Book Reviews

Operations Research for Management. Joseph F. McCloskey and Florence N. Trefethen, Eds. Johns Hopkins Press, Baltimore, Md., 1954. xxiv + 409 pp. Illus. $7.50.

This book is a highly interesting compilation of articles on various aspects of operations research, by a number of different authors. They were originally presented as talks at seminars on operations research jointly sponsored by the Operations Research Office (doing research under contract with the Department of the Army) and the Johns Hopkins University. Edited and published (with any profits to go to the advancement of operations research rather than to the authors, by the way), they should appeal particularly to two classes of readers who have heard lately a lot of discussion about operations research and what it can do for management.

For executives in business and industry it can throw some light (from several directions and variously polarized) on some questions that may have been bothering them, such as "What is this operations research all about, and what is new in it, if anything?" "Why should scientists become involved in management problems that have nothing to do with research and development?" or "How good are these new and powerful techniques the operations research people talk about?" Also, a person with scientific training and an urge to apply that training to solve large-scale problems, rather than to develop new trees for the forest, can get a good idea of the potential for working in operations research and how to add to his training the better to prepare for it.

As would be expected from such a compilation, there is some duplication and contradiction of points of view. In the opening part of the book, which deals with the history, characteristics, and organization of operations research, there is ample evidence of the immaturity of the field as a unified science. There is some whistling in the dark as the authors try to convince themselves and one another that operations research is really scientific in the sense that science is aimed more at understanding than toward immediate practical utility. Ellis A. Johnson, in his general introduction, stresses the elements of observation, the model, experimentation, verification, and prediction, but these elements are often lacking in the examples of operations research presented later in the volume. He makes again the often-heard point that operations research deals with the operations of a whole organization, serving the whole management, rather than with subsidiary problems. Here again, however, this is not borne out by example, and this seems to remain a goal rather than an accomplishment of operations research.

Florence N. Trefethen's chapter on history includes a bow in the direction of time-and-motion study, quality control, industrial engineering, and so forth, as cousins, if not the grandparents, of operations research, and notes the addition of broader points of view, new disciplines, and more sophisticated techniques. Her summary of university programs and organizations to develop operations research is especially helpful to the potential student in the field.

George S. Pettee, in his chapter on operations research as a profession, offers an interesting discussion of how professions start. He aptly likens the status of operations research to that of chemistry during the time between Lavoisier and the later fairly complete identification of that field. He hopes that ethics in operations research, as in other professions, will allow complete interchange of methodology—as opposed to results with their military or industrial secrecy. If in fact methodology is the key to success of operations research, this may require some education among management, which is notably reluctant to reveal any clues to competitive advantage.

Charles Goodeve's discussion of operations research as a science reveals a basic difference in viewpoint between this country and Britain, where the scientific approach with rather simple methodology is stressed rather than the sophisticated techniques stressed in the U.S. His chapter almost belongs among those of examples, since he illustrates well one of the best attributes of operations research, the transferability of a single method among problems in widely different fields.

Lawrence J. Henderson's part on organization for operations research recognizes that organization is no substitute for ability and that operations research will find the place in an organization consonant with its success. He demolishes other authors' concept of the "mixed team" for operations research as a morale-building metaphor born during personnel-scarce World War II and outlines the real mixed team of coordinated specialists.

J. W. Pocock compares management consulting and operations research. From the viewpoint of long experience in a well-established field, he takes operations research promoters to task for their insistence on "proper conditions" for operations research and their inability to communicate their product to management without either confusing complication or ridiculous oversimplification. He notes, however, that so far as technique is concerned, operations research may begin where industrial and management engineering stop—that the best minds for operations research are those that almost unconsciously translate the activities in the world about them into curves, parameters, tables, and equations.

P. M. Morse leads off the section on methodology with some prognostications on the growing diversified utility of some older analytic techniques and the need for new ones. As a scientist who has managed sizable enterprises, he recognizes that the processes of research and management are inimical—within the same person, at least—but foresees the partnership between executives and operations research teams that has become the usual pattern in military organizations.

Russell L. Ackoff's chapter on statistics in operations research will shake most executives' equanimity regarding the adequacy of their statistical staffs. He shows the importance of modern statistical methods if reliable and useful conclusions are to be reached with a reasonable amount of statistical analysis, balancing the cost of analysis against the consequences of resulting errors (as opposed to mistakes). One example demonstrates the usefulness of stratified sampling and optimum allocation to a normally nonscientific problem—interline settlements for railway freight shipments.

Chapters by Byron O. Marshall, Jr., on queueing theory and by David Slepian on information theory will probably introduce the reader to two useful techniques that have only recently been formalized in mathematical terms. Their versatility is astonishing, with queueing theory potentially useful wherever capacity, demand, and service interact—in cafeterias, airports, warehouses, telephone systems, or what-have-you.

A discussion by Charles Hitch and

Roland McKean on suboptimization presents not so much a method as a warning and some rules. To the manager who has judged his operation on subsidiary measures, such as production per man or the ratio of profits to costs, ignoring or suppressing such factors as capital requirements, or the efficiency of other parts of the enterprise, this chapter says beware, as it does to the operations research worker on his selection of his basic measure of effectiveness.

