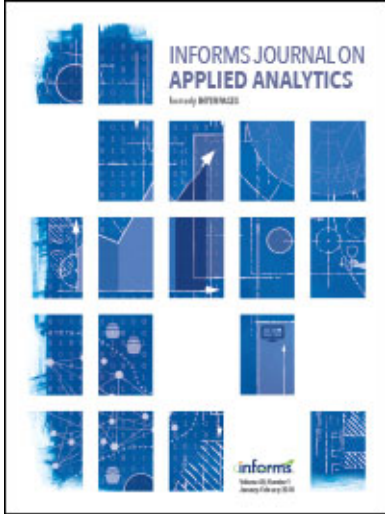




Interfaces

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Book Reviews

To cite this article:

(1998) Book Reviews. Interfaces 28(2):123-138. <https://doi.org/10.1287/inte.28.2.123>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 1998, INFORMS

Please scroll down for article—it is on subsequent pages

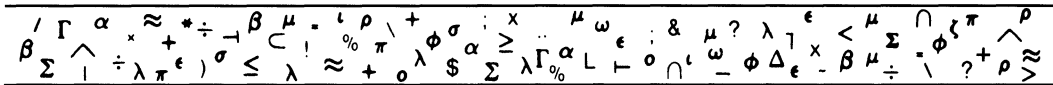


With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes. For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Book Reviews

BENJAMIN LEV

School of Management
The University of Michigan-Dearborn
4901 Evergreen Road
Dearborn, Michigan 48128-1491
BLev@FOB-F1.umd.umich.edu



The range of books reviewed is wide, covering theory and applications in operations research, statistics, econometrics, mathematics, computers, and information systems (no software is reviewed). In addition, we include books in other fields that emphasize technical applications. Publishers who wish to have their books and proceedings reviewed should send them to Professor Benjamin Lev. We list the books and proceedings received; not all books received can be reviewed because space and time are limited. Those who would like to review books are urged to send me their names, addresses, and specific areas of expertise. We commission all reviews and do not accept unsolicited book reviews. Readers are encouraged to suggest books that might be reviewed or to ask publishers to send me copies of such books.

1996 Franz Edelman Competition

Videotapes

BOTHA, SALLY; GRYFFENBERG, IVAN; HOFMEYR, RAUTEN; LAUSBERG, JEAN; NICOLAY, RUPERT; SMIT, WILLEM; UYS, STEFANUS; VAN DER MERWE, WILLIE; and WESSELS, GYS
1996, *Guns or Butter: Decision Support for Determining the Size and Shape of the South African National Defense Force (SANDF)*, No. 96.01, 1/2" VHS: \$125 PAL: \$85.

CURNOW, GEORGE; KOCHMAN, GARY; MEESTER, STEVEN; SARKAR, DEBASHISH; and WILTON, KEITH

1996, *Credit and Collections Decision Automation in AT&T Capital's Small-Ticket Business*, No. 96.03, 1/2" VHS: \$125, PAL: \$85.

CARR-HILL, ROY; HARDMAN, GEOFFREY; MARTIN, STEPHEN; PEACOCK, STUART; SHELDON, TREVOR; and SMITH, PETER 1996, *A New Formula for Distributing Hospital Funds in England*, No. 96.04, 1/2" VHS: \$125, PAL: \$85.

GOLABI, KAMAL and SHEPARD, RICHARD 1996, *PONTIS: A System for*

Copyright © 1998, Institute for Operations Research
and the Management Sciences
0092-2102/98/2802/0123/\$5.00

Maintenance Optimization and Improvement of US Bridge Networks, No. 96-07, 1/2" VHS: \$125, PAL: \$85.

ELIMAN, ABDILGHANI A.; GIRGIS, MAURICE; and KOTOB, SAMIR 1996, *The Use of Linear Programming in Disentangling and Bankruptcies of al-Manakh Stock Market Crash*, No. 96-02, 1/2" VHS: \$125, PAL: \$85.

GERAGHTY, M. KEVIN and JOHNSTON, ERNEST 1996, *Revenue Management Program at National Car Rental*, No. 96.05, 1/2" VHS: \$125, PAL: \$85.

CAMM, JEFFREY; CHORMAN, THOMAS; DILL, FRANZ; EVANS, JAMES; and SWEENEY, DENNIS 1996, *North American Product Supply Restructuring at Procter & Gamble*, No. 96.06, 1/2" VHS: \$125, PAL: \$85.

The 1996 Edelman Competition produced some very interesting videotapes. The tapes cover a range of subjects with some truly novel applications. To some extent, the viewing quality has improved. There is more attention to readable graphics. Given the number of years that the competition has run, it is now possible to put together a suite in various functional areas of business. For example, there are some excellent tapes on financial applications of management science as well as the usual operations management applications. Also, one could put together a suite on military applications.

