OR NEWSLETTER

Operational Research Society of New Zealand (Inc.), PO Box 904, Wellington, New Zealand **January 1995**

EDITORIAL
SOME OVERSEAS IMPRESSIONS

H.G. Daellenbach

He wouldn't dare!

After visiting some ten American, Canadian, British, and European universities on this last sabbatical (last, both in the sense of the just most recent one, as well as the last one of my university career), I cannot wonder but what is happening to OR/MS. With few exceptions, departments of OR have disappeared. Either they have renamed themselves as department of management science, or decision sciences, or quantitative methods, or have been absorbed by, merged with, or joined other subject areas, such as industrial engineering, production and operations management, information and system sciences, or information systems. I observed this trend already on my previous leave, six years ago. But now it seems to have swept away all but a handful of OR departments, such as the ones at Stanford, the Naval Postgraduate School, or the Center of O.R. at MIT, and these have largely remained stagnant, i.e., have not benefitted of the growth in other areas of management and business administration. Has the euphoria about OR/MS of the sixties and seventies been replaced by a more critical assessment? Is it a confirmation of what some people have been claiming for a number of years now, that OR/MS, as it is taught at many universities, has lost its relevance for practical decision making? Or has OR/MS thinking and its relevant techniques simply been integrated and become part of other disciplines, like production management, various strands of engineering, information systems, marketing, finance, etc.?

I do not profess to know the answer. At best, I would venture that it is a bit of all three, as well as other aspects. However, I have been concerned/dismayed/discouraged by the increasing trend in academic journals in the U.S., but more recently also in Europe and Asia, to take the mathematics of OR as synonymous with OR. This clearly supports the contention that OR has lost

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its relevance and has become a self-serving exercise for academic advancement. With a few notable exceptions, the articles included are nothing more than applied mathematics of little or no relevance for practical problem solving. In order to get tractable models, the assumptions made are so restrictive that there is no reality left. What is paraded under the label of applications more often than not are trivial artificial examples which are a far cry from the real world. Any operations researcher would be foolish to try implementing such models, unless he or she has already signed up for another job. Our own journal, *The Asia-Pacific Journal of OR*, is a prime example of this practice. Over the last two years it has featured 39 papers. They break down as follows: 29 theoretical papers, dealing with computational improvements, algorithms, or mathematical properties of models (e.g., queueing) and algorithms, only 6 of which seem to report adequate testing at the time of publication; 3 application papers, only one reporting on a real-life implementation, while the other two show potential applications for practical decision making; and finally 7 other papers, dealing with statistics or other topics related to OR. I wonder how many of our members read any of these papers? A quick survey in our own OR group of 7 staff and 6 Ph.D. students at Canterbury indicated two papers read in total. We may seriously wish to ask ourselves whether we should continue allocating scarce bookcase space for such publications. (If you think that you are not facing a space constraint yet, you may wish to expand the range of option for the use of this space — in the spirit of real OR!. A nice potted N.Z. maidenhair fern, strategically placed in your bookcase, will give your eyes much needed variety and have a pleasing effect on visitors to your office.)

Naturally, this is not just the fault of the editors. The reviewers who accept such papers and all the potential authors, who neglect to write up their real-life applications or implementations of theoretical advancements, are equally to blame for this state of affairs. (**This reminds me that we need more of your relevant and interesting contributions to the ORSNZ newsletter.**)

Some notable attempts have been made to counteract this trend, such as the application papers featured in *Operations Research, JORS*, or *Interfaces*. But it is too little.

I am a firm believer that OR/MS has a vital role to play in the real world. Not only is its paradigm a useful mental model to follow — even if in the end all that is used for the quantitative analysis is a spreadsheet and not some high-powered OR technique — but there are also many complex and important problems out there where the use of sophisticated OR tools can bring about valuable insights which may translate themselves into substantial additional benefits in terms of lower costs, better performance, or higher returns. It is unfortunate that the OR professional and scientific literature gives such a misleading and blinkered view of the true nature of OR as an aid to practical real-world problem solving, with the emphasis on *practical* and *real-world*. Why compete with mathematical economists? They are already doing an excellent job in building precariously balanced mathematical castles for imaginary economies, where only infinitesimally divisible identical cockles and widgets are produced and traded by two totally cloned myopic species with strictly convex preferences and whose lifespan covers at most two instantaneous moments in time where everything happens in a flash. Personally, I prefer good science fiction or fantasy novels. They seem to be far more plausible.

