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Book Reviews

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BOOK REVIEWS

Editor: Philburn Ratoosh, Center for Research in Management Science, Stephens Hall, University of California, Berkeley, California 94720.

KREWERAS, G. and G. MORLAT (eds.). *Proceedings of the third international conference on operation research*. Oslo, 1963. Dunod Paris, 1964. London: English Universities Press Ltd., \$17.00, 952 pp.

Reviewing this 950 page volume of some 60 papers and reports dealing with topics ranging from research planning to integer programming and OR in forestry represents an uncommon assignment.

When so distinguished an expert as Mr. Morlat feels unable to draw a synthesis of this set of communications, the reviewer who regards himself as a student in the field, feels somehow puzzled. However Mr. Morlat facilitates our task greatly by giving, in his comments on the conference, a clear classification of the various contributions.

There exist two types (according to the audience) of communications: those delivered at assemblies and those delivered at separate simultaneous sessions (parallel sessions) or in special study groups. Those delivered at parallel sessions constitute the core of the book.

Most of the reports presented at assemblies deal with generalities about OR. Mr. Boiteau provides us with an interesting and optimistic prospect on OR in the forthcoming years. A contribution by R. Frisch deals at length with optimal national economic planning. R. Frisch strongly criticizes the Masse-Wald-Bellman type of dynamic analysis and the approach which consists in estimating the probable future growth rate and deduce, by input-output analysis, the consequences for the different sectors of the economy. Those figures are then put up as targets. R. Frisch wants to get rid of the target setting approach. He insists on continuity in the planning work and proposes a "moving" planning system. "A five year plan should be elaborated every year and each such plan should cover the next five years." This principle has been experienced by some western countries for many years in a somehow milder form. I know of no national economic planner who would not, at least readjust his policy when realizing that economic evolution contradicts his expectations and policies. In a country like France, there is an annual report on the implementation of the Plan and policies for the coming years are modified accordingly.

Transforming the "Joe Stalin's social welfare function" of the late Sir Dennis Robertson into a "Santa Claus approach", R. Frisch proposes a preference function to be determined without any reference to technical constraints or economic feasibility. Then he introduces constraints given by scientists and technicians which determine a convex admissible region. One might ask how this technique differs from target setting. Planners know with a certain degree of accuracy what is feasible and what is not. Insofar as target setting is determined with regard to what is feasible and what is desirable, results might well not differ greatly. In addition, targets might be put up by governments remembering Claude Bernard's saying "when you do not know what you are looking for, you do not see what you find out".

Of greater interest is the concept of a coalition preference function through which people express their interest in grouping either geographically or according to their trade or social class. It seems that this concept could benefit greatly from recent developments in game theory (with coalitions) and contributions dealing with the core of an economy.

Parallel session 1 is devoted to mathematical programming with special attention on the decomposition principle. Most of the papers delivered at this particular session deal with practical computer experience and show the rapid increase in the sizes of problems which can be solved on modern computers. Even more spectacular results are expected within the forthcoming years.

A paper by A. Charnes, W. W. Cooper and K. Kortanek presents some interesting results about duality in non-linear programming. This gives economic properties and effective means to solve some nonlinear programs in connection with traffic distribution and stochastic models.

Session 2 deals with buying and marketing problems. A paper by R. L. Ackoff gives "Some Observations on Marketing and Operations Research in the United States" and shows how commercial costs are rapidly expanding and even exceeding production costs in many instances. At the same time the author casts some doubts about the ability of OR to market itself. This poses, once more, the problem of OR implementation, on which a great deal of work is being done by Professor C. W. Churchman. The ability of the management to welcome OR contributions seems to differ widely from country to country since managers are selected differently.

Other sessions 3 and 4 deal with health problems and scheduling, respectively.

Session 5 is devoted to "Intra Firm Input-Output." As The President of the Session, Dr. Wence, points out, the tendency to consider one output only in linear programming problems results in the use of square matrices and this, will give importance to input-output analysis.

Session 6 deals with Traffic with two theoretical papers and three which are devoted to actual problems. Among those a study by R. Loue and G. Nahon (from Sema-Paris) constitutes an excellent example of full cost analysis applied to an investment decision whether to build a bridge or not.

Session 7 deals, at length, with research planning.

A very sophisticated paper by H. Theil gives a mathematical approach to the optimal management of research problem. A stimulating paper is the one presented by Burton V. Dean on "Group Research as an Educational Tool." Though we do not believe too much in the "publication criterion" in a country whose academic world is dominated by what could be called "a publishing disease" (something which strikes the foreign visitor to the U.S.), some of the statistical evidence given by the author seems to prove that group research would increase efficiency if started at the college level. The author even discusses the suitability of a group thesis!