Guns or Butter

The transformation of South Africa has been one of the major news stories of this

half of the 20th century. Racial, ethnic, and tribal groups seem to be working together under the remarkable leadership of Nelson Mandela. One of the touchiest issues when the fighting ends is figuring out what to do with all of the separate militaries. Adversaries have to stop killing each other and start working together as an organization. This tape describes the approach the South African military took to redefine itself. By merging together all combatants, the military grew from 70,000 to 140,000. Yet, it had to do this with a 50 percent cut in the budget. Combined with this, as part of the devolution of the cold war and the return to peace in South Africa, the wars in the border states of Angola and Mozambique ended. This meant that the mission changed dramatically as well. Accomplishing the remaking of the military is one of the many successes that have kept South Africa out of the news because things are going right instead of wrong.

The work described started and grew with the new defense-planning cycles over a period of four years. The redefined mission was mapped into tasks, around which appropriate force-structure elements had to be defined. These elements could contribute to meeting several tasks, leading to a mixed integer programming model. The latest version of the model described has 6,000 constraints, 16,000 variables, and 256 integer variables. The military faced the usual implementation issues, such as building the supporting database. Also, as is common with IPs, the solution of the model involved a lot of art. Solution times were initially two to three weeks on a pentium PC. They are now 24 to 48 hours af-

BOOK REVIEWS

ter a lot of work. The military also developed a risk model to estimate the probability that a mission would have to be pursued. This determined weights in the LP objective function.

Through the modeling, they were able to achieve a further budget cut of 22 percent and maintain the chosen missions. The project had other difficulties that are not typical of a management science project. Team members had their lives threatened, illustrating that there are always rough spots in any major transition.

The presentation was nontechnical. The models are fully documented in the paper. The South African general who did much of the presentation was remarkably poised and showed a natural sense of humor. He and others like him are a good part of the reason why the redefinition of the military seems to be succeeding and a new nation is being built. The tape is useful in illustrating the power of our tools in policy-making situations. The real value of the tape is in documenting the unsung work that must go on in building a nation after internal strife and the potential of management science to contribute to building a society.

AT&T Capital Corporation

This is another example in a recent string of applications in the finance industry, and it illustrates the increasing importance of management sciences in the finance industry. The area of application is leasing. Leasing is price and response-time driven and there are many competitors. One way to succeed in this business is to be a cost leader and make good credit granting decisions. To compete on price, one needs to lower the costs of granting

credit—especially with small leases, the focus of the presentation—and reduce losses. AT&T Capital, through AT&T labs, developed a suite of tools to address three areas in credit granting and management. The analysts developed a way to sequence the use of credit bureaus and make decisions based on the cost of gathering information and the value of this information. This is an interesting application of decision analysis that is different from the usual decision-tree examples used in classes. Furthermore, AT&T now extends credit lines to specific customers using a second model. This has marketing advantages because the companies using AT&T as their source for customer leases have pre-approved leasing capacity and can complete a sale immediately. AT&T also employs a delinquent accounts model to improve collections from customers who are late in paying. This model sorts customers into categories based on degree of risk of default.

The tape has clear graphics and good nontechnical descriptions of what AT&T did. The models are sketched out in the appendix of the paper. The tape can be useful in illustrating how a decision process can be automated, and it provides the background on how one can use a decision analysis. It can be used as an example of quality management in a service industry. The presenters also discuss their conversion from nonbelievers into satisfied customers of management science. This may seem strange at a company like AT&T. However, different business units within the same company can have very different business cultures, and we have to be aware of this.

Distributing Hospital Funds

Health care is one of those important industries that does not always respond to market mechanisms in socially acceptable ways. With a national health-care system and no market mechanism, Britain has had to constantly rethink its allocation of resources. Health care demand is also a function of supply, since there is a cost to going to the supplier and waiting even when the treatment is free. Also, agency problems result from the way formulae give incentives to the health-care units.

In this presentation, the presenters address the critical issue of equity in accessibility. They developed statistical data and tools to come up with a formula for allocating resources. Their work was subjected to national political debate and was implemented by a Conservative government even though the districts benefiting from the reallocations voted for the Labor party. Because of the nature of the problem and the political environment, the analysts had to come up with an approach that would be perceived to be equitable and would meet the criteria of statistical acceptability, plausibility, and parsimony. They were successful, and they are now applying their approach to children's social services.

What defines equity, the objective function here, is a value-laden question. This comes out in the tape as the presenters segregate needs into "legitimate" and "illegitimate" needs. These terms express their values but not necessarily those of others. For example, middle- and upper-class people naturally consume more health care since their economic needs are addressed to a greater degree. Should equity not include utility functions and ad-

dress marginal value? From another perspective, an allocation scheme could define equity as an equal wait (not one of the factors in the talk). However, this accords everyone's time the same value. Yet, the time of the unemployed is not worth as much as that of the employed. This is counterbalanced by the desire of the middle classes for more health care. They may be willing to wait longer. Also, waiting has agency effects. I mention this because this tape is only another round in the debate as to what is equitable and how to manage health-care costs. One can use the tape as a starting point for discussions on the issues of values in social policy. For this reason, it would be useful in an analytic-methods course with a public-policy or health-care orientation.

