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Book review

Progress of Cybernetics, Vols. I, II and III, by J. Rose (editor), 1970; 521 pages. (Gordon & Breach, Vol. 1 £10.25 or \$24.50), Vol. 2 and Vol. 3 £8 or \$19.50 (each), complete set £20.75 or \$50.00.

The number and diversity of the contributions to a large compilation precludes the reviewer from attempting to assess them individually. His proper task is rather to select systematic trends; a problem in fact of pattern recognition. Where an editor has exerted cybernetic influence on the compilation, it is also proper to enquire whether the editorial statement of aims has been duly reflected in the actual material.

The Editor of the present three volumes states in the preface that an objective of the 1969 Congress of Cybernetics was 'To establish cybernetics as an interdisciplinary science on solid foundations without the spurious accretions of the last two decades'; also that 'it is intended to demonstrate the scope and maturity of cybernetics, though a few papers bear the stamp of a rather exotic approach. These somewhat fatuous contributions were included in order to bring to the surface certain undesirable accretions. A mature science has to be able to live and cope with those who are trying to jump on the band-wagon and use it as a vehicle for their exuberant claims'. We ask therefore whether (excluding 'fatuous contributions' which the reader can skip without outside aid) the contents do reflect a mature science. Specifically, do they represent sound contributions to the scientific method of systematic observation, formation of hypotheses, quantitative development of the consequences of these hypotheses, and confrontation with new observations?

The present reviewer judges these matters in part by scoring positively for pages containing relevant mathematical development or experimental results and comparisons. He scores negatively for such features as material that is either not new or (non-exclusively) is trivial, repetitions of well-worn diagrams, the mutual taking in of quotational washing, photographs of opulent apparatus accompanied by minimal experimental results, and above all for acres of qualitative discourse. It is a question of whether the author is actually doing the subject, or just talking about doing the subject.

By these criteria 'Progress of Cybernetics' scores somewhere around half marks. There is indeed a good sprinkling of sound scientific building-blocks, enough perhaps for one volume or even a little more; experiments, theoretical developments, developments of technical capabilities, and the combination of these things into coherent scientific strategies.

The opening section is called 'Main Papers'. These are rather longer than the general run of contributions, appear to have an invited status and are largely of a review nature. The density of plus scores is not maximal in this Section; one would not for example mistake the general format for the undoubtedly mature Reports of Progress in Physics. Among others, however, Ashby has an interesting discussion of information flow in tasks like tight-rope walking or driving in a large city (the connection is only too obvious), Beer has some deservedly unkind things to say about our economic and social institutions, and Glushkow gives a solid account of data processing

in specific natural sciences.

Section I (which follows the Main Papers) is called 'The Meaning of Cybernetics' so one fears the worst but does not always find it. Muses, going as far afield as operator algebras and epistemology, still keeps the appearance of rigor. Section II, 'Neuro- and bio-cybernetics', includes a contribution by Levy on computer simulation of neurological systems, by Andrew on the results of simulation of self-organising systems with significance feedback, by Arigoni on the algebra of intelligence, by Moore *et al.* on a model of a visual system, by Taylor on visual size-illusions, by Gambardella on auditory time perception (but some concepts appear to have been anticipated by P. M. Woodward), and by Auslander and Sharma on computer simulation of hormone levels. These unselectively chosen examples illustrate the broad international flavour of the Congress.

Volume 2 opens with Section III, 'Cybernetics and Industry (automation)'. With a few exceptions, the contributions in this Section are good, solid, quantitative and practical, perhaps even sometimes stolid; the plus scores are here too numerous to mention individually. Section IV, 'Social and economic consequences of Cybernetics', has the additional rubric 'including management'. Beer's assertion (q.v.) that there ain't no such animal, and overall scores about $\beta -$. However, Billeter-Frey criticises current economic models for leaving out some of the most important feedback connections, Winkelbauer analyses co-operative games (or how to maximise your divi) and Vaida has a paper on ALGOL 60 implementation and translation which would not be out of place in *The Computer Journal*.

'Cybernetics and artifacts' (Section V) is wide-ranging, including even computer sculptures, and contains several interesting articles, notably a pouring of cold water by Bagley on any assumption of an easy road to artificial intelligence.

Volume 3 contains Section VI, 'Cybernetics and natural sciences' and Section VII, 'Cybernetics and social science'. Neither received many plus marks from your reviewer, Section VII in particular posing the implicit question whether there are indeed as yet any social sciences. Two specific and quantitative contributions are by Chiaraviglio on computer modelling of DNA sequences, and by Malitza and Zidaroiu on random decision processes. Goffman treats the spread of the ideas of symbolic logic by means of a theory developed for epidemics, Irtem gives an intriguing hint about how to 'change' natural laws. There is also the aimable intelligence given by Kerschner that the term Cybernetics had been used before Wiener not only by Ampère in 1843 but also by Platon. Kerschner also tells us that all but 2-4 of the professional 'political scientists' in the world are American; no comment.

The reviewer draws two general conclusions. The first is that these volumes suffice neither to prove nor to deny the assertion that Cybernetics is now a mature science. The second is that while one may have reservations about the usefulness of publishing conference reports in general, this is not a bad example of its kind. (The reviewer would not personally pay £20.75 for it, however.)

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