NEWSLETTER

Operational Research Society of New Zealand (Inc.)

Newsletter Editor   -   Kevin Hall

Material for the Newsletter should be sent to:-

9 Fairview Cres.,
Kelburn,
WELLINGTON, 5.

COUNCIL NOTES

1. Council has decided to change the membership mailing list procedures. The membership list has now been put on a computer (updated and correct we hope). The new system should allow easier checks and changes to be made and also be able to be operated with minimal effort and error.

2. The present financial situation of the Society has taken up much of Council's time recently. Because of the delay in getting out the subscriptions the Society's finances were in poor shape. However, this short term difficulty has now past but care will have to be taken this year to ensure that the budget is not exceeded in view of the cost increases which have to be faced this year.

3. The branches are to receive an interim operating grant of 50c per member. In addition it was decided that the Wellington branch should receive a grant of $50 in recognition of its sterling effort in organising last year's conference (the conference profits of $296 have passed to Council).

4. Bill Foster has proposed a programme for the year. The main elements are:-

    i.   To prepare a new improved membership application form.
    ii. To prepare brochures for promoting membership.
    iii. To generally consider methods of promoting membership.
    iv. Encourage associate members to become full members.

                                                        Andrew Smith.

BRANCH NEWS

The Auckland Branch of the ORSNZ held its first meeting for 1976 at the University School of Engineering on March 16. Three speakers from industry gave their views on Corporate Development Models.

Mr Paul Felton of Fletcher Industries began by describing a mini-computer deterministic model which he has developed for use by financial management. At an interactive visual-display terminal, the manager is able to model the growth of his business by specifying alternative strategies and noting changes from one balance sheet to the next. Nine full-screen reports are generated, covering such features as profit and loss statement, working capital movements and so on, for six consecutive annual periods. The main difficulty so far has been in overcoming managerial fear (and therefore scepticism) of the model. Its use is only a small step towards the far more difficult task of developing a theory which will show interactions between the five key divisions of a large corporation:
(i) environment (ii) goals and values (iii) managerial (iv) structural
(v) psychosocial.

Mr Bill Johnson next spoke of his work at UEB Industries, and began with the warning that top management is still reluctant to accept scientific theorising as a solution for managerial problems. This may lead to a shift from scientific analysis to political intrigue; the corporate planner

may in dissillusionment become a corporate plotter. Reports to management should stress conclusions and leave complex analysis to an appendix. The most important need for a large company is to provide more information for shareholders (the real owners), such as discounted cash flows for investors. Corporate planning is best done by a clear accounting control and this control must be exerted from top management downwards, aided by full consultation.

Finally Mr John Shaw outlined N. Z. Forest Products' LP model of the Kinleith Forest. This has been developed (at about 3 man-years' cost) in order to assist management in best using a limited resource - the forest. The need for a "clear-felling age" to be as high as possible places upper bounds on total wood available (for eventual use as timber or pulp/paper, both locally and overseas). But the market potential tends to rise more rapidly than the quantity of wood available. The LP provides answers to questions such as: how to balance export and local sales; how much low quality timber should be chipped; what is the best shift configuration for labour use. A steering committee for this model development was formed from high-level executives for two purposes: (i) so that the OR section could get access to information (and budget forecasts formed the safest basis); (ii) in order to educate management in the usefulness of the model. The committee now shows interest in the model both as an operational tool (optimizing the "present") and a planning tool (answering "what if" questions). In the long term it is hoped to combine the LP model with the existing forest simulation program and financial ("budplan") model.

NEWS OF MEMBERS

The following applications for student and associate membership have been received since December:-

G. Burrell, H.B. Moore, A.D. Lee, B.K. Rea, R.F. Lee, R.D. Finnerty, D. Silvester, R. Young, P.G. O'Connor and S.P. Copsoy.

Council has approved the full membership application of Dr D.M. Ryan.

Welcome to the Society!

Wellington Branch Chairman Awarded Fellowship

A Harkness Fellowship, one of five offered annually to candidates from Australia and New Zealand, has been awarded to Mr John Boshier of the New Zealand Electricity Department. Mr Boshier is the sole New Zealand Fellow this year.