Session 8 devoted to Decision Criteria contains six contributions. A paper by M. Shubik raises, once more, the question as to whether decision criteria must be normative or not. Francis Bessiere gives an interesting paper about the minimax regret criterion. This criterion has raised a greater interest in France than in many other countries. The author wants to prove that in a game against nature you do not know how to choose (or you do not want to choose)

a probability distribution for the different states of nature. He suggests that the "best" decision has to be chosen among those which are optimal for, at least, one subjective probability distribution. In a game against nature, nature is not a "player" and is indifferent to the outcome; the point of the author consists in showing that the minimax regret criterion gives the best expression of this indifference, and he actually gives a proof of their equivalence.

Session 9 is devoted to long-term investment planning with an all-European contribution. Papers delivered at this session, deal with practical topics and do not raise highly theoretical points. They show that new techniques like non-linear programming, will be widely used in the near future, provided appropriate computer programs exist.

Session 10 is the second one devoted to mathematical programming with insistence on integer programming. New methods which have nothing to do with the cutting plane approach are presented by B. Roy, A. Le Garff and Y. Malgrange. It seems however that for small (50 variables) problems, Gomory's methods are still the most efficient and that no satisfactory algorithm can solve problems of higher dimension. A paper by F.E.A. Briggs gives an interesting extension of Hitchcock problems with capacity constraints. The algorithm given here solves the problem raised by more than one constraint by now with a special case when overlapping constraints are nested within each other. Session 11 deals with military problems, Session 12 with traffic and contains papers resulting from actual problems rather than theoretical ones.

The rest of the volume deals with special study groups and their reports. General comments given by G. Morlat provide us with a clear classification of the various contributions given here:

Mathematical Techniques	Sessions 1, 10
Life of a firm	Sessions 4, 5, 9
Cases	Sessions 2, 3, 6, 11, 12
Principles	Sessions 7, 8

Very few will find an interest in every paper, but very few applied mathematicians, economists or businessmen will not find some papers of interest to them.

Those proceedings prove that OR is in good health and is expanding in so many fields that only the theorician who is an applied mathematician can still have a general grasp of what is going on. Such a tendency is likely to be maintained in the future; provided we know exactly what OR is (a question which is inevitably raised at any OR meeting), there is a bright prospect in the field.

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CHACKO, GEORGE K. *Today's Information for Tomorrow's Products.*

Washington, D.C.: Thompson Book Company, 1966, \$11.00, 225 pp.

This book is an attempt to use the method and approach of operations research to provide a predictor of technological advance. It is obvious Dr. Chacko, like many others, feels that if one is to do operations research in those

fields whose problems are not amenable to solution using the existing set of mathematical techniques, then one must provide some compelling reason as to why he has allocated his personal resources in this manner. With his introduction—"At Stake—Survival"—and his first chapter he begins to provide his *raison d'être* for the application of operations research to this broader and more complex class of problems, and to indicate the shortcomings of the "techniques' approach to managerial decision-making problems"¹ as providing but "symptomatic relief."

If there is a unifying objective for this effort, it is summarized by his statement ". . . how may sign posts be devised and recognized along the uncertain path toward the unknown new product."² To achieve this objective the author has developed a "Periodic Table of Product Diversification," the "PTPD." The table, which like Mendeleyev's table and its missing chemical elements, will provide management with information as to the selection and timing of the products to be introduced to and removed from the "organism' (enterprise's) output portfolio."³ It appears surprising that Dr. Chacko can attempt to create this almost direct analogy, and yet claim considerably broader predictive powers for an admittedly more complex and less structured problem set.

There are many other explanatory analogies in Dr. Chacko's philosophical approach to product change, but they are too numerous to describe in detail. His description of the effects of new technology upon product conception is accompanied by an argument for the necessity of considering capabilities of individuals rather than specific skills, if the "organism" is to be able to withstand wide variations in its resource requirements. It appears that if Dr. Chacko could have developed this last point to the degree to which he developed his "S-index" (the ability to satisfy wants) and "V-index" (the vital nature of the want), he might have made a more substantial contribution.

In his diagrammatic and symbolic description of the product life cycle, he uses methods based upon exponential smoothing to determine the shape of growth and the value of information on new demand for an existing product. Given his intended readership as stated in the preface, it appears that it is inappropriate to introduce orthogonal polynomial curve-fitting without an adequate discussion of the limitations and the conditions in which the use of each of the equations is applicable.

It is obvious that Dr. Chacko has been captured by the romance of the history of innovation and intrigued by the potential value of technology extrapolation. Great honor awaits the originator of a predictor of technological advance. Dr. Chacko describes this challenge and several affecting factors, but he contributes very little towards the satisfaction of this challenge in either theory or technique. However, the obvious contribution is a delightful, easy to read treatment of product life cycles and technological advance that leaves a stimulated, but slightly frustrated reader.

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¹ Chacko, George K., *Today's Information for Tomorrow's Products*, p. 17.

² *Ibid.*, p. 4.

³ *Ibid.*, p. 155.