Pontis

With the aging of the highway system, the cost of bridge repair is going to increase. A series of bridge collapses and closings has increased awareness of the need to repair these bridges. The US Department of Transportation, six states, and two consulting firms developed Pontis to be a decision support system to help track bridge maintenance and to optimize decisions to repair, replace, and improve bridges. The presentation and the paper focus on the decision support function, not the underlying models, which are Markov chains and include dynamic programming for some of the optimizations. A key element of the system is the design of the database around engineering requirements. The reason data issues are important here is that this is a reliability and maintenance problem with many heterogeneous items to maintain. Part of the solution is to

BOOK REVIEWS

maintain failure distributions by bridge elements, which are fewer in number, rather than by bridge.

The presentation includes a videotape produced as part of the project for explaining the system to states. This video is better than the usual talking-heads format and clearly describes how the DSS is used. This presentation would be useful for showing a civil engineering application of management sciences, or it could be used in a reliability course for students who realize the importance of different failure distributions but need a broader view of reliability and maintenance concerns. It also illustrates all of the complicated aspects of building and using a decision support system.

Kuwait's al-Manakh Stock Market

In 1982, a speculative bubble in the Kuwaiti stock market collapsed. This left \$94 billion of debt to be resolved. The amount was over four times the GDP of Kuwait. The government tried to use standard legal solutions. After one year of applying purely legal means, it had not resolved the mess, and a new finance minister decided to use management science. The problems were exaggerated because 29,000 postdated checks had been used to finance purchases. Postdated checks are a form of lending with interest used to get around the Islamic prohibition against charging interest, even though postdated checks are illegal in Kuwait.

The linear programming approach described here is a novel use of LP, and the presenters describe most of the important implementation issues in using linear programming with the added dimension of critical time pressures. They offer a very

good discussion of the choice of objective function, which is not obvious in this application. Also, they were able to present the theoretical results of the model that demonstrated solution robustness, an important element in demonstrating the fairness of the solution. The critical importance of the model in resolving the crisis and maintaining social order (the extended families in a small society were all involved) comes through from the former finance minister's description of the issues.

This tape could be very useful to those teaching linear-programming courses; it has a good context, a clear problem description, a good discussion of implementation and how the model is used, and important social as well as monetary benefits. The LP reduced the total unresolved debt to \$20 billion. One of the interesting social benefits was that potentially \$9.4 billion in lawyers' fees were avoided, and the systems perspective of management science solved a problem while the case-by-case approach used in law is quixotic at best. The graphics are insightful and clear enough. Although the portion of the tape covering the former finance minister has an annoying flicker, it does not hinder comprehension. The model is fully documented in the paper, which complements the tape well, as the tape presents the importance of the application in ways a written piece cannot.

National Car Rental

National Car Rental was losing substantial amounts of money, and General Motors, the owner, had two choices: fix it or liquidate it. GM hired turnaround specialists to save the company. The typical strategy in these situations is to cut costs. They

tried but did not find much to cut, and what they cut lowered customer service. The only viable strategy for survival was to enhance revenue. National was in the position of running out of vehicles and turning down profitable customers on some days and having too much capacity on others. It was also turning down customers when it had vehicles on the lot because of no shows.

The clear strategy was to improve revenues through a yield management system. The typical management science project focuses on cost reduction. Yield management systems, which emphasize revenues and capacity utilization and were pioneered by American Airlines, have been an exploding area for management science professionals. At National, the booking curve, the curve that tracks reservations by number of days before the cars are rented, starts to show periods of heavy demand over 55 days out, clearly showing the potential for yield management. Still, National could not use the airline models directly. The flow of customers is continuous and not batched by flight. Furthermore, the capacity depends on car returns as well as what is on the lot at the start of the day.

National developed a system that has a forecasting module, a representation of planned upgrades, an overbooking model, a rate-setting model, and a fleet-inventory-optimization model. Up to 70,000 price changes are made per day. In the presentation, the presenters did an actual update of prices, showing how they use the system.

The presenters were enthusiastic, and the application saved a company. The pre-

sentation was nontechnical, and the models are included in the paper. Changing rates in front of the audience was a brave thing to do and successful. Unfortunately the graphics were hard to see, so some of the impact was lost.

This tape would be useful in a case-studies course where the focus is on problem solving, as opposed to studying a single class of models, except in a forecasting class. It is also a useful demonstration that analysis tools do not have to focus just on cost reduction. They can also be used for revenue enhancement.

P&G's Supply Chain

To improve its competitive position, Procter and Gamble decided to reexamine its production and distribution of paper products. This involved classic facility-location techniques. The analysts used an uncapacitated facility location model to site distribution centers relative to centroids of customer demand and a transportation model to determine the links between factories and distribution centers. The analysis involved 123 customer zones, 17 distribution centers, 60 plants, and 30 product groups. Interestingly, they used two separate models and not one large model.

This presentation shows the power of modern computer graphics and PCs to deliver useful decision support systems. The demonstration in the presentation is impressive and shows how one can quickly generate a set of scenarios to develop strategies. The graphics look good. So, the power of the decision support tool is clear. The demonstration also illustrates why graphics are necessary. The scenario used showed crossing links between distribu-

BOOK REVIEWS

tion centers and customer centroids. The presenters investigated and explained this by showing the input data in user-oriented screens.