H.G. Daellenbach, University of Canterbury
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FROM THE PRESIDENT
OR — A Bright Future

Jonathan Lermit

In looking through the proceedings of the last conference, I was impressed by both the width and the depth of the OR problems that are being addressed in New Zealand. While there were the perennial favourites, such as scheduling of airline crews and electricity generation — two obvious

examples that come to my mind, a much wider variety of industrial problems are being examined.

Now that the economy is at long last starting to improve, there will be more scope for OR work. I am sure that OR has played a significant part in the recovery that has already taken place. All of us will know of instances where OR could help, but where, through lack of experience, managers have not realized that OR could be used. Many management programmes now include at least an appreciation of OR — a recognition of a problem is halfway to its solution.

The Government is also beginning to recognize the need to bring the academic and industrial worlds together. For example, the Foundation for Research, Science, and Technology has recently introduced the 'Graduate Research in Industry Fellowship' to support students working with industry on their research efforts. A large part of this work could be OR related, and hopefully this will generate some significant OR projects. If these are in areas where OR has not previously been employed, so much the better!

Another step towards fostering better liaison the Society has taken is to rejoin the Royal Society of N.Z. This august body, like so many institutions, has undergone 'restructuring' in recent times, and should be better equipped to meet the needs of New Zealand science and technology. We must build up these contacts for our mutual benefit — a source of interesting and useful problems for us to solve, and a means of benefiting New Zealand in the years to come.

Best wishes for a prosperous 1995 — particularly in OR.

ORSNZ COUNCIL FOR 1995

President	Jonathan Lermit
Vice-President	Andrew Philpott
Secretary	Mark Pickup
Treasurer	Matthew Hobbs
Council members	Vicky Mabin (APORS)
	Hugh Barr (IFORS)
	David Ryan (Student liaison)
	Julie Falkner (Student liaison)
	Grant Read (Professional Development and Membership)
	Andrew Mason (Professional Development and Membership)
Ex Officio	Hans Daellenbach (Newsletter editor)
Les Foulds	(APJOR editor)

ERRORS OF COMMISSION — ERRORS OF OMISSION

Russel L. Ackoff, well-known for his outspoken views, recently wrote a short feature for the *Systems Practice* (February 1994), the journal on systems thinking and the use of systems methodologies for improving decision making and problem management, edited by Prof. M. C. Jackson, from the University of Hull. The article, entitled 'It's a Mistake!', talks about organizational learning from errors. Although doing things right is what we aim for, it will largely confirm what we already know. More learning can occur from mistakes made. But such learning can only occur if the mistakes can be identified, its producers are known and made aware of the mistakes, and procedures are in place to take corrective action for organization-wide learning.

Ackoff distinguishes between two types of mistakes:

1. **Errors of commission**: doing something or in a form, that should not have been done.

2. **Errors of omission**: not doing something that should have been done. For example, introducing a new product that fails to attract sufficient sales to become profitable is an error of commission, while not introducing a product that could have been highly profitable (as subsequently shown by a competitor) is an error of omission. The accounting records usually

contain the information needed to identify errors of commission, but obviously do not contain any information on errors of omission, nor will there usually be any other internal data sources shedding any light on the latter. Hence, they are more difficult to detect.

Unfortunately, as Ackoff points out, most organizations are programmed to conceal mistakes, particularly if they have been committed by people high up in the managerial hierarchy. "The higher the rank of the decision makers, the less likely they are to be made aware of the mistakes they make." Since the persons responsible may never become aware of the mistakes they made, no learning takes place. But even if those who made a mistake become aware of it, they will tend to conceal the fact from others and no organization-wide learning occurs.

