Any 'odd' available times are made into multiples of 30 seconds as soon as possible. If any time has to be left in a break (e.g. 8 seconds left in a break and there are no 7 second spots available) a factor known as 'Leeway Time' is examined. This is calculated at the beginning of the reslotting process and is the amount of time you can 'afford' to leave unoccupied. If the Leeway Time is nil, then all breaks must be filled.

6a. If the attempt at reorganisation fails to reslot all spots into the segment, an appropriate response will be sent to the terminal.

6b. If Priority Reslotting has been successful, the actual drum-held spot records are set to match the reorganised disposition worked out in memory. The spot is then booked.

### Current state

At the time of writing, the reslotting algorithm has been proved highly workable by simulation. Plans are being made for its implementation.

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### Reference

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# Book Reviews

*Nonlinear Programming—Sequential Unconstrained Minimization Techniques*, by A. V. Fiacco and G. P. McCormick 1969; 210 pages. (John Wiley & Sons Ltd., 95s.)

Very many different algorithms have been published for solving, on a computer, the important problem of minimising a function of several variables, the variables being subject to non-linear equality and inequality constraints. Most of these are a result of careful machine calculation, rather than theory, so the subject of non-linear programming has become rather fragmentary. Therefore this book by Fiacco and McCormick is particularly welcome, for it provides a coherent account of the theory and practice of methods that transform the constrained minimisation problem into a sequence of unconstrained problems.

I like especially the balance that has been obtained between the practical importance of non-linear programming, and the intention to provide a structure of theorems, for the authors have avoided the unfortunate current tendency of generalising results so that they are impressive instead of instructive. Moreover throughout the text numerical examples are given to explain the main theorems. Also, where conditions are needed in order to establish results, these conditions are chosen with the deliberate intention of relevance to practical problems.

The contents include a discussion of necessary and sufficient conditions for a constrained minimum, taking into account any curvature of the constraints, descriptions of various penalty function algorithms and proofs of their efficacy, methods for accelerating the convergence of the sequences of unconstrained minima, a chapter on the advantages of convexity, including duality theorems that yield intermediate bounds on the final solution, a synopsis of other methods for non-linear programming, and finally a description of methods for the unconstrained problem.

Its main limitation is unavoidable, which is that it cannot be up to date, because of the continual development of new methods. However I am sure that it will always be worthwhile to study this book, and I recommend it highly, both to theoreticians and to computer users.

M. J. D. POWELL (Harwell)

*Modelling of Thinking and the Mind*, by N. M. Amosov, 1969; 192 pages. (Macmillan & Co. Ltd., £6 0s. 0d.)

The official Soviet attitude to Western innovation has been as full of contradictions as the philosophy on which Marxist politics claim to be based. When the assembly of propositions and techniques which came to be called Cybernetics was first presented to Russian scientists it was rejected as decadent, mechanistic, idealistic and frivolous. Yet within a few years an impressive Institute of Cybernetics and Automation was established in Moscow and similar units have since sprung up in other centres of research and development. The author of this book is described as 'one of the Soviet Union's leading cyberneticists'; he is concerned not merely with the theoretical possibilities of 'intelligent machinery' but with the very practical problems of planning a new society with due regard to the quantitative aspects of individual psychology. We do not need recollection of '1984' to appreciate the sinister as well as the wholesome implications of this thesis. Where the State is supreme, the better individual psychologies are understood the more precisely personal prejudices and aspirations can be matched and cancelled. However, Amosov dispels such anxieties by reference in his introduction to the claims made for telepathy and the admission of the 'possibility of "wireless" transmission of psychic events'. When he adds 'but I suspect that their significance in human behaviour is not great' we realise that we have nothing to fear and little to learn. One cannot dismiss the significance of telepathy because it is a 'weak' force; it is either nonsense or the most important effect in the human universe.

Amosov's approach to the basic problems of thinking is direct and simple but naïve by contemporary standards. He provides a number of box-and-arrow schematic diagrams of such processes as memory, feelings, attention and so forth but does not propose how these should be embodied in the flesh or the metal. No doubt current work in the Soviet Union has gone far beyond this account and its elementary level may be attributed to the long delay since the first Russian publication and the translation, which is excellent.

W. GREY WALTER (Bristol)