NEWSLETTER

Operational Research Society of New Zealand (Inc.)

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WELLINGTON.

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FROM THE EDITOR

For those members who did not get a TIMS XXVII notice in their pre-conference mailing, this issue of the Newsletter carries a belated 'Call for Papers' for Australasian OR's 'Event of '86 '. Intending contributors who have not already done should send in an abstract immediately.

Around August was an active period for the Wellington OR community. The well-attended Scott Armstrong meeting on Forecasting and Strategic Planning (reported in the last newsletter) duly got a page's coverage in the National Business Review (12 Aug). A couple of weeks later, David Batten from CSIRO spoke to a joint ORSNZ/Institute of Foresters meeting on IIASA's Global Trade Model as it applies to forest products. Hugh Barr reviews this meeting for us.

Early September saw our 21st Annual Conference held in a wet and wind capital city. The Conference was honoured to have Prof George Dantzig as its keynote speaker. And who better to cut our 21st Birthday cake?

In between all this, Bruce Benseman attended the Australian OR Society's conference in Adelaide. His review would suggest that we still have some friends in Aussie, probably many more than we have in France or Washington.

CALL FOR PAPERS

The XXVII International Meeting of The Institute of Management Sciences will be held in Gold Coast City, Australia, near Brisbane, July 21-23, 1986. The meeting will be held in cooperation with ASOR, the Australian Society for Operations Research and APORS, the Asia-Pacific Operational Research Societies.

Submissions are invited on all topics in the theory or practice of operations research and management science.

1. Anyone who wishes to present a paper at TIMS XXVII but has not, as yet, submitted an abstract should send one (50 words, non-technical, 3 copies) together with a fee of US$25 (refundable upon acceptance) to:

   TIMS XXVII
   The Institute of Management Sciences
   290 Westminster St
   Providence, R.I. 02903
   USA

   immediately. (Deadline 6 November)

2. Any participant who wishes to be an ORSNZ delegate to the APORS Council Meeting to be held in conjunction with TIMS XXVII and/or who wants to be considered for a contribution to expenses by ORSNZ are requested to contact

   The Secretary
   ORSNZ
   Box 904
   Wellington
   (Ph. 727-855)

TIMS XXVII, Gold Coast City, Australia, July 21-23, 1986

conference '85

The "Coming of Age" 21st Annual ORSNZ Conference was held at the Victoria University of Wellington on 2-3 September. It was well attended by about 68 people from a broad range of organisations including 27 from the Universities, 27 from Government departments, 3 from Government trading corporations and 11 from the private sector. We were very fortunate in having Mr Peter Neilson, M.P. for Miramar and Parliamentary Under-Secretary to the Minister of Trade and Industry, to open the conference. Peter provided a very stimulating address in which he outlined the development of OR and the contributions that the profession could make to the New Zealand economy.

A lot of the "atmosphere" at the conference was created by the presence and contributions of the keynote speaker, Professor George Dantzig, from the Department of Operations Research at Stanford University. He presented two keynote addresses. The first was a fascinating insight into the origins of linear programming, and in particular, into the development of the simplex method for which he is internationally famous. He also provided an outline of the history of OR and some very amusing stories about his former colleagues, many of whom are now Nobel prize winners (all the best for the future, George!).

On the 2nd day Professor Dantzig provided us with a very comprehensive lecture on methods of solving large scale linear programming problems. Although many of us may not remember the details of Professor Dantzig's talk on mathematical programming, I am sure that we will never forget George cutting our 21st birthday cake at the conference dinner, thus heralding our societies' "coming of age" in the world of OR. Our thanks are due to Andrew Smith, from the Ministry of Energy, for arranging Professor Dantzig's visit and also for acting as host to him during his stay in Wellington.

The other papers at the conference were generally of a very high standard. For the statistically minded, 18 papers were presented; 5 of which were from Government departments, 3 from University staff, 4 from University students, 1 from the private sector, and 5 from various combinations of the above! David Ryan and Karen Garner's paper on "The Solution of Crew Scheduling Problems for Air New Zealand" was generally regarded as one of the most "professional" applications of OR in New Zealand in recent years. Karen Turner and Peter Mellalieu's paper on "Expert Systems for Agricultural Production" was also particularly interesting and the area of expert systems shows considerable potential for the future. The student paper prize by Ian Twomey, David Ryan and David Clarke provided a very thorough description of an LP model developed for the integrated planning of the Stage 1 mill expansion at NZ Steel Ltd. The other student papers were also very good and it was generally agreed that a special session be devoted to student papers at future OR conferences.