The Fellowships enable candidates to undertake 12 to 21 month's study and travel in the United States according to a programme which best suits their personal and professional needs and offer an unrestricted choice of a university or other institution at which to work.

Mr Boshier, who is a graduate of the School of Engineering at Canterbury University, has a specialised interest in the planning of energy production which embraces the depletion of the world's fossil fuel stocks, nuclear generation, thermal and exhaust pollution and methods of conservation.

He believes the technical and social development of the United States is important to New Zealand and that America, being an energy intensive

society, has achieved varied expertise in energy management.

For these reasons Mr Boshier considers the Harkness Fellowship offers a unique chance to observe how the world's largest energy consumer plans its policies.

He plans to spend the first year at the Massachusetts Institute of Technology studying computer models of energy supply. He also hopes to work at the Energy Research and Development Administration (ERDA) for a period. This is a Federal Authority responsible for the implementation of "Project Independence" which aims to make America independent of foreign sources of energy as quickly as possible. ERDA has taken over the functions of the Atomic Energy Commission, with the exception of the regulatory aspects, and therefore has a very wide range of activities.

The Fellowship provides for a period of travel within the United States, and Mr Boshier plans to use this time visiting other authorities responsible for energy planning and development. Included among these are oil companies and electric power utilities.

He also plans to visit the Council for Environmental Quality and other environmental groups which are actively concerned with the development of energy resources.

Congratulations John, look forward to hearing from you on your return.

Kees de Kluyver

Cornelis (Kees) A. de Kluyver joined the Operations Research group at the University of Canterbury (Economics Department) in July of last year. Prior to that, he was a member of the Marketing Faculty at the Krannert Graduate School of Industrial Administration of Purdue University, Indiana in the U.S. He received his training at the University of Oregon (B.A. Marketing, M.B.A.) and at Case Western Reserve University (Ph.D. Operations Research) and was associated with T.R.W., Inc. as an economic analyst in the area of New Product Management from 1972 until 1973.

His research interests are concentrated in the area of New Product Management. In particular, he is currently working on the development of quantitative GO/NO decision models for new product ventures. In addition to doing research in this field, he is in the process of writing a short monograph on recent O.R. contributions to this marketing problem.

Kees is also interested in the use of O.R. in Research and Development work and in Advertising.

Hans G. Daellenbach - reader in operations research at the University of Canterbury, has just returned from a study leave abroad, where he visited a number of electric power companies on the U.S. West Coast, in France, Sweden and Switzerland, and studied their use of operations research tools in the management of hydro-thermal power systems. This project was partially supported by a grant from the N.Z. Energy Research and Development Committee. He is presently preparing a detailed evaluation on the various models used in the light of their potential use for the N.Z. system.

Hans G. Daellenbach and John A. George - from the operations research group in the Economics Department of the University of Canterbury, have recently signed a contract with Allyn and Bacon Inc., Boston, U.S.A., for the publication of a text entitled "Introduction to Operations Research

Techniques", intended for intermediate and advanced O.R. courses. The text is ready to go to print and the tentative publication date is mid 1977. Its coverage and scope is comparable to the texts by Wagner or Hillier and Lieberman. Although it picks the student up at a somewhat lower level than these texts, it attempts to bring them up to about the same final level. Both authors have worked on the text over the past three years. It has been partially class tested and undergone a thorough revision as a consequence of this and detailed reviews obtained from overseas academics.

SPEAKING UP

The recent "Speak Up" campaign by the J.C.'s and Police to encourage people to come forward with evidence prompts me to raise the question for our profession. How often do we shrink from publishing results which might conflict with Government's or our employer's policy, or might offend a pressure group?

Overseas the trend is clear. There is an increasing tendency in scientific circles to support the release of responsible scientific papers that may conflict with established interests. This is evident by disclosure by British water boards of river polluters, and in America Association for the Advancement of Science steps to encourage codes on scientific freedom and responsibility (See "Those who speak out" p.579 "New Scientist", 11 Mar. 1976). It reflects an awareness that technology and society interact to a greater extent today than ever before, and that informed public opinion is necessary for good public decision-making.

New Zealand seems strangely out of step in this area. For instance within the last year the principal government scientific department has issued instructions which have the effect of muzzling its employees. All information on a number of controversial topics must be collated and released through a single administrative spokesman. There have also been rumblings from politicians that public servants are to carry out policy, not to comment on it.

