There is no doubt, in my mind, that computer technology is more important for the future than aviation, atomic power, or space travel. It calls for smaller investments than these, investments measured in tens of millions rather than hundreds of millions, yet whereas we have put thousands of millions of pounds into these other kinds of research, we have probably put less than ten millions altogether into computer research. We now have a lot of leeway to make up.

The other big problem is the design problem. I am referring not only to the design of the computers themselves, the "hardware," but also to the design of the "software," the collection of standard programs—the compilers and so forth, amounting perhaps to over 100,000 instructions—needed to make computers do the kind of tricks that I have been talking about. I am referring, in fact, to the whole great edifice of "mathematical engineering" that comprises a complete computing system. This is now so vast, rambling and expensive, that it demands much more study than it has had so far. One obvious need is for more standardization at all levels. But there are so many people involved, and the repercussions of a decision so complicated, that standardization is extraordinarily difficult.

I myself would like to see more theoretical work done on this subject, and more attempts to extract general principles by studying mathematical models of certain aspects of computers. This is a subject that uses many of the methods of mathematical logic, but requires an appreciation of the practical problems of computing. There are, unfortunately, very few people looking into it in this country at present. If my arrival can do anything at all to promote the study of this subject in this College, then I shall be very pleased.

Reference

McCarthy, J. *et al.* (1962). *LISP* 1.5 *Programmers Manual*, M.I.T. Press.

Book Reviews

Time-dependent Results in Storage Theory, by N. U. Prabhu, 1965; 48 pages. (London: *Methuen & Co. Ltd.*, 8s. 6d.)

This is the first of a series, each member of which will consist of a separate off-print of a review paper published in the *Journal of Applied Probability*. The intention is to keep the standard of exposition as simple as possible but to provide up-to-date accounts of research done in particular fields. This article by Mr. Prabhu has a fairly extensive list of references and an index, and should be useful to anyone interested in storage theory.

Storage models are a particular case of what is variously described as queuing theory or inventory theory. Basically they comprise a reservoir with inputs and outputs which may be either random or controlled variables. Mr. Prabhu, working with Moran and Gani in Australia, has been particularly interested in dams. Early work in this field was concerned to extend the theory of queues, in which arrivals, service and departures are usually in discrete quantities, to the case where input at least is continuous; e.g. by rainfall. Later developments have considered extensions to inputs which are correlated over time, and to various types of controlled release from the system. Interest has also developed in various transient features, and in particular to the distribution of volume in the reservoir and of the so-called "wet periods," i.e. times during which there is anything in store available for release.

Mr. Prabhu knows his field thoroughly and has made some notable contributions himself to its development. This article effectively covers work done in the last seven or eight years. From the nature of the case, it is not a text-book and has at times to quote results without proof or to condense arguments. But it gives a very useful review of a rapidly developing subject and will be very valuable to all those interested in storage problems.

M. G. Kendall

Journal of the Institute of Mathematics and its Applications: Volume 1, *Numbers* 1, 2, edited by F. A. Goldsworthy, 1965. (London: *Academic Press*, 120s. per volume).

The *Institute of Mathematics and its Applications* was formed in 1964; of its two publications the *Journal* (which is quarterly), is devoted to research papers while the *Bulletin* (also quarterly), is principally for news. Two issues of the *Journal* have now appeared; the quality of production is very high and the printing and format pleasing. The quality of the articles fully matches this standard; the series begins appropriately with an outstanding survey/expository article on group velocity by the Institute's first President, Professor M. J. Lighthill, F.R.S.

Of the twelve papers (average length 16 pages), in the first two numbers, six are on fluid mechanics (including MHD), three on elasticity, one on electromagnetic diffraction, and two only on statistical topics (stochastic processes and curve-fitting). The concentration on classical applied mathematics seems somewhat at variance with the declared policy of treating "all areas of the application of mathematics," but it would clearly be unfair to judge from two issues and no doubt the newer applications in mathematical economics, bio-mathematics, information theory etc., will in time receive their due share of attention.

One hopes also that the editorial statement "Especially welcome will be papers which develop mathematical techniques applicable to more than one field," may give scope for articles on applicable pure mathematics or applied mathematics in the Continental sense, in which this country seems sadly backward and in which members of the *British Computer Society* might be greatly interested.

F. M. Arscott