Apart from the formal part of the proceedings the informal meetings, teas, lunches and conference dinner, were also very enjoyable. Not only did these occasions provide refreshments and meals to satisfy the most fastidious gourmet (and gourmand!) present, but they also provided the right atmosphere to make new friends, renew old acquaintanceships and continue exchanging ideas. Finally , our special thanks must go to Andrea Johnson and David Whitaker from the Wellington branch for their excellent work in organising this conference, and to Professor George Dantzig for helping us to make our 21st Conference a truly memorable occasion.

Bob Cavana
Chairperson, Wellington Branch

ECONOMIC GROWTH AND ENERGY MODELLING SEMINAR

Following the ORSNZ Conference on Wednesday 4 September, Professor Dantzig presented a very stimulating seminar discussing the recent work in modelling the US economy, which is being carried out in the Systems Optimisation Laboratory of the Department of Operations Research at Stanford University. He outlined the large scale dynamic macro-economic model which has been designed to assess the long term impact on the US economy of foreign competion, innovation, modernisation, and energy needs. He also discussed his derivation of a utility function for this model and he presented some very interesting simulation runs with the model.

The seminar was jointly sponsored by the Ministry of Energy, Shell Oil NZ Ltd, Victoria University of Wellington and the Applied Mathematics Division, DSIR. Once again we would like to thank Andrew Smith for organising this highly successful seminar, which was attended by about 60 people including many economists and energy modellers from "down town" Wellington and Victoria University. An abstract of the paper is presented below and a copy of the paper can be obtained at a price of $2 (to cover copying and postage) from the Secretary, ORSNZ, Box 904, Wellington.

Bob Cavana

DERIVING A UTILITY FUNCTION FOR THE ECONOMY

G.B. DANTZIG

Abstract

The model we describe has the same general features of the PILOT dynamic macro-economic model of the U.S. designed to assess the long term impact of foreign competition, innovation, modernization, and energy needs. We derive the aggregate demand function of final consumer demand from individual demand functions in order to state its mathematical properties; we then estimate its parameters by a fit to empirical data. The equilibrium conditions are those of the Arrow-Debreu model, the only unusual feature is that investors calculate their rate of return using discounted normalized prices of future periods. If investors choose to normalize intra-period prices in the usual way by requiring that they sum to unity (or equivalently their average value is unity), the inverse demand functions turn out to be non-integrable. Equally satisfactory from the investors' point of view, is for them to choose instead to normalize intra-period prices by making these equal to $\bar{\pi}/(\bar{\pi}'H\bar{\pi})^{1/2}$ where H is a given positive-definite matrix and $\bar{\pi}$ is a vector of intra-period prices. In the latter case, we show that the inverse-demand functions are integrable and derive a utility function for the economy which if maximized subject to the physical flow constraints implies the equilibrium conditions.

STUDENT PAPER PRIZE 1985

Students doing OR projects as part of their studies towards a University degree (and particularly their academic supervisors) are reminded that a prize for the best student paper is awarded each year. Entries should be in to the address given below before 31 January 1985.

The paper may be of any reasonable length and may be joint-authored. Winners are invited to present their paper at the ORSNZ Conference. One copy of the report should be sent to:

Dr J.A. George
Convenor, Student Paper Prize
Operational Research Society of New Zealand
Department of Economics & Operations Research
Canterbury University
Private Bag
Christchurch.

Professor G.A. Vignaux
Education Officer, ORSNZ

VACANCIES

Government Stores Board

The GSB (Stores Div, Treasury) has vacancies for graduates, preferably with postgraduate qualifications in Operations Research, Statistics (or similar) who are seeking employment appropriate to their qualifications.

The work of the GSB includes assistance with the improvement of inventory control in government departments. Work of this nature which is being carried out at present include:

1) inventory control research,

2) the development and implementation of an inventory control system, and

3) assistance with the development and implementation of computerized supply systems.

Anyone interested is invited to contact:

Mr Don J. Johnston
Government Stores Board
P.O. Box 5067
Wellington
(Tel. 723-617)

ASOR CONFERENCE 1985

The Australian OR society held its conference at the University of Adelaide on 26-28 August. Despite arriving in a thunderstorm, we enjoyed three days of sunny weather. Adelaide is like Christchurch - green parks and wide malls. It also boasts a string of good Italian and Greek restaurants. These halved my motel bill.

The ASOR 1985 conference attracted over 83 people, with more people coming from industry and the universities.

from	ORSNZ	ASOR
government	44% *	11%
university	40%	57%
industry	16%	32%

Because ASOR holds its conference every second year and charges about NZ$250, it can attract more overseas speakers. The five invited addresses at Adelaide are what I remember most.

