

The Scientist in American Industry

Simon Marcson and W. S. Emmerich

Citation: *Physics Today* **14**(12), 58 (1961); doi: 10.1063/1.3057291

View online: <http://dx.doi.org/10.1063/1.3057291>

View Table of Contents: <http://scitation.aip.org/content/aip/magazine/physicstoday/14/12?ver=pdfcov>

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sary to scan the whole of a new book to determine whether it covers the special field of *his* interest. Professor Fano has spared the reader this problem. In the first chapter, he makes a complete and explicit statement regarding the purpose of his text and defines the problem which he treats, i.e., communication of information from a source to a user, under the condition of a fidelity criterion specified by the user.

The author then develops measures of information from elementary considerations of the probabilities involved in choosing one message from the universe of possible messages. When the reader has reached the end of the second chapter, he will have found that he has been exposed to a terse review of the elements of information theory as introduced by Shannon.

The remainder of *Transmission of Information* is devoted to studying how information transmission is influenced by the characteristics of the message source, the channel, and the coding system. Of particular interest is the closing chapter in which the effect of the choice of codes on error rate is treated for discrete, constant channels.

Each chapter is concluded with a brief list of references. Problems for each chapter are given in an appendix. Since no answers are given, these turn out to be exercises for both the student and the instructor.

A useful table of entropy for a binary alphabet as dependent on the probability of one of the two symbols and a brief table of the Gaussian distribution function are given in appendices. The entropy table, including as it does binary logarithms, is a valuable portion of the book.

This is one of the few books in the specialized field of information theory which can be read with profit by the amateur. At the other extreme, it should be useful as a formal text for a graduate course on this subject.

The Scientist in American Industry. By Simon Marcson. 158 pp. Industrial Relations Section, Department of Economics, Princeton University, Princeton, New Jersey, 1960. \$3.00. *Reviewed by W. S. Emmerich, Westinghouse Research Laboratories.*

THE rapid growth of industrial research since World War II and the subsequent shortage of scientific personnel have added to the problems faced by industrial research management. The author has endeavored to look at a typical industrial research laboratory through the eyes of those whose daily lives are spent within its walls. His material stems from interviews with the personnel of a particular, fairly representative laboratory, which is referred to as the PEC Laboratory, a fictitious name. For alert sleuths, its true identity, though inconsequential, should be quickly apparent. For readers with lesser talents, clues are liberally sprinkled throughout the text. The goals of the corporation and those of a scientist are outlined. Two, sometimes conflicting, objectives are immediately evident: company profit vs. professional orientation. This gives

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rise to strains which place the laboratory manager squarely in the middle. This theme is explored further in two chapters dealing with the career and professional needs of the scientist. A number of quotations from interviews, some quite poignant, enliven the arguments. They illustrate admirably the predicament of the managers and provide consolation for those individuals who fancy the grass to be greener on the other side. There follows a discourse on team work and a discussion of the very important subject of research pathways, or the method by which the "right" problem area for research is chosen in the industrial research laboratory.

Systems of authority and "strains" form the subject matter in the second part of the book. One of the main points brought up by the author concerns the predominance of executive authority in industry. Research management may, pro forma, acknowledge the existence of colleague authority, but when the chips are down, the professional employee tends to be powerless except for defection to other, perhaps competitive, laboratories. The subsequent shortage of competent technical personnel forces management to scrutinize its methods and evolve a more favorable policy toward the scientist.

The end of the book occurs just at this point, when the problem has been outlined and the reader's interest stimulated. Except for generalities on colleague authority, no concrete solutions are offered, either from the standpoint of the scientist or that of management. This reduces the level of the work to that of a status report. Perhaps it was never meant to be anything else, but a sequel on concrete ideas of how to overcome currently encountered difficulties could be of significant value in this field.

BOOKS RECEIVED

SPACE AND TIME (Reprint of 1926 ed.). By Emile Borel. Transl. from French by Angelo S. Rappoport and John Dougall. 234 pp. Dover Publications, Inc., New York, 1960. Paperbound \$1.45.

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