There is an insidious feedback loop in organizational behaviour. Since errors of commission are more easily detected than errors of omission, decision makers tend to avoid making errors of commission by simply doing nothing. The irony of this protective strategy is to increase the likelihood of making errors of omission, but these are less likely to be attributed to the persons who made them. *Something to think about!*

Ackoff then suggests that for each decision, or lack thereof, a decision record is kept that provides a problem situation summary relating to the issue, the action or lack of action taken, the reasons for that and the information used, and the person(s) responsible.

summarized by H. G. Daellenbach

THE INSTITUTE OF STATISTICS & OPERATIONS RESEARCH
Victoria University

Tapas Sarkar

Aims

The Institute of Statistics and Operations Research (ISOR) is a part of the Science Faculty of Victoria University. Its main functions are

- teaching and research in the area of statistics, operations research and financial mathematics at undergraduate and postgraduate level,
- giving mainly statistical advice to university staff and postgraduate students,
- doing research and consulting work with organisations from outside the university.

The operations research group is small. At present it consists of two permanent staff members, one fixed-term staff member and a few casual lecturers. In addition, one statistical colleague also shares some OR courses.

Undergraduate programme in OR

First year: One-third of a full year: STAT131 (Text: Straight, P.G. (1983), A first course in probability and statistics with applications), using S-PLUS.

Second year: One full year OR course: OPRE251 (Operations Research, Text: Hillier & Lieberman) covering decision analysis (12 sessions), queueing (8), inventories and simulation (8), LP, including duality (16), CPM/PERT (8), using QSB-PLUS.

Third year: One full year and one half year OR course: OPRE351 (Operations Research, Text: Hillier and Lieberman or Taha) covering: LP (8 sessions), IP (6), forecasting (8), DP (9), reliability (6), networks (6), location and routing (6), including cases.
OPRE 352 (Simulation and Stochastic Models, Text: Hillier and Lieberman) covering: simulation (6 sessions), random variable generation (6), queueing (12).

A typical "OR major" will have done first-year computing and second-year statistics. Because of this background the OR courses are taught with a mixture of theory and applications. Computers are used widely at all levels.

Up to 1994 there was no major in OR for the BSc. Statistics and operations research will be introduced as a major subject from 1995. At third year level the number of students doing OR exceeds 30.

Graduate Programmes

At the honours level three full year OR courses are offered.

OPRE 451 (Operations Research Applications, recommended texts: Christofides, Graph theory; Larsen & Odoin, Urban OR; Barlow & Prosdian, Stat. theory of probability and life testing; de groot, Optimal stat. decisions), covering: graphs and networks and reliability theory.

OPRE 452 (Deterministic OR) covering: LP theory, decomposition, QP, networks, unconstrained NLP, constrained NLP theory and techniques, IP.

OPRE 453 (Simulation and Stochastic Models, recommended texts: J Hunter, Math Techn. of Applied Prob., Law and Kelton, Simulation Modelling and Analysis; Lewis & Orav, Simulation etc., vol. 1; S Ross, Stochastic Processes; A Papoulis, Prob., Random Variables & Stoch. Process) covering: intro. to MODSIM, heuristics, simulation output analysis, variance reduction techniques, Markov chains & continuous time processes, queue networks.

In the past the number of students in honours courses has varied between 3 and 10.

The honours programme in operations research and statistics is one year full-time. A candidate has to do five full courses or equivalent. In this programme the students usually combine statistics and operations research.

The MSc programme in operations research consists of part I and part II. Part I is equivalent to honours and a student can join part II later. In part II they have to do two special topic papers (full year) and a thesis equivalent to three full papers. Typical thesis topics in OR area are graphs and networks, simulation, genetic algorithms, simulated annealing, global optimization, etc. In 1994, 2 masters students have submitted their theses and 3 more are expected to do the same in 1995 and beyond.

In addition, ISOR offers a (postgraduate) diploma in operations research and statistics. As a part of the diploma the students have to do a practical project supervised by a member of the staff. The projects can be either in statistics or in operations research.

Current staff members in OR

Prof G A Vignaux

Prof Vignaux has a Ph.D. from Imperial College, London. He has been associated with ISOR since its inception. In the postgraduate level he teaches simulation and queue analysis. His research interest lies in the area of simulation, genetic algorithm and global optimization. He is currently co-authoring a book on the use of Bayesian analysis in forensic evidence.