In this atmosphere where does the New Zealand O.R. practitioner stand? In many ways we are vulnerable. Society members are in private enterprise, consultancy, universities or government departments. They risk loss of jobs, clients, grants or promotion prospects respectively if they release controversial findings, and are therefore not likely to do so without careful thought. That our journal has published somewhat controversial papers recently on road safety and superannuation, is encouraging, and indicates a society commitment to professional responsibility.

O.R., as one of the decision sciences, is one in which the adversary process and advocacy, can and do play an important role. As professionals there will be times when some of us will need to speak up responsibly on public issues.

As a profession we must be prepared to support those who do. This support could well run to pressing authorities to fund work critically assessing policy in controversial areas.

However, I feel it may be some time before the special "adversary nature" of O.R. is fully understood by New Zealand decision-makers.

Hugh Barr,
President.

1975 STUDENT PAPER PRIZE

The prize this year attracted six entries. The judges compliment the entrants on the high standard of their oral and written presentations. Congratulations go to the winner, John Crawford, of Theoretical and Applied Mechanics Dept., University of Auckland, for his paper on the scheduling of beer tankers.

ABSTRACTS OF STUDENT PAPER PRIZE ENTRIES - 1975

(Copies of papers are available from the departments concerned)

Scheduling of beer tankers, by J. L. Crawford, Dept. of Theoretical and Applied Mechanics, University of Auckland.

This investigation considers the weekly scheduling of beer deliveries for Waikato Breweries with a view to the reduction of both running and standing costs. In addition to the basic delivery and tanker-usage constraints, the Breweries vehicle scheduling problem features constraints which are peculiar to the delivery of pressurised fluids and require that an integral number of tanker tanks be used to fill an integral number of hotel vats. The analysis of the problem is restricted to routes of a "petal" form and the resulting overconstrained zero-one integer program solved using the TEMPO package. Results indicate that reductions in both types of cost may be achieved, with an overall saving of approximately 17% compared to the present hand solution.

Simulation of a dial-a-bus system, by J. J. de Pont, Department of Theoretical and Applied Mechanics, University of Auckland.

An event-based simulation model for investigating the performance of a proposed dial-a-bus system for the Auckland suburb of Mt Roskill is discussed. A many pickups to one destination (a rapid rail station), and return is modelled. There are poblems in accurately measuring bus travel time by traditional methods and a mesh procedure for estimating travel time was used in the simulation. The scheduling strategy for drop off and pick up is described, and alternative measures of system performance discussed. The simulation aims to investigate the relationship between number of buses, system performance, and cost.

An Application of Queueing Theory to Computers in Banking by David J. Martin, Department of Theoretical and Applied Mechanics, University of Auckland.

Two problems which arise in designing a computer terminal network are how to get the best use out of the equipment and how to predict future requirements as the demand grows. This paper explains why delays are present in a banking terminal system and discusses how they can be reduced. Expressions derived in the mathematical analysis are used to determine guidelines for the distribution of teller terminals and the number of telephone lines linking them.

A Financial Model of a Meat Company, by S. Byrne Department of Information Science, Victoria University of Wellington.

> The paper describes an application of the ICL financial modelling package PROSPER to model the money flows of one of the works of a local meat company. The structure and possible uses of the model are described, as well as areas where greater modelling detail is required.

Aircrew rostering within NAC, by J. L. Scott, Department of Information Science, Victoria University of Wellington.

> The aircrew assignment process attempts to attain an objective associated with equitable workload and efficient crew utilisation, while meeting award constraints. Flight duties, days off, training and administration must be assigned. Because of size the task is usually split into:-
>
> (i)   construction of daily crew rotations
> (ii)   construction of fortnightly crew rosters by assignment of rotations.
>
> The paper considers (ii) and discusses current rostering procedures at NAC, and possible algorithms and a proposed computer method for solving the problem.

A Political Redistricting Problem by R. G. Smith, Economics Dept., Canterbury University.

> The paper discusses a heuristic method for dividing the country into a specified number of compact electoral districts of appropriately even population. See also N. Z. Operational Research Vol. 4, No. 1.

