

Then they have demonstrated a point which people often accept in theory but forget when it comes to practice; that complex systems often react to inputs in unexpected and unintended ways. If you kick a black-box—an outboard motor that won't start, or a TV set—it may do better than before, if it has been designed to have good stability for its main function. But it may do something quite unexpected if its performance has not been well stabilized.

Thirdly, the MIT group have started what will clearly be a long-enduring process of modelling the global situation. Improvements on their Mark I scheme are obviously called for, and some are already in hand by groups associated with the Club of Rome. One American-German team is developing a model which will "dis-aggregate" the world into three sections: rich capitalist, communist, and the Third World. They will also add another level to the system, namely of goal-setting activities which attempt to control the causal mechanisms so as to attain certain objectives. Another South American group is particularly concerned to distinguish the rich and the poor regions and study the interactions between them.

Beyond these developments, there are three others which seem to me especially desirable: (i) a distinction between material products which are generally agreed to be socially desirable, for example, food and housing and so on for an increasing population, and products which are unnecessary or undesirable (electric toothbrushes, arms); (ii) a recognition of the place of tertiary and quaternary employment (services, information processing, including education); (iii) allowance for unavoidable time lags (how long will it

take for increased investment in agriculture or natural resource utilization actually to produce and distribute fertilizers, say, or an infra-structure of roads, bridges and so on?).

There is no reason why such factors should not be built into later versions of world models, and I suggest they almost certainly will be. *Nature* ends its homily by telling the Club of Rome that it will have to live with some modifications of the Mark I model, exhibiting different properties. I think the remark boomerangs. *Nature* will find that it has to live with a new field of computer-model exploration of the world system, perhaps comparable in activity to the fields of computer exploration of intelligence and language.

Yours faithfully,

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Postcards to *Nature*?

SIR,—Professor McCrea's suggestion (*Nature*, 239, 239; 1972) for author credit, refereeing and editing seems likely to generate more editing on your part than it will save, if your correspondents write to point out the many flaws of the idea. May I therefore refrain from criticism and offer instead an alternative scheme?

Basically my suggestion is that journals should publish in full only those papers for which there is a proven demand. The existence of such a demand could be assessed by the initial publication of the abstract alone. Proof of a readership would then be the receipt, within some specified period, of

an adequate volume of requests for further details; the time allowed would clearly vary from subject to subject and journal to journal. If the number of requests received were large enough the full paper would be refereed, edited and published as at present, thus taking its deserved place in the scientific literature; otherwise it would be the responsibility of the author to send photocopies or the like of his manuscript to those few people who had requested details of the work.

In some subjects the delay involved in the process described above would be undesirable. In most of these subjects, however, there will be considerable personal contact between those engaged in the field and it should be possible for an author to demonstrate the existence of a readership when submitting his manuscript to the journal; the paper could then be published forthwith.

Some people may object that many of the papers published in *Nature* are already so short that their abstracting would cause difficulty. Logically, however, this problem should be met by requiring very short abstracts with which to test for a readership; perhaps these could be published as "Postcards to *Nature*"?

Both Professor McCrea's suggestion and my own are based on the assumption that scientists currently write too much about too little, thus clogging the literature with print few wish to read; in this case one may well ask whether the solution does not lie in more (and more stringent) refereeing rather than in less!

Yours faithfully,

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