The numbers are large. Procter and Gamble took a \$1 billion write off and generated \$200 million per year in savings. In the process, 6,000 people were affected, of which one third retired early, one third moved, and one third were trained and placed with other companies. The project led to the return of management science in Procter and Gamble. P&G also used the models developed for competitive analysis and benchmarking against competitors' costs.

This tape would be useful in demonstrating how a major company uses a decision support system, especially in an operations management class for business students. Typically the authors of the books for such classes do not give a real feel for location decisions and resort to trivial models that are good only for homework problems and not for real location decisions.

Frederic H. Murphy

School of Business and Management, Temple University, Philadelphia, Pennsylvania 19122

CAMM, J. P. AND EVANS, J. R. 1996, *Management Science: Modeling, Analysis and Interpretation*, South-Western, Cincinnati, Ohio, 865 pp., \$48.00.

This is another among several new, refreshing books [Clauss 1996; Hesse 1997; Plane 1996; Ragsdale 1995; Savage 1994; and Winston and Albright 1996] emphasizing the use of spreadsheets in decision making. These texts, with their

spreadsheet-modeling approach, stand in contrast to traditional management science books that emphasize techniques and mathematical algorithms. Papageorgiou [1997] points out the results of years of emphasizing techniques, stating "we have ignored the fact that business students are our prospective consumers and clients, as the managers of tomorrow, and we have done our best to turn them away from our discipline." Texts such as this go a long way toward helping faculty become better advocates of management science. When students see a Monte Carlo simulation demonstrated on a spreadsheet add-in, such as Crystal Ball, the overwhelming reaction is "Wow!"

The authors assert six features for their book: (1) a distinct modeling, not algorithmic, focus; (2) unique coverage of important contemporary topics; (3) heavy reliance on spreadsheets and widely available software; (4) use of real applications and examples throughout; (5) extensive worked-out examples and solved problems; and (6) comprehensive end-of-chapter exercises. They have successfully accomplished what they set out to do. One could quibble with the term *unique* of the second point, but the text does provide all these features and quite competently.

The text is logically organized into three major parts: the first providing an introduction to management science modeling and spreadsheets, the second focusing on deterministic models, and the third dealing with probabilistic models.

In the first section, there are introductory chapters covering management science and problem solving, spreadsheets, and modeling. The authors give considera-

tion to influence diagrams.

The deterministic modeling part has seven chapters, covering linear programming, multiobjective LP, integer programming, network modeling, and heuristics. Camm and Evans deal with linear programming more comprehensively, compared to multiobjective LP and IP.

In the probabilistic modeling part, the authors assume students already have a basic understanding of probability and probability distributions. They include chapters on probabilistic and statistical modeling, decision analysis, computer simulation and risk analysis, dynamic simulation, and modeling queueing systems. They use Crystal Ball, a spreadsheet add-in, to illustrate Monte Carlo simulation (however, the software is not provided with the text).

The authors make extensive use throughout the book of real-world examples. Students will appreciate the diversity of functional areas covered (including marketing, finance, and human resources, in addition to the usual operations management). Both the examples and end-of-chapter exercises vary in complexity, with some being more appropriate for MBA students rather than undergrads.

Considerable instructor support material is available, including a solutions manual, PowerPoint lecture slides, a data disk containing most of the examples and exercises in the book, and a test bank. LINDO is included on the data disk. The PowerPoint files are particularly useful, providing excellent coverage of the text material, and much effort has gone into producing them. The authors are readily available via e-mail.

This past term at Wilfrid Laurier University, we used the text with a second year business class. Students overwhelmingly recommended its continued use. They appreciated the opportunity to improve their spreadsheets skills, as well as the labor-saving lack of hand calculations. They saw the number and diversity of examples as a plus. Occasionally some students were overwhelmed by the complexity of certain examples, while other students relished these challenges.

Somewhat disappointing was the number of errors in early printings of the text (we worked with the first printing, and our students with the second) and solutions manual. These are being corrected and future printings should be much better. Another concern is the mixing of Lotus 123, Excel, and Lindo examples—ideally, instructors could be offered the flexibility of customizing the software shown throughout the text. Our students are Excel users and some were confused when confronted with Lotus 123 examples (the table lookup function, for example, is slightly different). Overall, the text emphasizes Excel.

In summary, the authors have successfully met their objective of writing an introductory management science book for undergraduates or MBA students that emphasizes modeling and spreadsheets. The book provides considerable coverage (865 pages) of introductory decision analysis topics and gives good value for its price. It provides excellent support for faculty who want students to understand the significant contribution OR/MS can make to solving business problems from many areas and environments.