SURVEY

The Education Sub-committee in conjunction with the Information Science Dept. at Victoria is about to carry out a survey of OR work in Wellington organisations currently employing members of the society. The primary purpose of the survey is to encourage communication between society members who are working on similar problems. The information collection phase of the survey, to begin in May, will be carried out by OR Honours and Diploma students at Victoria and it is hoped that our members will co-operate with them in this worthwhile venture. The survey results will be published in the Newsletter. If successful and resources permit, a similar survey may also be carried out in Auckland and Christchurch at a later date.

John Scott.

NOTICES

1. The 3rd International Conference of the Australian Society of Operations Research will be held in Adelaide, South Australia in August 1977. The Conference will include sessions on OR in education and manpower planning, energy modelling, communications, transportation, and management.

   Abstracts are required for November 30, 1976; completed papers February 28, 1977.

   Contact: Richard Stevens, Organizing Secretary, ASOR,
                P.O. Box 143, Rundle St, Adelaide,
                South Australia, 5000.

2. The 27th Annual Conference of the Statistical Association will be held in the Shell Theatrette, Wellington on the 29th and 30th June, 1976. For further information contact the secretary, N.Z. Statistical Association, Box 1731, Wellington.

3. The December Issue of the N.Z. Statistician is available for sale for $2 a copy. This issue of 105 pages, contains most of the papers given at the May 1975 Conference on Statistical Computer packages organized by the Statistical Association in conjunction with the Victoria University Dept. of Extension. It also contains a variety of other papers on Statistical packages, an index of Algarithms published JRSS, sec. C.
   Orders to: The Editor, R.B. Davies,
                  c/- A.M.D., D.S.I.R.,
                  Box 1335, Wellington.

NEW ZEALAND MATHEMATICAL SOCIETY

The Society was established in 1974 to promote the development, application, and dissemination of mathematical knowledge within New Zealand and to assist Mathematicians in New Zealand to maintain effective co-operation with one another and with mathematicians and Mathematical societies in other countries. Members of the society receive the society Newsletter three times a year. The most recent issue came out in December 1975 and contains, amongst other things, notes from the October council meeting, a report on the meetings between the Mathematical Association and Mathematical Society, a review of the agreements between the N. Z. Society and Societies in other countries, articles on Mathematical Education and the Employment of Mathematical Graduants, a list of 1976 Conferences in Mathematics, local News and advertisements including job vacancies. Members also receive the N. Z. Mathematical News-sheet - this publication comes out two or three times a term and is published by the Southland Mathematical Association with the encouragement of the committee of representatives of the N. Z. Mathematical Associations and the N. Z. Mathematical Society.

Members are also able to subscribe to the Mathematical Chronicle at a reduced rate and to become members of the Australian, South East Asian, and London Mathematical Societies for 50% of the usual subscription of each of these societies.

The annual subscription for the N. Z. Mathematical Society is $5.00 for ordinary members and $1.00 for student members.

Applications for membership should be made to:

Professor Peter Lorimer,
Treasurer and Membership Secretary,
New Zealand Mathematical Society,
Department of Mathematics,
University of Auckland,
Private Bag,
Auckland,
NEW ZEALAND.

All other enquiries should be made to:

Dr Kevin Broughan,
Secretary,
New Zealand Mathematical Society,
Department of Mathematics,
University of Waikato,
Hamilton,
NEW ZEALAND.

REFEREES FOR NZOR NEEDED

This is an appeal to any person (member of friend) who has in depth know-
ledge about some O. R. technique (such as Penalty-and-Barrier Methods,
Branch-and-Bound, Markov Chains, etc.) or practical experience in some
area of application (such as Inventory control, transportation, marketing
research, etc.) and who considers himself competent to referee articles
on this subject submitted to NZOR for editorial considerations. Please
fill in the slip below and send it to the editor. No respondent will be
asked to referee more than two articles per year, and obviously keeps
open the option to refuse refereeing any article sent to him.

Send to:

H. G. Daellenbach,
Editor, NZOR,
Economics Department,
University of Canterbury,
CHRISTCHURCH.

I am competent in the following O. R. techniques: _____

_____

_____

I have experience in the following areas of application: _____

_____

_____

Name: _____

Business Address: _____

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My field of activity or professional position is: _____

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