Dr Tapas Sarkar

Dr Sarkar obtained a Ph.D. from Stanford University, USA. At the postgraduate level he teaches graphs and networks, and integer programming. His research interest also lies in the above two areas. Dr Sarkar is currently the Chairperson of ISOR.

Dr Yu Hayakawa

Dr Hayakawa obtained a Ph.D. from the University of California, Berkeley, USA. At the postgraduate level she teaches Bayesian models of reliability. Her research interests are in the area of reliability theory, in particular, reliability models from a Bayesian perspective and the characterization of ageing and positive dependence of lifetimes.

Tapas Sarkar, Chairperson of ISOR

PROBLEM SOLVING AND DECISION ANALYSIS COURSES
in the Management Group, Faculty of Commerce & Administration, Victoria University of Wellington

Bob Cavana

Aims

The courses offered in this area seek to provide current and future managers with general management decision-making skills. It is increasingly important for managers to effectively use information for decision-making. This requires the ability to view management situations from different perspectives, to recognise problems, to structure them in appropriate ways, and to implement solutions to improve the problem situation.

There are many quantitative approaches that can be drawn on as aids to decision-making, which provide frameworks within which to perform "what-if" analyses, and which enhance the decision-makers' understanding of the problem.

These courses involve addressing the benefits of general systems approaches, whether qualitative or quantitative, while also addressing their limitations. Many factors limit the scope for rational decision-making, such as limits on decision-makers' time, information, analytical skills, and resources. Further, the ability to obtain numerical results is only one aspect of decision-making, and is of little value without the problem structuring skills, the information-using skills, and the other behavioural-socio-political skills that are required by effective decision-makers and problem solvers. Hence the behavioural issues surrounding these qualitative aspects of decision-making also need to be addressed. Consequently, a feature of our courses is the study of a variety of decision-making processes employed under conditions of risk, ambiguity, uncertainty, and incomplete information. This draws on work from many other disciplines, such as psychology, economics, mathematics and statistics, and writers on creativity and thinking processes. The impact of framing on perception and judgement is explored. Other less strictly quantitative approaches, such as constraint management, also help graduates think outside the rigid quantitative model structures. The courses taught are aimed at acquainting students with both the quantitative and qualitative approaches available to them, and their use, benefits and limitations.

With the advent of user-friendly software for problem-solving, we see the primary need of students to develop the ability to use such tools as decision aids, rather than learning the solution techniques themselves, as may be appropriate for management scientists, as distinct from managers. However, we do provide enough background on how and why the methods work, to ensure their proper usage.

