

Review of  
“An annotated timeline of Operations Research,  
An informal history”  
by Saul I. Gass and Arjang A. Assad,  
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## 1 Introduction

This volume is a new contribution to the growing literature on the history of OR. The authors have tried to organize the development of our discipline on a timeline, emphasizing a number of “key events”. For each of these events, the authors provide a brief explanation of why it is important (from 10 lines to one page) and a number of references. For most events, a picture of the authors of the discovery is also available together with a short biographical sketch and/or representative quotes.

This book is authored by Saul I. Gass and Arjang A. Assad. The name of Saul Gass will probably be familiar to all readers of this Journal through his many papers and books and, in particular, his *Encyclopedia of Operations Research and Management Science* (co-edited with C. M. Harris, and published by Kluwer). He is currently Professor Emeritus at the University of Maryland at College Park. Saul Gass is a past president of ORSA and a past vice-president of both INFORMS and IFORS. Arjang Assad is professor of Management Science at the University of Maryland at College Park. He has published two books and numerous research papers. His interests include Total Quality, vehicle routing and operations management.

This volume has 210 pages and is priced at 79.95 € (ISBN 1-4020-8112-X). A cheaper paperback edition is also available at 29.95 € (ISBN 1-4020-8116-2).

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## 2 Content of the book

The title of the book accurately reflects its content. The annotated timeline is divided into eight periods:

- (1) Operations research precursors from 1564 to 1873 (18 pages),
- (2) Operations research precursors from 1881 to 1935 (25 pages),
- (3) Birth of operations research from 1936 to 1946 (15 pages),
- (4) Expansion of operations research from 1947 to 1950 (19 pages),
- (5) Mathematical, algorithmic and professional development of operations research from 1951 to 1956 (31 pages),
- (6) International activities, algorithms, applications, and operations texts and monographs from 1957 to 1963 (29 pages),
- (7) Methods, applications and publications from 1964 to 1978 (29 pages),
- (8) Methods, applications, technology and publications from 1979 to 2004 (33 pages).

The book ends with a very useful index of acronyms, names, and subjects.

The timeline for the prehistory of OR (up to 1936) reveals a rich picture, including many great names: in Probability (Cardano, Pascal, Huygens, Jakob, Nicolaus and Daniel Bernoulli, de Moivre, Buffon, Bayes, Laplace, Poisson, Galton, Bachelier, Markov, Erlang, Lévy, de Finetti, Chapman, Kolmogorov, Pollaczek), Statistics (Boscovich, Graunt, Legendre, Gauss, Quételet, Neyman, K. and E. Pearson, Fisher, Gosset aka Student, Yule, Slutsky, Dodge, Shewhart), Games (Waldegrave, Verdy du Vernois, Lanchester, Zemerlo, Borel, von Neumann), Utility (Bentham, Pareto), Calculus and Linear Algebra (Newton, B. Taylor, Lagrange, Fourier, Gauss, Gordan, Newton, Minkowski, Poincaré, Farkas, Brouwer, Whitney), Computer Science (Babbage, Turing), Industrial Engineering (Kirchhoff, F. W. Taylor, F. and L. Gilbreth, Gantt, Harris), and Graphs (Euler, Hamilton, Fermat, Torricelli, Kuratowski, König, Egerváry).

The birth of OR around World War II (1936–1946) is probably the part of the history of our discipline that is the most well known. All great names of the fathers of OR are present here (Watson-Watt, Motzkin, Leontief, Blackett, Kantorovitch, Flood, Kuhn, Tucker, Hitchcock, Morse, Koopman, Kimball, von Neumann, Morgenstern, McCulloch, Brown, Steinhart, Dantzig, Ulam), including the development of the Blackett circus, the RAND project, the US Antisubmarine Warfare Operations Group and the US Navy Operations Evaluation Group. One should note that this early history seems to be slightly biased towards the US (for an antidote, see the book by M. W. Kirby *Operational Research in War and Peace, The British Experience from the 1930s to 1970*, Imperial College Press, 2003).

One may have the impression that the rest of this history (from 1946 to the present days) is more common knowledge to our profession. Nevertheless, the authors offer quite a clear and deep view of the key events in this history. I learnt much reading the book, on top of being able to put a face on many great names. In this journey through time, the reader will encounter an amazing number of recipients of the Nobel prize (I resist the temptation to name them all here. This would spoil some of the pleasure of reading this book).

### 3 Discussion

I have argued (see D. Bouyssou, “La ‘crise de la recherche opérationnelle’, 25 ans après”, *Mathématiques et Sciences Humaines*, **161**, 2003, 7–27) that works on the history of OR were urgently needed. It should be therefore no surprise that I consider this book as a very useful addition to the literature. The life of Saul Gass is intimately connected to the development of OR and his immense knowledge of the field shows at every page of the book.

Altogether, the book gives much information that is not only anecdotal (even though, I loved the many pictures—by the way, the reader interested in pictures will find many more on the WWW using standard searching tools for images). Each key event in the history of OR is summarized succinctly but always quite clearly. The references accompanying each of these summaries are numerous, precise and accurate (even references that are not in English are, in general, accurate, a fact that is being exceptional in these days).

