Effective Use of Information

In the course of a study of the U.S. system for handling science and engineering information, the tremendous influence of the educational techniques employed in the training of U.S. scientists and engineers has become very apparent. Radical improvements in the information handling system are hamstrung by the educational system, which turns out a professional scientist or engineer accustomed to acquiring information by the complex, diffuse, and grossly inefficient techniques now in use. Habit patterns thus established in the schools are difficult to change.

The fruits of scientific and engineering discoveries (indeed, their very justification) lie in their application to mankind's daily problems, and the major stumbling blocks in the way of progress are human beings habituated to inefficient methods of acquiring, using, and disseminating information, floundering in an ever-growing morass of technical information. There seems little ground for hope that the flood of technical information will return quietly to its former, confined channels; the volume of published literature is doubling every decade or less. Piecemeal attempts to shore up the present information system will be helpful, but only for a short time. What is needed is a revolution in the training of scientists and engineers, so that their abilities to acquire information of a directly pertinent nature will be multiplied several-fold. I believe the average technically trained man could triple his productivity if he had a more efficient information system at his disposal, and if he were motivated and trained to use it.

It is true that some highly creative research workers on the frontiers of science are productive, even with the present inefficient information system. The numbers of people in these activities are, however, relatively small, and it is conceivable that even their creative productivity could be enhanced by better methods of acquiring and using available information. It is also true that groups of research scientists working with very large, expensive, experimental equipment such as linear accelerators probably know many workers engaged in similar research and exchange information with them informally. While this is true at one period in the history of any development, these frontier areas of science soon become like other well-established areas.

The incentive for a radical improvement in U.S. methods of handling technical information lies, of course, in the need for maximum utilization of the relatively few scientists and engi-

neers, in whose hands in large measure lies the national security. The extraordinary emphasis in the U.S.S.R. on training technicians to apply available information is well known. The emphasis which is given by the U.S.S.R. to technical information at the State Council of Ministers' level is also well known (even if it is not so well known that the centralized information structure is performing erratically). The United States was founded to give the individual room for maximum development, and its educational system is based on giving each person an opportunity to develop his or her talents to the maximum extent possible. The United States might well make a large national effort to discover and apply new and better techniques for training individuals in the most effective use of information, and then to devise an information system which can serve these better-developed citizens.

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Style Manual for Biological Journals: Approval of Manuscripts

Researchers ordinarily submit manuscripts to their professional journals without prior approval by administrative officers of their institutions; at least this is true in universities. Do editors consider this an undesirable practice and one to be combatted?

The Committee on Form and Style of the Conference of Biological Editors has issued a little book entitled *Style Manual for Biological Journals*. Chapter 3 of this begins, "The author should obtain approval from the responsible official within his institution before submitting a manuscript, to safeguard the interests of all staff members against erroneous or premature publication."

It is true that erroneous and premature publication harms the author and makes his institution ridiculous, but that is a small matter compared with the good effects our present editorial system has on science in general. As a rule, the journals will consider a manuscript regardless of who the author is and will see that it is reviewed by experts. If these men think it is good, it will be published. If they think it is bad, and the author isn't convinced, he can get the manuscript back and try a different journal. It is surprising that editors should undervalue their own role in the scientific process and should seek to legitimize a veto power by presidents, deans, and department heads.

Where administrative censorship is