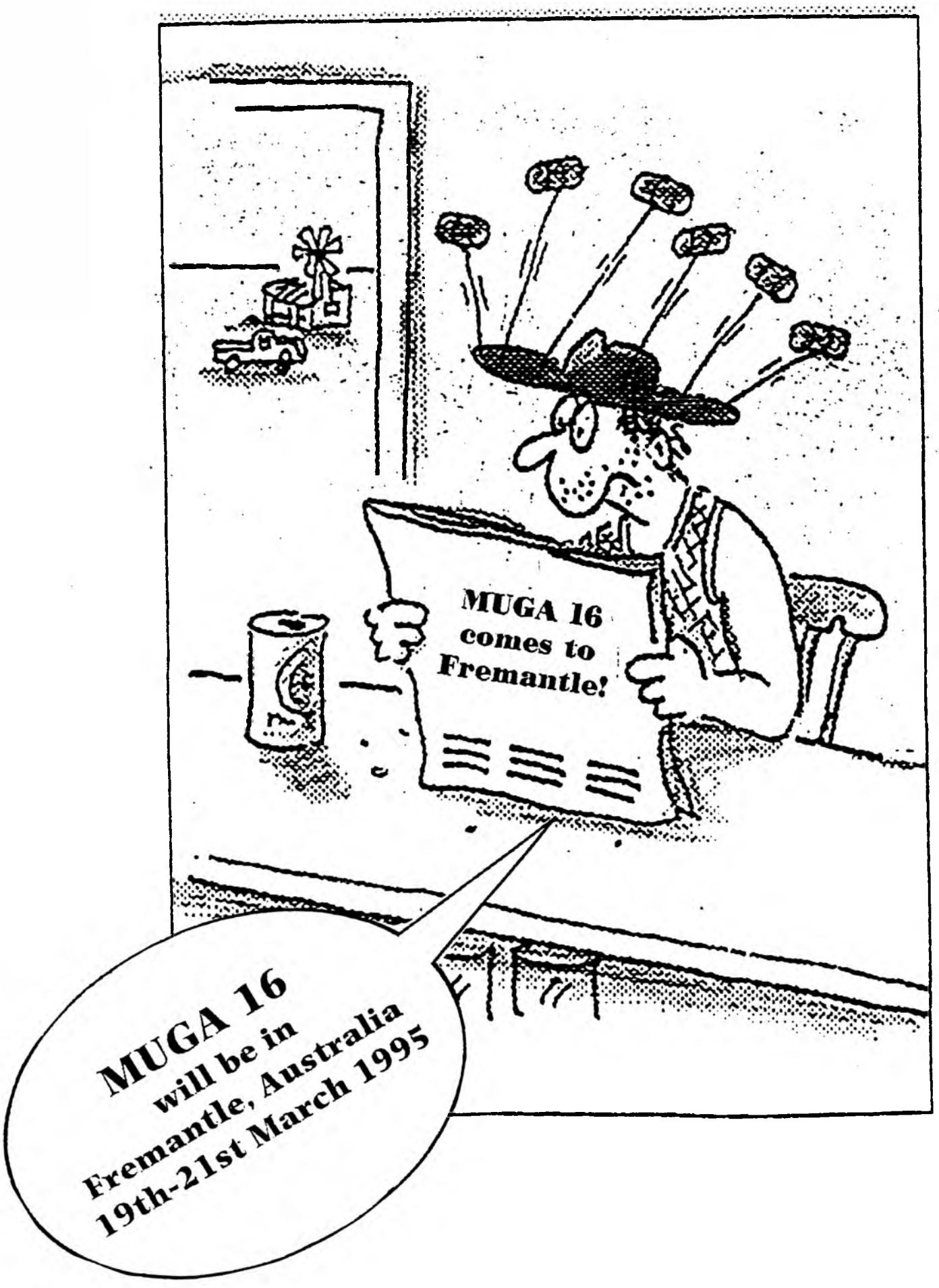
Overall, we aim to provide a better understanding of decision-making processes and the role of models in decision-making. Models are taught as frameworks within the wider study of decision-making processes.

Course Topics

Depending on the level and backgrounds and learning needs of students, topics on courses include: decision-making processes; models of competition and conflict using game theory; decision-making under risk, uncertainty, and ambiguity using decision theory, prospect theory and other models; the roles of perception and judgement; introductory management science (including modelling, and resource allocation using linear programming); continuous improvement using constraint management; project management; strategic modelling using system dynamics models; systems planning and analysis of operations using simulation; forecasting; business research methods including survey design and analysis; and problem-structuring methodologies including soft systems; viable systems modelling; critical systems methods; and cognitive mapping.

Mode of Delivery

The courses involve a balance of classroom teaching, case studies, management games, tutorials and computer laboratories. Case studies are made as relevant as possible to local needs. Cases are developed from students' own problematic situations if possible, such as the recent


MUGA 16
comes to
Fremantle!
MUGA 16
will be in
Fremantle, Australia
19th-21st March 1995

HAVERLY SYSTEMS

LP events in New Zealand and Australia 1995

Haverly Systems is an international company specialising in promoting mathematical programming, and planning and scheduling techniques.

In February and March 1995, Mr David Alexander, a New Zealander currently working for Haverly Systems Europe Ltd will be back in NZ for a few weeks, and plans to give one or two courses in the Wellington area. The courses will probably be the 5-day Basic Linear Programming modelling course, and the 2-day PC Skills for LP Users course. Please contact HSE direct for more details: Fax No. +44 1727 846942.

In March 1995, Haverly Systems will be holding the 16th Asian conference (MUGA 16) for users interested in planning and scheduling at the Esplanade Hotel in Fremantle, Australia. Before and after this conference several courses will be held at the same venue.