BOOK REVIEWS

References

- Clauss, F. J. 1996, *Applied Management Science and Spreadsheet Modeling*, Duxbury, Pacific Grove, California.
- Hesse, R. 1997, *Managerial Spreadsheet Modeling and Analysis*, Richard D. Irwin, Chicago, Illinois.
- Papageorgiou, J. C. 1997, "Pursuing the wrong objectives," *OR/MS Today*, Vol. 24, No. 2, p. 8.
- Plane, Donald R. 1996, *Management Science: A Spreadsheet Approach for Windows*, Boyd and Fraser, Boston, Massachusetts.
- Ragsdale, C. T. 1995, *Spreadsheet Modelling and Decision Analysis: A Practical Introduction to Management Science*, Course Technology, Cambridge, England.
- Savage, S. L. 1994, *Fundamental Analytic Spreadsheet Tools for Production Operations Management*, McGraw-Hill, New York.
- Winston, W. L. and Albright, S. C. 1996, *Practical Management Science: Spreadsheet Modeling and Applications*, Duxbury, Pacific Grove, California.

Ron Craig

School of Business and Economics, Wilfrid Laurier University, Waterloo, Ontario, Canada N2L 3C5

JARROW, R. A.; MAKSIMOVIC, V.; AND ZIEMBA, W. T., eds. 1995, *Handbooks in Operations Research and Management Science*, Vol. 9: Finance, North-Holland, Amsterdam, The Netherlands, 1,165 pp., \$165.00.

This is Volume 9 in the Operations Research and Management Science Handbook series first published in 1989 by North-Holland. This particular volume is huge, and the first word off my lips when I picked it up was "wow!" (The second and third words were "wow!!" and "beautiful!")

The Handbook of Finance is intended primarily for financial-economist and financial-modeling academics and practi-

tioners, and in its 33 chapters the contributions have been classified within capital markets and corporate finance. My review of this book is from an outsider's perspective, and this is likely to be a view that *Interface* readers find comforting. Volume 9 continues the fine tradition of the first eight volumes of the series (*Optimization*, *Stochastic Models*, *Computing* [see the review in *Interfaces*, Vol. 24, No. 6, 1994], *Logistics of Production and Inventory*, *Marketing*, *Operations Research and the Public Sector*, *Network Models*, and *Network Routing*). The reader can expect an excellent collection of articles, which, although not entirely suitable as a textbook, serves as a nice addition for a reference text or supplementary reading. The coverage is broad, and not everyone will be excited or enticed by every chapter. There is, however, a little something to everyone's taste, and the book is consistent in its presentation and the chapters are generally written in an expository manner. This is one of the definite strengths of the handbook. I picked out a few of the chapters that were personally appealing for a closer look and was surprised by the interest they generated. There are a number of very interesting chapters, and if you are not a financial economist you may initially be intimidated by the contents (arbitrage, finite-state securities, interest-rate options, derivatives, capital-growth theory, valuation, volatility, and so forth). My advice is to let the initial intimidation pass and dig in to one of the chapters that catch your interest.

The material is sufficiently refined and presented so that even a novice can begin to understand the main emphasis of re-

search work in this fascinating field. Some of my favorite chapters are on portfolio theory, pricing interest-rate options, volatility, efficiency of sports- and lottery-betting markets, performance evaluation, real options, and dividend policy. Chapters average 30 pages or so in length, and this is not a book you would likely (or want to) read from cover to cover. Indeed, the nature of the handbooks is to broaden one's perspective and outlook on a field, and as such it serves a particular and timely niche in an academic environment. The book is rather expensive, however, and it is hard for me to imagine anyone actually buying it except university libraries. Nonetheless this book definitely deserves shelf space.

Mark Kaiser

Department of Industrial and Manufacturing Engineering, Wichita State University, Wichita, Kansas 67260-001

VOSE, DAVID 1996, *Quantitative Risk Analysis: A Guide to Monte Carlo Simulation Modeling*, John Wiley and Sons Ltd., West Sussex, England, 328 pp., \$65.00.

In this book, Vose's stated aim is "to guide the reader through the necessary steps to producing an accurate risk analysis model." To a large degree, he does accomplish this goal but not without some problems as noted below. In an unusual drive toward clarity, Vose defines most of the mathematical notation that he will use in subsequent chapters within the first five pages. How many times have we searched for definition of notation in a book of this type? As part of this notation, he also indicates notation to be used in commercial spreadsheet risk models though the reader

has to wait until Chapter 6 for the details on these commercial tools.

Chapters 2 through 5 are what can be called foundation chapters, in setting the stage for later chapters. In essence, the author wants to make sure that everyone is at least at the same level of competence before proceeding on to more advanced topics. Quantitative risk analysis is clearly defined in Chapter 2. Vose compares methods of moments, exact algebraic solutions, and Monte Carlo simulation as vehicles for analysis. The following three chapters, Chapters 3 through 5, contain an undergraduate-level review of probability and statistics. Chapter 4 contains a good discussion of inverse probability functions and in particular of Latin hypercube sampling as opposed to Monte Carlo sampling. Knuth [1997] presents interesting formulations and extensions to the material presented in this chapter. In Chapter 5, Vose presents a useful review of probability distribution functions with applications, which might better have been included as an appendix. Some errors in formulae have crept into this and other chapters (for example, "Cumulative distribution function" on p. 88, "Mean" on p. 90).

