 72, 52-62.

WEGNER, PETER (1970): "Three Computer Cultures: Computer Technology, Computer Mathematics, and Computer Science" in *Alt et al.* 1970, 7-78.

WILLINGHAM, D. J. S. (1973): "Is The Programmer Dead?" *Datafair 73 Conference Papers* London: The British Computer Society, 5-12.

WISEMAN, TONI (1973): "ICCP Initiating Moves to Administer Certification" *Computerworld* VII, 44, 31 Oct 73, 32.

ZEMANEK, H. (1972): "What is Informatics?" *Management Informatics*, 1, 2, Apr 72, 43-52.

# Book Review

*Digital Computer Concepts:* A Self-Instructional Programmed Manual, by Vester Robinson (Reston). 300 pp., $7.95.

This book claims to be "indispensable as a reference manual to computer installers, technicians, operators and programmers" by an author who "has spent 25 years in teaching electricity, electronics and computers".

The format of the book is quite readable and the programmed instruction should be effective, however, the material would be of interest only to a reader approaching computers from a technical background in electronics. The title might mislead an unwary layman into believing that this book was a general introduction to computers and the type of work which they perform. Instead, he will be initiated into the mysteries of unbiased clampers, Schmitt triggers and single shot multivibrators.

I feel that the book must be of limited use as a general reference but may provide a relatively painless means by which more may be learned of the internal machinations of a digital computer.

J. Juliff