The **MUGA 16 Conference** commences on the evening of 19 March and lasts until late on Tuesday 21 March. In the packed two day programme, there will be a number of papers on topics including refinery scheduling, measuring non-linearity, generalising reports, infeasibility search programs, long-term investment planning, Gantt chart display systems, future developments in computer hardware and operating systems. A number of planning and scheduling systems will be demonstrated. There will be a 'Modellers Question Time with a Panel of Exports', and a refinery visit. The conference fee is 275 (A$550) but a special introductory offer halves this fee for companies who are not currently users of Haverly's services.

Courses offered **13 - 17 March** are:

Basic Linear Programming Modelling (5 days)

A course on how to model by linear programming and how to interpret LP results.

Basic Omni Programming (5 days)

A comprehensive introduction to programming in the OMNI model management language.

Courses offered **22 - 24 March** are:

Practical LP Modelling using GRTMPS (3 days)

GRTMPS is a generalised refinery modelling system.
(This course may be rescheduled to **15 - 17 March**).

Advanced LP/Refinery Modelling Course (3 days)

This course is concerned with the more advanced techniques used in refinery modelling.

Advanced OMNI Workshop (2 days)

This course is intended to help users of OMNI improve the efficiency of their OMNI programs through a deeper understanding of the system.

PC Skills for LP Users (2 days)

This course covers a variety of practical skills for PC users such as disk caching, data compression, moving data to and from spreadsheets and data bases.

For more details, please contact Haverly Systems Europe Ltd direct: Fax: +44 1727 846942.

Haverly Systems Europe Ltd, 1 Highfield Lane, St Albans, AL4 ORD, England.

Goulds Fine Foods Ltd case. Management games allow students to manage a business in a simulated, competitive environment, which helps them develop integrated business and teamwork skills. Computer labs and tutorials are an integral part of all courses in this area. Such sessions are fully utilised to guide students through correct usage of computer software, and alert them to the pitfalls of incorrect usage. Such use of hands-on training is demanding on staff time, but is essential for cementing the theories taught in the classroom into successful practice. We make extensive and innovative use of everyday packages, such as spreadsheets, to ensure that techniques and skills learnt on courses can be easily carried out by our graduates in their workplaces. We also introduce them to specialist software packages for specific uses, such as Stella for exploring system dynamics, JMP for evaluating statistical problems, and MS Project for project management. Many successful research projects, such as the wine industry modelling study, have used such techniques. In summary, the courses use a hands-on, experiential learning process, backed up by theory, to allow students to manage in a changing environment.

Staff Members

Staff in the Management Group involved in teaching and research in the decision sciences field include John Davies, Bob Cavana, Vicky Mabin and John Brocklesby. Problem solving and decision analysis courses are offered on a variety of undergraduate and graduate programmes including the BCA, MCA, MBA and DipBusAdmin.

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SEEN ELSEWHERE

From *MANAGEMENT* November 1994:

Brainstorming: Sitting about looking at the Huka Falls thinking 'Why did I drink so much last night?'

Inter-face: Physically face one another.

TQM: Buzz word for a novel system, usually introduced after a bit of a brainstorm, which organises a weekly staff inter-face situation where the cleaner gets to tell the general manager to get stuffed.

From *The Script* November 1994:

Humour is not a laughing matter: 'When people laugh, their resistances tend to disappear.' Here are some examples:

A fellow who went to an analyst for three months said: "It was the most frustrating experience in my whole life."
Friend: "What happened?"
Fellow: "After three months, he finally spoke to me and said: 'No hablo Ingles!' "

Woman to a friend: "My husband ran away with my best friend, . . . and I miss her."

"Do you know that I recently lost my job because of illness? . . . My boss got sick of me!"

In the **U.K. O.R. Society Newsletter** (August 1994): A reprint of an article from the South African O.R. Society Newsletter (July 1994) of a reprint of an article from the ORSNZ Newletter (March 1994), entitled 'Soft systems methodologies — New MS/OR weapon of soft-way-out?'. Somebody suggested that we should run it again as a reprint from the U.K. O.R. Society Newsletter to close the circuit.

Signs seen elsewhere: (Seen any funny signs lately? Let me know!)

In a Japanese hotel next to the hairdryer: 'Use for hairdrying only. Please, do not use for the other purpose.' (Any guesses?)