In Chapter 6 and subsequent chapters, Vose launches into the business of formulating and using risk-analysis models. Chapter 6 contains advice on formulating these models using commercial risk-analysis software. In Chapter 7, Vose discusses fitting theoretical distributions, including maximum likelihood estimates and goodness-of-fit statistics, for example, Kolmogorov-Smirnoff, Anderson-Darling, and chi-square statistics. In Chapter 8, he discusses defining distributions from ex-

BOOK REVIEWS

pert opinion. Particularly interesting are the experiments on estimates of errors in subjective evaluation. Any researcher intending to use expert opinion in risk analysis should review the results of these experiments and their implications.

Noteworthy among the remaining chapters are Chapter 10, which has a good discussion of project risk analysis with several examples, and Chapter 12, which contains a particularly good discussion of interpreting risk-analysis results. I urge readers to pay particular attention to the excellent graphical presentation of results and the topic of using net present value and internal rate of return as measures of discounted cash flow models in risk analysis. In Chapter 11, Vose treats the topics of incorporating uncertainty into time-series projections by presenting a credible discussion of short term (moving average), medium term (Weiner process), and long term (expert opinion for trend analysis).

Though *Quantitative Risk Analysis: A Guide to Monte Carlo Simulation Modeling* suffers from some organizational problems and mistakes in notation, I recommend the book to those desiring a good introduction to background and topics in risk simulation.

References

Knuth, Donald E. 1997, *The Art of Computer Programming: Seminumerical Algorithms*, Vol. 2, third edition, Addison-Wesley, New York.

Geoffrey C. Scott

Lucent Technologies, Inc.—Bell Laboratories,
PO Box 900, Princeton, New Jersey 08540

RIVETT, PATRICK 1994, *The Craft of Decision Modelling*, John Wiley and Sons, Chichester, England, and New York, viii

+ 304 pp., \$45.95.

The Craft of Decision Modelling is a seminal contribution to the literature of operations research and management science; the treatment of material is unique and the subject is important. For problems in real-world operating systems, it introduces readers to the important contextual realities, principles, and craft issues present when models are used to achieve understanding. It is valuable for students and beginners and for a wide spectrum of experienced analysts, particularly those teaching in educational and training programs.

The term *decision modelling* in the title may have different meanings for different readers. Rivett means the work of helping client decision makers improve their understanding of problem situations and doing so by creating intellectual constructs—that is, models—for selected phenomena in them and then employing these models to generate findings that shed useful light. Rivett's *decision modelling* denotes what others may call the practice of operations research and management science.

Patrick Rivett is one of the early British post-war pioneers of operations research. After an education in mathematics, he began his OR career at the British Coal Board, and it has included varied consulting and educational appointments, the authorship of numerous papers and six other books, and presentations of his views on analysis to the general public. This book is in many ways a distillation of the lessons he has learned in his long, varied, and successful career.

Toward the end of the book, after appealing to dictionary definitions of the

terms, Rivett offers the key clue to the material he chose to present: "Education is a process of maturing and of producing certain attitudes of mind. Training is a drilling process. . . . Hence one is trained in linear programming but not educated by it" (p. 291). Against this background, it is clear that this book is about education: understanding how OR/MS works in practice Rivett describes some of the appropriate realities, basic attitudes, principles, and needed craft skills; and he pays no attention to training in the techniques that are the usual dominant fare in OR/MS introductory texts and academic programs.

The introductory chapter (pp. 4–9) sets the tone:

"... life does not proceed with the stately timetable logic of a university course. Issues are not clear cut, data are ambiguous and it is never the case that the information with which one is presented is necessary and sufficient for the task. It is, nowadays, more likely that one is grappling with too much information rather than too little. . . . To those trained in quantitative disciplines it can be a shock to be thrust into an industry (even a scientific one) or into a service or a government department and find that most people are not quantitatively oriented: decisions often emerge by stealth and emotion, reason is not the driving force, and much energy is consumed by fighting one's colleagues for resources. The picture of the pure analyst holding the world at bay while he does his sums does not apply. He is not on the bank of the river watching and modelling life as it goes by, but is out of his depth in a frail canoe, shooting the rapids."

Of the analysts, Rivett says:

"Their task is to hold up a lantern in the dark. . . . it is not the job of the analyst to be so much at arm's length from the managers he is serving that he is dissociated from them. . . . The analyst has to laugh when the managers laugh and weep when they weep. And still be calm and professional."

In the first part, Rivett explains how to

cope with this complex life and its relationships by using nine examples chosen from his and his friends' professional careers, each illustrating principles of good practice and each accompanied by a chapter discussing the ideas introduced by the example. The diversity of these ideas is suggested by the chapter titles: "Decisions and the scientific method," "Logic and common sense," "Describing a problem," "Uncertainty," "Deterministic problems," "Forecasting," "The analyst," "The anatomy of organizations," and "Bridge building."

The second part consists of five chapters: "Focal points," "The analytical process," "Practical matters," "The future," and "Closing thoughts."

The hallmark of the book is Rivett's wise and witty observations about the realities of practice; on almost every page, something will cause the experienced practitioner to vibrate sympathetically. For example, in the chapter on decisions and the scientific method (pp. 19–38), we read:

"... there is no such thing as a neutral value free measure. All measurement involves a view of the world."