George Dantzig from Stanford recalled the origins of Linear Programming. Peter Checkland from Lancaster talked about Soft Systems Methodology - which asks what objectives are relevant, rather than what do we do? Richard Tweedie from SIROMATH emphasised the need for teamwork, because most OR projects also need statistical and computing experts. Martin Starr from Columbia contrasted US and Japanese companies. He said US firms think innovation is too risky. "If it works, don't fix it." To survive, Martin says, we must copy Japan and eliminate waste, promote quality and foster change.

I liked Gerry Hoffman from Chicago best. He set the cat among the pidgeons. He said "OR textbooks are written by people who have never practised OR,# and produce graduates who will never practise OR." He explained how to be more effective practitioners. "We must give the customer what he wants, when he wants it, at a price he can afford." He said people in industry must not confuse research with practice. "Never work on anything that is publishable."

As an aside, Gene Woolsey has a gentler approach. "Theory with no defined link to a practical application is not really OR at all - but belongs as part of mathematics."

In addition to the invited addresses, there were 32 presented papers. My paper on Production Planning in the NZ Dairy Industry was received enthusiastically. Hindsight showed why. There were only four commercial application papers in the whole conference, and nobody else really sold the benefits of their work. Ian Grayburn from Shell talked about Additive Purchasing, and two BHP people talked about crew rostering and bloom casting at the Newcastle steelworks.

Most of the other papers were theoretical - typically on Markov processes. There was a general talk on expert systems which divided opinions. Peter Checkland predicted "it would be another disaster". I enjoyed John Croucher's talk on the practical value of Queuing Theory. Responding to Byrd's 1978 attack in Interfaces, John sent his Macquarie students out to study queues in supermarkets, banks and fastfood shops. They found it was hard to formulate and estimate realistic models. But the shop managers were still very interested in their findings.

Overall I valued attending the ASOR conference, especially listening to the variety of experienced practitioners. I found the Australians very friendly. Although ORSNZ doesn't sponsor visits like mine, I invited them to future ORSNZ conferences, and they responded keenly. I hope they find us all satisfying real customers.

Bruce Benseman

* Bruce's & Bob's numbers agree!

D,G&M (& Graduates) ?!

- Ed,

— Announcing —

NEW ZEALAND JOURNAL OF TECHNOLOGY

It is a pleasing task to bring to the attention of Society members the appearance of a new and exciting indigenous publication. The New Zealand Journal of Technology, published quarterly by the Science Information Publishing Centre of DSIR, replaces the New Zealand Journal of Science. In his introduction to this new journal, Dr A.J. Ellis, Director-General of DSIR, stresses that the journal must not be seen as a house journal of the DSIR but is published by the DSIR as part of its responsibility to "collect and disseminate science and technology information". Dr Ellis also expresses the hope that the "major proportion of contributions will come from companies, universities and research institutes". The scope of the Journal is described as the publication of "articles on all aspects of technology relevant to New Zealand and the South-West Pacific". The Journal will publish review articles, research papers and notes, book reviews, news items and letters to the Editor.

Although the first issue contains nothing of specific OR interest, I believe this journal provides a valuable opportunity for OR workers to put the benefits and advantages of the OR approach and methodology before an audience with broad technological background. It is of course our responsibility as Society members to take advantage of this opportunity by practising our skills for the benefit of technological development and then to ensure that our contributions are duly reported.

The DSIR is to be congratulated on its initiative in bringing into being a new high quality journal - the Journal deserves our support both as readers and contributors.

D.M. Ryan
Theoretical and Applied Mechanics
University of Auckland

SUBSTITUTION AND TECHNICAL CHANGE IN THE MARKETS FOR FOREST PRODUCTS
(Wellington Branch Meeting)
(mid-August 1985)

This talk by Dr David Batten, of CSIRO's Division of Building Research, was jointly sponsored by the NZ Institute of Foresters. It was about his work with the Forest Products collaborative project at the International Institute for Systems Analysis (IIASA) in Austria.

The Forest Sector Project has been running for some years, and is nearing completion. Its objective has been to set up a global model to look at the future prospects for forest products and likely trade flows. Some 18 nations are involved.