On U.S. Interstate 95 in Boston: 'Water on road when raining.' (*Guardian Weekly)*

Some 20 feet in the water in a Florida State Park: 'No wading or swimming. Do not feed the alligators!' *(Guardian Weekly)*

MEETINGS

Call for Papers

31st Annual Conference of ORSNZ

31 August - 1 September 1995
Victoria University of Wellington
Deadline for abstracts (maximum 2 pages): 1 May 1995
Deadline for submission of summary paper (maximum 6 pages, including figures, tables, and references): 1 July 1995
Note: Pre-conference proceedings will include summary paper, if submitted by 1 July, or abstract. Please follow the page format and style of the 1994 proceedings for both the abstract and the summary paper.
Conference chairperson: Kerry Mayes
ORSNZ 1995 Conference Committee
c/o Telecom NZ Ltd, P.O.Box 570, Wellington
Deadline for submission of Young Practitioner Prize 1995 and Student Project Prize 1995:
Full paper for reviewers: 12 May 1995
Get details of format, etc., from Dr A. Philpott, Dept. of Engineering Systems, University of Auckland, Private Bag, Auckland
e-mail: A.philpott@auckland.ac.nz
Note: Abstracts and summary paper for inclusion in Pre-conference Proceedings, clearly labelled as submission for Young Practitioner or Student Project Prize, need to be sent to conference chairperson, as for regular conference papers by the deadlines listed above.

Other conferences and meetings

TIMS/ORSA Joint National Meeting

23-26 April 1995
Los Angeles, Bonaventure Hotel
Information: Richard D. McBride, University of Southern California, Los Angeles, CA 90090-1421
There will be a special stream of sessions on OR in the Pacific Rim. Dr Bruce Lamar and Dr John George, University of Canterbury, are the co-chairs for the two Session devoted to New Zealand.

Canadian O.R. Society National Conference

22-25 May 1995
Westin Hotel, downtown Calgary
Conference theme: Survival in the Global Environment
Deadline for abstracts (100-200 words): 31/12/1994 to
Cornelis van de Panne, Dept. of Economics, University of Calgary, Calgary T2N 1N4
e-mail: vandepan@acs,ucalgary.ca
Invited speakers include Alan Manne (Stanford U.), Ed Silver (U. Calgary), Andrew Whinston (U. Texas), and Bill Ziemba (UBC)

17th Symposium on Math. Programming with Data Perturbations

25-26 May 1995
The George Washington University, Washington DC
Deadline for submission of abstracts: 17 March 1995
Anthony V. Fiacco, Mgt Science and Engineering, School fo Engineering and Aplied Science, The George Washington University, Washington DC 20052, USA
Tel. 001 202 994-7511

TIMS XXXIII International Meeting

25-28 June 1995
Singapore
Conference theme: Excellence in Global Services: Competitive Technologies
Information: Prof. Wee Yong Yeong, Faculty of Bus. Adm. National University of Singapore, 10 Kent Ridge, Singapore 0511, FAX (65) 779 2621
Keynote speaker: William P. Pierskalla (UCLA) on *Management Science and World Health Care Delivery*
Selected full-length papers presented at the conference will be considered for publication in a special issue of the *Asia-Pacific Journal of O.R.*

EURO XIV — 14th European Conference on Operational Research

(1995: 20th Anniversary of the foundation of EURO)
3-6 July 1995
Jerusalem, The Hebrew University of Jerusalem - Givat Ram Campus
Conference theme: OR: Towards Intelligent Decision Support
Deadline for abstracts: 10/12/1994 (sorry!)
Information: EURO XIV Secretariat, c/o Ortra Ltd., P.O.Box 50432, Tel Aviv, 61500, Israel, FAX 972-3-660952
e-mail: euro@bgumail.bgu.ac.il
Cost: early registration by 30 April 1995: Sfr 480.