Of problems in which optima may be sought:

"Because of the mathematical seductiveness of such problems, they have achieved more attention from researchers than their incidence in the real world demands."

"There is a tendency to regard uncertainty or variability as reprehensible and something of which to be ashamed. But it is uncertainty, and not certainty, which is the nature of the universe."

"One of the temptations to which all modellers are subject is that where seductively elegant methods are available they may be used carelessly and without regard to the assumptions that have to be made."

BOOK REVIEWS

"Objectives evolve and emerge during a study."

"... we operate in a changing environment and during a study the world will change."

"... why have a model? The answer ... is that there is too much information and too much complexity in the problems we tackle. We have to simplify."

"An important quality of a model should be its capacity to reach out into the unknown or the unknowable."

"The more variables you need to describe something the less you know about it."

"It is particularly important not to impute objectives to others because they make sense to the model builder."

"Constraints can too easily be accepted as 'given' and must never be accepted with docility."

"The problem as first given to a research team nearly always has to be changed and the most common reason for the rejection by management of a research team's proposals ... is that the team has 'solved' the wrong problem."

"... basic to all this ... is the overwhelming need for the analyst to visit and observe what is going on and to be personally involved wherever possible."

"... when data can be made available in profusion at the touch of a button, it is tempting to sit back and carry out pre-packaged analyses. Never, never, never do this. Always go to the source of the data."

"... it must never be forgotten that we are dealing with people. Behind the data sheets and the computer printouts, behind the graphs and tables, behind the mathematics, are people in all their emotions, in all their contrariness and bloody mindedness and in all their humanity. The man or woman can always beat the system."

I am tempted to compile such a list of observations for each of the 15 general discussion chapters in the two parts of the book—but I would exceed the space allotted to a review, and I would deprive the prospective reader of the pleasure of discovery.

There is one temptation I cannot resist:

In the penultimate chapter, Rivett discusses the stark contrast between what the usual academic OR/MS programs train a student to do and what he/she will later have to undertake in practice; his parting shot is, "The important point which some universities have not grasped is that education and training are not mutually exclusive." This book can be a major contributor to academic programs that wish to undertake serious education for the practice of OR/MS as a complement to their traditional training in its techniques.

Rivett includes a carefully selected bibliography suggesting further reading and an index (which I wish was more comprehensive, as many readers will want to rediscover quotations, and the present brief index will not help much in such a search).

For some time, OR/MS has needed to develop a maturely realistic epistemology of practice, that is, a coherent view and account of its origins, nature, methods, and limits. This book is the most important contribution to this goal to appear in recent years. OR/MS workers, whether in academia or practice, have much to learn from it—and its keen wit and down-to-earth observation of the realities of practice make it as attractive and easy to read as it is important.

Hugh J. Miser

199 South Road, Farmington, Connecticut
06032-2522

FORTUIN, LEONARD; VAN BEEK, PAUL; AND VAN WASSENHOVE, LUK, eds. 1996, *OR at Work: Practical Experiences of Operational Research*, Taylor and Francis, Bristol, Pennsylvania, 359 pp., \$39.95.

Starting from a basic premise ("OR/MS

is essentially an applied discipline”), one arrives at the conclusion that our students not only need to learn techniques for solving problems but should also take on real projects, which involve much more complicated situations than the pure application of a mathematical technique.

It is true that OR/MS books focus primarily on techniques, but it is also true that this practical experience, like that in any other discipline (medicine or engineering, for instance), is acquired only by participating in real projects. A substitute for this can be reading other people’s experiences, and this is precisely what the reader will find (in abundance) in this book.

From my point of view, the book could be divided into two parts. First, there is a collection of 15 real case studies developed by (mainly Dutch) lecturers and consultants in highly diverse fields and companies (including production planning in the fodder industry, the distribution of ornamental products, and even—thus demonstrating the interdisciplinary character of OR/MS—decision making in medicine). The other part is a series of chapters dealing with practical experience in this field, what problems arise, what attitudes companies adopt regarding OR/MS techniques, and what the future holds for us. These chapters contain the opinions of executives who describe their experiences with certain projects (some of which were successful, others not). That is, this book is more than just a book of case studies.

The coordinators of this work call themselves the *troika*, in reference to the crusade that they embarked upon 10 years ago to promulgate the practical aspects of OR, and of which this book is the final

word. In the case studies, they did not want to concentrate on the applied technique (as the majority of the books of case studies do) but to concentrate on the process of decision making that surrounds the problem. The idea is laudable, since numerous books and articles exist that describe the techniques. At the same time, they have not limited themselves to presenting the more classic applications of OR, such as classic formulations of LP. Finally, another praiseworthy aspect of the case studies presented is the fact that they are presented in a “raw” way, including both success stories and difficulties. We also learn from mistakes, sometimes more than from successes. The coordinators refer to this fact when they speak of a kind of “auto-censorship” on the part of authors of case studies.

It is important to show that OR makes important contributions to society (one of the goals of *Interfaces*), and this is the road that Fortuin, Van Beek, and Van Wassenhove have taken. In my opinion they have done this in a very successful way—with regards the case studies—and in an interesting way—as far as the commentaries on the applicability of the techniques of OR/MS are concerned.