Chapters by Walter E. Cushen on symbolic logic, by Joseph E. Harrison, Jr., on linear programming, and by David H. Blackwell on game theory are the most technical in the book and discuss techniques for which wide usefulness in operating problems is potential rather than proved. In general, their computational complexity is such that examples are given only in oversimple problems. It is refreshing to note the authors' statements of the limitations surrounding each. But a chapter, also by Harrison, on the use of high-speed large-capacity computers in operations research gives promise that their employment will allow the routine use of such techniques in practical problems.

Joseph F. McCloskey introduces a section on case histories in operations research with the opinion that scientists can make a new contribution in the new environment of operating problems, because they command the mathematical tools that make it possible to reduce to principle and formula many variables that enter into consideration when major decisions must be made. He notes that most successful operations research has been in an atmosphere of detachment from direct responsibility for the operation, sufficient time for research, and the confidence of the responsible executive.

The several case histories that follow are an interesting cross section of what different workers in the field view as operations research, although allowances must be made for distortions due to paraphrase and condensation. The example by John F. Magee concerning the effect of promotional effort on sales should appeal particularly to the businessman. It deals with a problem close to his heart, clear improvement in the operation resulted through methods not normally at his disposal, the best principles of operations research were applied, and, best of all, he can probably understand most of the method. Charles Warren Thornthwaite's example of developing a climatic calendar for large-scale vegetable farming is a wonderful case of a scientist's being around, recognizing an important problem, and solving it in an almost offhand and obvious manner. It should be an everlasting refutation to some businessmen's reaction that "anybody" could do that—the fact is they had the opportunity to do so and did not. Horace C. Levinson's account of his operations research in the mail-order and department store businesses includes some interesting examples on the evaluation of advertising and night store hours that required some pretty good techniques, but others that seem to be indistinguishable from normal market research. A useful model for relating complexity and reliability of electronic equipment is discussed in David M. Boodman's chapter on the reliability of air-borne radar. It would seem to have obvious application to the setting of design and manufacturing standards for consumers goods, balancing costs of extra reliability against those of servicing and fulfilling guarantees.

In my opinion, examples by Alfred H. Hausrath on study of the utilization of Negro manpower in the Army and by Robert H. Roy on operations research in the printing industry were not suitable for inclusion in this volume. The first is social research, the second is methods research or industrial engineering—neither was dominated by quantitative analysis or met McCloskey's own criteria for operations research. One more case history, by Seymour T. R. Abt, dealt with opportunities for operations research in supermarkets rather than accomplishments.

In summary, the book is an excellent compendium for the reader who wishes to catch up on operations research and get a good idea of how it may be useful to management in business and industry. It suffers little from its multiple authorship and usefully draws together many of the bits and pieces in which information on this field existed heretofore. It will give the executive reader some uneasy moments as he wonders whether he is missing some good bets for improving his operations and whether he might better his competitive position by having some scientists messing around with his management problems.

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The Chemistry of Lipids of Biochemical Significance. J. A. Lovern. Methuen's Monographs on Biochemical Subjects. Rudolph Peters and F. G. Young, Eds. Methuen, London; Wiley, New York, 1955. xiii + 132 pp. $1.75.

J. A. Lovern has written a compact book that deals with the field encompassed by its title in five different chapters dealing, respectively, with the structure of lipids, their preparation and analysis, their condition in the tissue, their dynamic state, and, finally, their biological function. The subject matter is well distributed among these five different headings, and the result is an exceedingly readable little book that manages to impart an amazing amount of information in very little time. The facts and theories presented are clearly stated, critically evaluated, and woven into a logical whole.

Lovern is a well-known lipid biochemist. Therefore the book is the work of a specialist writing on his own field. Too often such authorship results in an exposition of the subject that is either too specialized or too general. Lovern has successfully avoided these twin pitfalls, and his book is, on the one hand, authoritative and thorough and, on the other hand, easy to understand. It should be useful both to the specialist and to the general biologist.

Coming shortly after the exhaustive works of Deuel and of Wittcoff, Lovern's small book might have run the danger of being overlooked. Its excellence will undoubtedly save it from such fate.

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A History of Dermatology in Philadelphia. Including a biography of Louis A. Duhring, father of dermatology in Philadelphia. Reuben Friedman. Froben, Fort Pierce Beach, Fla., 1955. 556 pp. Illus. $10.

To members of the medical and allied professions who have seen the exhibits of historical manuscripts presented at society meetings by Reuben Friedman and to those who have read his historical articles, monographs, and books on the discovery of the cause of scabies, his scholarship in the field of medical history needs no further elaboration. The author is also a dedicated dermatologist whose precepts I was fortunate in having during the formative years of my own training in the specialty.

Although it concentrates on the history of dermatology in Philadelphia, the treatise includes a background of national and international events in the growth of the specialty that affords an excellent perspective of the development of cutaneous medicine in the Quaker City. As a result, the volume will be found valuable by graduate students of dermatology in appreciating how definite names and descriptions of cutaneous disease entities crystallized from a heritage of confused and confusing nomenclature. In addition, physicians will gain from it an understanding of the growth of that body of specialized science: from Willan's classification of skin diseases and his modern concept of eczema, through Alibert's classification, to that of Hebra