The book is quite well written and pleasant to read. It has been well edited and typos are rare. I am confident that every reader of this journal having a copy in hands will immediately start browsing through it looking at the pictures and will soon realize that there is much information in the text too.

I therefore consider this book very useful. Senior OR persons will want it on their shelves and they should give it to read to every student willing to enter the field.

I conclude this review by some more specific comments.

- (1) In their preface, the authors encourage readers to send them comments and suggestions. I have a number to make here. At least three important names seem to be missing in the list of the OR precursors (although, they all turn out to be French, like the author of this review, the reader should be aware that we are talking here about times in which France was still an important center of scientific life).

The first one is the marquis de Condorcet (see, e.g., <http://cepa>.

[newschool.edu/het/profiles/condorcet.htm](http://newschool.edu/het/profiles/condorcet.htm)). He was one of the first mathematicians to have considered the application of mathematics in the realm of what is now called Human and Social sciences. His famous text “Essai sur l’application de l’analyse à la probabilité des décisions rendues à la pluralité des voix” (Paris, 1785) has had an immense posterity through what is now called “Condorcet’s paradox” and the “Condorcet jury theorem”. Prior and posterior works on the theory of elections (e.g., by Lull, Borda, Lhuilier, Dodgson aka Lewis Carroll or Nanson) should also have deserved a mention. More generally, it seems that the philosophical revolution that occurred in Europe in the seventeen and eighteen centuries, revolution to which Condorcet contributed much, that paved the way for modern Western science should be given some credit in the book.

A second important missing name is Gaspard Monge (see, e.g., <http://www.answers.com/topic/gaspard-monge>). He published in 1781 a famous memoir entitled “Mémoire sur la théorie des déblais et des remblais” in which he studies the best way to move stones from one place to another. This may be one of the first attempt to optimize, using formal tools, production processes.

Finally, a last name that seems to be missing is that of Jules Dupuit (see, e.g., <http://cepa.newschool.edu/het/profiles/dupuit.htm>). He published in 1844 one of the first text on cost-benefit analysis (“De la mesure de l’utilité des travaux publics” in the *Annales des Ponts et Chaussées*). Cost-benefit analysis is, more generally, rather under-represented in the volume and, e.g., no mention is made on the works in the area done for the Tennessee Valley Authority between the two World Wars.

- (2) Going through the timeline proposed in the book, reveals a mystery about the development of OR. While OR at its beginning was clearly interdisciplinary (having intimate relations with, e.g., Industrial Engineering, Mathematics, Computer Science, Statistics, Economics and Management), these relations tends to fade away as time goes by. Important parts of what was clearly central to OR in the beginning (e.g., utility theory, game theory, martingale theory or logistics) tend to have lost their central character. This surely would call for further analysis.
- (3) At times, one has the impression that the authors have been too closely connected with history of OR to be in position to offer an fully objective perspective. I would just like to mention here that no mention is made in the book to the “crisis of OR” at the end of the seventies. The famous paper by R. L. Ackoff (“The future of Operational Research is past”, *Journal of the Operational Research Society* **30**, 1979, 93–104) is not even mentioned in the text.
- (4) The timeline extends to 2004. I think that it might have been wiser to stop it much earlier, say at the end of the eighties. History is a difficult business and recent history is even more difficult. The part of the book covering the last 20 years tend to be somewhat less rich and more anecdotal than

- the rest of the volume.
- (5) As the authors acknowledge in their preface, applications of OR are not well covered in the book. Although the spreading of OR in industry after World War II is mentioned, things are getting less clear starting with the sixties. Surely, this point should be worked out in detail our in further historical studies. This is of utmost importance for an applied science like OR.
  - (6) Compared to other closely related fields (e.g., Statistics, Computer Science or Game Theory), the reader is really struck by the relative absence of historical works in our field. Whereas the History of Statistics has become to be an active part in the the History of Science, no such thing happened with OR. We are still missing books that would offer biographies of the great names in our field, not to mention more systematic research on its development. Besides a few works (a number of papers on the foundation of EURO and IFORS (in *EJOR* and *ITOR*), a number of entries in the *Encyclopedia of Operations Research and Management Science*, Volume 50 (1) of *Operations Research*, some papers by A. Schrijver, the book edited by J. K. Lenstra, A. H. G. Rinooy Kan and A. Schrijver on the history of mathematical programming (North-Holland, 1991) and the already mentioned book by M. K. Kirby), it seems that this field is still widely open. Historians of Science are badly wanted here and we should think of ways to attract them.
  - (7) Reading the book, I searched the Internet for additional documents related to the history of OR. I was struck by the poverty of what I have been able to find. The complete correspondence of Ronald A. Fisher is easily found available on-line (from the University of Adelaide at [www.library.adelaide.edu.au/digitised/fisher/](http://www.library.adelaide.edu.au/digitised/fisher/)). There does not seem to exist anything comparable in our field. This is all the more a pity that for most of our young students, anything that cannot be found on the WWW simply does not exist. Preserving archives and making them widely available should be a major task of every OR Society in the world.
  - (8) A sad final note: women are nearly absent from the timeline with two notable exceptions (Lilian Gilbreth and Kathryn E. Stecke). I am afraid that this may indeed be a faithful picture of our field... which should give food for thought to all of us. Although OR has military origins, it seems now that most armies are vastly more feminized than our field! We should not be proud of that.