First Joint Int. Symposium: Energy Models for Policy and Planning

18-20 July 1995
London Business School
Deadline for abstracts (150 words): 28 February 1995
Early registration by 1 March: 250
For information e-mail: energy@lbs.lon.ac.uk

A.C. Aitken Centenary Conference - 3rd Pacific Statistical Congress
Annual Meeting of the N.Z. Statistical Association
1995 N.Z. Mathematics Colloguium

28 August - 1 Sept. 1995
University of Otago, Dunedin
Deadline for abstracts: 1 April 1995 to
A.C.Aitken Conference Administrator, Dep. of Math. and Stats, University of Otago, P.O.Box 56, Dunedin, N.Z., FAX 64-3-4798427
e-mail: casm@maths.otago.ac.nz
Registration fee postmarked 1April 1995 or earlier: NZ$300

International Symposium on OR with Applications in Engineering, Technology, and Management (ISORA)

28-31 August 1995
Beijing; sponsored by The Asian-Pacific OR Centre within APORS and CAS
Topics: theoretical, computational, and application aspects of optimization in the widest sense, including LP, NLP, stochastic, combinatorial, multiobjective techniques.
Deadline for extended abstracts (5 copies) of at most 10 pages: 1 April 1995.
Information: Dr Ding-Zhu Du, Computer Science Department, University of Minnesota, Minneapolis, MN 55455, USA, FAX 1-612-6250572
e-mail: dzd@cs.umn.edu

OR '95 Annual Conference of the O.R. Society (U.K.)

12–14 September 1995
University of Kent at Canterbury.
Information: Phil Stringer 071-217-4490

IFORS 4th Specialized Conference on O.R. and Engineering Design

24-27 Oct. 1995
Hyat Regency Hotel at Union Station, St. Louis, Missouri, USA
Deadline for abstracts: 1 February 1995; full paper: 3 April 1995
Information: Prof. James Campbell, School of Business Admin., University of Missouri -St. Louis, 8001 Natural Bridge Road, St. Louis, Missouri 63121-4499, USA
e-mail: ifors.stl@whimsy.umsl.edu

ORSA/TIMS Joint National Meeting

29 Oct. - 1 Nov. 1995
New Orleans: Sheraton
Information: Amiya Chakravarty, Tulane University, New Orleans, LA 70118-5669
FAX: 001 504 865 6751

TIMS/ORSA Joint National Meeting

5 - 8 May 1996
Washington D.C.: Washington Hilton and Towers
Information: T. R. Gulledge Jr., George Mason University, Fairfax VA 22030-4444
FAX 001 703 764 4692
e-mail: gulledge@gmuvax.bitnet

1996 IFORS Conference in Vancouver, B.C.

8 - 13 July 1996
Hyatt Regency, Vancouver
Deadline for abstracts: October 1995
Chairman program Committee: Prof. Theo Stewart, Dept. of Math. Statistics,
University of Cape Town, Rondebosch 7700 South Africa
FAX +27 21 650 3918/3726
e-mail: TJSTEW@maths.uct.ac.za

APORS' 97 - 4th Conference - PRELIMINARY ANNOUNCEMENT

30 Nov. 1997 - 4 Dec. 1997
Melbourne, Australia
Invitation to be added to mailing list, contact:
APORS' 97, c/o ASOR Melbourne Chapter, GPO Box 1048H, Melbourne 3001
e-mail: P.Lochert@sci.monash.edu.au

Yes, he does have his eyes open!

WHAT IS OPERATIONAL RESEARCH?

Operational Research is the scientific approach to solving management problems. Using observation, data and analysis, the OR practitioner builds up quantitative relationships, called models. Models that take an overall system view help management make informed decisions.

The Secretary
Operational Research Society of New Zealand
P.O. Box 904
WELLINGTON

Please enrol me as a member of the Operational Research Society of New Zealand, at the membership grade indicated below. I enclose the appropriate fees*.

Individual members in Auckland, Wellington, Christchurch and overseas $45.00
Individual members in other areas $40.50
Student members † $15.00
Corporate members $150.00

I agree to be governed by the constitution of the ORSNZ, and to remain liable for subscriptions until I notify the Secretary in writing of my intent to withdraw from the Society.

Signature _____ Date _____

Name _____
(block letters please)

Address _____

_____

Telephone number _____ Occupation _____

Organisation _____

Special interest areas _____

_____

Payment enclosed _____ Please charge my VISA card _____

Card number _____ Expires _____

GST number _____

* Current fees for 1995

† Student certification _____
(Signature of Instructor and Institution)