Belarmino Adenso-Díaz

*Escuela Superior Ingenieros Industriales
Campus Viesques, 33204-Gijón, Spain*

MISER, HUGH J., ed. 1997, *Operations Analysis in the Eighth Air Force, 1942–1945: Four Contemporary Accounts*, INFORMS, Linthicum, Maryland, 296 pp., \$20.00.

The field of operations research began during the second world war to support the British Royal Air Force. Observing the

BOOK REVIEWS

success of these early efforts, the United States military established its own operations analysis section within the Eighth Air Force in 1942. This book is a collection of four personal accounts written in the 1940s by civilian members of this group. Though these accounts do not explicitly describe the models and techniques the section developed, this collection provides an interesting insider's perspective on the early days of operations research.

Hugh Miser introduces the collection with an overview of the air force during the second world war. Leslie Arps next presents a detailed history of the operations analysis section. Bissell Alderman provides a history of the bombs and fuses subsection, and Edwin Hewitt describes the gunnery subsection. G. Baley Price concludes the book with his personal and witty memories of the section.

Much of this book focuses on interdepartmental skirmishes between the operations analysis section and other factions within the air force over the best strategies for using planes, bombs, and guns. The section based its recommendations on analysis of mission data, on the results of controlled tests, and on the insights drawn from mathematical modeling. This book contains no explicit mathematics or models, for such details were still classified when the accounts were written. However, the narratives are sufficiently detailed that a modern reader familiar with mathematical modeling can envision the likely techniques employed. In this fashion, one could use excerpts of this collection as case studies in a graduate-level applied modeling course: students could practice extracting the important relationships in these

problems and formulating these relationships mathematically.

The operations analysis section made important contributions to the war effort and was highly commended by the air force for its efforts. Several themes critical to the group's success appear repeatedly throughout this collection. These maxims culled from the earliest days of operations research remain as applicable for analysts today: Keep in close proximity with the problem and the involved parties. Get out in the field. Build political support behind policy recommendations. Stay close to the data. Develop excellent communication skills—number-crunching alone will not convince decision makers.

Though these accounts are heavy on military details and light on mathematical details, they present a unique view of the earliest days of operations research. I recommend this collection to those who enjoy military history, to professors seeking unusual examples for an applied modeling course, and to academics and practitioners interested in the history of the field.

Alan Rimm-Kaufman

Signet Financial Services, 7 North Eighth Street, Richmond, Virginia 23219

Books Received for Review

- Bodily, Samuel E.; Carraway, Robert L.; Frey, Sherwood C., Jr.; and Pfeifer, Phillip E. 1998, *Quantitative Business Analysis: Text and Cases*, Irwin/McGraw-Hill, New York, 649 pp., \$66.00.
- DeLurgio, Stephen A. 1998, *Forecasting Principles and Applications*, Irwin/McGraw-Hill, New York, 802 pp., \$81.82.
- Fiacco, Anthony V., ed. 1998, *Mathematical Programming with Data Perturbations*, Marcel Dekker, New York, 441 pp., \$165.00.
- Geisler, Eliezer 1997, *Managing the Aftermath of Radical Corporate Change: Reengineering, Restructuring, and*

- Reinvention*, Quorum, Westport, Connecticut, 228 pp., \$55.00.
- Glover, Fred and Laguna, Manuel 1997, *Tabu Search*, Kluwer Academic Publishers, Dordrecht, The Netherlands, 382 pp., \$140.00.
- Goldstein, M. William and Hogarth, Robin M., eds. 1997, *Research on Judgment and Decision Making: Currents, Connections, and Controversies*, Cambridge University Press, New York, 750 pp., \$74.95.
- Lewis, Pamela S.; Goodman, Stephen H.; and Fandt, Patricia M. 1998, *Management: Challenges in the 21st Century*, second edition, South-Western, Cincinnati, Ohio, 674 pp., \$79.95.
- Peters, Lawrence H.; Greer, Charles R.; and Youngblood, Stuart A., eds. 1997, *The Blackwell Encyclopedic Dictionary of Human Resource Management*, Blackwell Publishers, Cambridge, Massachusetts, 438 pp., \$100.00.
- Reinertsen, Donald G. 1997, *Managing the Design Factory: A Product Developer's Toolkit*, The Free Press, New York, 269 pp., \$30.00.
- Russell, Roberta S. and Taylor, Bernard W., III 1998, *Operations Management: Focusing on Quality and Competitiveness*, second edition, Prentice Hall, Upper Saddle River, New Jersey, 837 pp., \$78.67.
- Schmenner, Roger W. 1998, *Plant and Service Tours in Operations Management*, fifth edition, Prentice Hall, Upper Saddle River, New Jersey, 254 pp., \$30.67.
- Silverman, Melvin 1996, *The Technical Manager's Handbook: A Survival Guide*, Chapman and Hall, New York, 505 pp., \$44.95.
- Tellis, Gerard J. 1998, *Advertising and Sales Promotion Strategy*, Addison Wesley, Reading, Massachusetts, 483 pp., \$76.13.