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90	A. W. STEWART
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Book Review

Computers and Thought. Edited by EDWARD A. FEIGENBAUM and JULIAN FELDMAN, 1963; 535 pages. (Maidenhead: *McGraw-Hill Publishing Company Ltd.*, 62s.)

One of the most interesting and yet intractable points of both popular and professional discussions about computers is whether machines can, or conceivably could, "think". Unfortunately it is still necessary to put that last word in quotation marks as we have no agreed definition of the term. Several of the authors represented in this volume attempt that definition, the consensus being an ostensive definition which may be roughly stated as "behaviour indistinguishable from that of a human being under the given circumstances, if that behaviour on the part of a human being would be characterized as thought."

The present volume is a collection of the most notable papers on the study of thought processes by means of highly structured computer programs. The editors label this approach that of "cognitive models" and explicitly exclude work along the lines of self-organizing systems, "neural cybernetics", or homeostatic models. Whatever one's opinion of this or that approach the extent to which the experiments reported here have met with success is indeed the most lasting impression.

The 20 papers report on experiments in artificial intelligence that attempt both to simulate and to emulate human thought processes, and also include some papers that survey the problems and successes of the attempts. Additionally, the editors have included their own commentary to the several sections of the volume, a great help to the lay reader in following the relationships of the various projects described, and have appended an extensive bibliography of some 900 entries that is meticulously indexed under about one hundred descriptors (topic headings). This last was prepared by Marvin Minsky.

Not so long ago it may have been safe to say that research into artificial intelligence, whilst of vast interest, could yield little by way of immediate results of profitable application. Certainly the majority of the papers are concerned with game playing (chess and draughts), theorem proving, and similar intellectual pursuits, but two papers are far more mundane. That by Tonge on line balancing for assembly processes is the more advanced and therefore the more impressive. At the time of his report, first published in 1960, his program was already able to find a practical solution to balancing an actual 70-station assembly line in the appliance industry. If his program were implemented on a current-generation machine (JOHNNIAC was in fact used) it would be faster and probably cheaper than a human solution by a skilled and experienced manager. In the other paper on profitable applications Clarkson reports on a model designed for portfolio selection for investment trusts. At the time of publication this was not yet ready for use. Both papers are included in the volume because they use a heuristic rather than algorithmic approach.

Primarily this is a book for the library or for the specialist. Its value is greatly enhanced by the ample bibliography and by the care taken by the editors to relate their selections to each other and to their place in the field.

H. D. BAECKER