David talked to us about the substitution and technical change aspects of this Global Trade Model. It looks at prospects for some 21 forest product types in 18 regions of the globe. By looking at trends in substitution in these industries in different countries, the prospects for forest products can be assessed. Generally, products follow a growth, saturation (or maturity), and decay path. The points of interest are the take-over time, the time taken for the product to go from 10% to 90% of the market, and whether its market share is growing or declining. The most appropriate models are logistics curves. The initial growth phase is characterised by high expenditure on R and D; maturity and decay by high expenditure on marketing type activities (cf toothpaste, soap).

The length of the maturity phase is difficult to determine, but a product with a major share of the market is, sooner or later, likely to fall prey to a new technology competitor. From a position of market dominance, the only two options are continued dominance or decline.

All is not rosy with the forest products industry, as generally many of their products are in the mature phase, and some face strong competition, eg wooden window frames from aluminium, paper wrappings from plastics.

Another concern was the transfer of technology internationally. The US auto industry lead the world in the 1950s, exported cars, and subsequently stimulated interest in other countries, notably Japan. They imitated, and with the initial advantage of cheaper labour, competed. The ready transfer of the technology was a major consideration, and has been consolidated by present high levels of Japanese R and D. This leader-follower situation with the follower able to overtake the initial leader, and turn from importer to exporter, is not atypical. Studies show that the successful exporting countries are usually those that spend above average on research and development.

Relative price also appears an important consideration in determining the change in market share. The IIASA study used Lancaster-type models of this change.

David's advice to Australia and New Zealand was the importance of R and D for product development and improvement if we are to successfully export. We don't have the Chilean advantage of cheap labour, for example.

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The IIASA study is a useful one, both for its approach based on the product life cycle, and because it has accumulated data on a number of countries, for different product sectors and wood's market share.

Anyone wanting further information should write to:

Dr David Batten
Building Research Division, CSIRO
PO Box 56
Highett, Victoria 3190
Australia

In spite of its dry title, the talk was one of the most interesting this year. It has important ramifications for New Zealand, when we are hoping to increase exports, and is an approach to market forecasting NZ companies would do well to look at carefully.

Hugh Barr

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*  Next  Issue       *
*  planned for       *
*                    *
*  Mid-December      *
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CONGRATULATIONS to Dr Mike Saunders, winner of the inaugural "ORCHARD-HAYS PRIZE for Computational Excellence " presented by the Mathematical Programming Society. Well-known as the co-developer, with Bruce Murtagh, of the nonlinear optimization package, MINOS, Mike is with the Stanford Optimization Lab. at Stanford University. He is a graduate of Canterbury University and was formerly with Applied Maths Div, DSIR .

CONRATULATIONS to our outgoing Treasurer, Karen Garner, and Stephen White, on the birth of a daughter, Amelia (flying Air New Zealand Earhart?).

TECHNICAL AND SOCIAL OPERATIONAL RESEARCH

(The following is an extract from an article by Heiner Muller-Merbach, President of IFORS, entitled "THE CHALLENGE FOR APORS", in the first APORS (Assoc of Asia-Pacific OR Societies) newsletter, May 1985.)

Each single Operational Research Society has the choice to make OR an influential activity or to let OR stagnate in a mathematical ivory tower. This is the choice between SOCIAL OR (SOR) and TECHNICAL OR (TOR).

In the TOR world, OR is understood in the sense of a subset of mathematics. TOR provides a variety of mathematical tools and offers it to anybody who is willing to use it. But the application itself is not considered - by the TOR world - as a real challenge and an intellectual task. The members of the TOR world love mathematical structures and are fascinated by algorithms, theorems, and proofs.

Not so the SOR world. Its members are excited - and partly worried - by the real problems and messes, a term used by Ackoff. They like to join the problem owners, those who are responsible for the world and its parts, the managers and politicians. They are prepared to share the problem owners' concerns. They enjoy applying their OR skills in order to help the problem owners.

Many are convinced that TOR has almost arrived at a state of perfection and does not need much additional endeavour. For them, the real challenge for OR springs from the unstructured reality.

TOR is more or less the same all over the globe. And it can be taught in any country in almost the same way. Teaching TOR need not be adapted to the culture of a country.

The opposite is true for SOR. It requires an adaptation to the culture of a country. The reason is simply that decision processes are different, organizational structures are different, the economic situations are different, the values and beliefs are different, Knowledge and education of the people are different, the education systems are different, in short: the messes are different.

Because SOR is different in different countries, the exchange of ideas and experience between countries is particularly important and can produce a lot of cross-fertilization. This is a fundamental reason why the formation of APORS has to be encouraged and supported. The knowledge transfer with respect to TOR would only require some information channels, but exchange of ideas and experience with respect to SOR requires opportunities for personal communication. It is to be hoped that APORS will benefit.