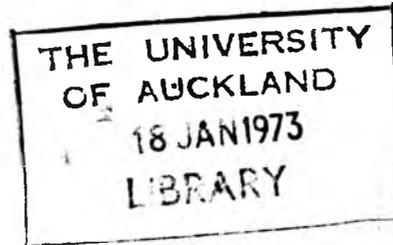




NEWSLETTER

Operational Research Society of New Zealand (Inc.)

DECEMBER 1972



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COUNCIL NOTES

Notes from Council meetings held August 24 and October 5.

1. Dr D.L. Reinken was elected a Full Member.
2. Ways in which the Society could help the National Productivity Centre are being investigated by Gary Dickinson, the Convenor of the Public Issues & Awareness Sub-Committee.
3. Each branch committee is to submit a recommendation for recipient of the lecture prize. The prize is to be open to all, but non-full members are to be given a greater chance.
4. Postal Addresses are now as follows:

Council:	P.O. Box 904, Wellington.
Wellington Branch:	P.O. Box 904, Wellington.
Auckland Branch:	P.O. Box 12360, Penrose.
Canterbury Branch:	P.O. Box 2189, Christchurch
5. The New Canterbury Committee is as follows:

Chairman:	H.G. Daellenbach
Hon Sec.-Treasurer:	J.A. George
Members:	R.A. Clements, T.A. Lusk, C. Shamway, J.B.C. Taylor.

Dr H.G. Daellenbach was co-opted to Council, being Chairman of the Branch Committee.

The following Sub-committee appointments were made:

Constitutional:	Dr H.G. Daellenbach
Education:	Mr J.B.C. Taylor
International Affairs:	Dr H.G. Daellenbach
Membership:	Mr T.A. Lusk
National Events:	Mr T.A. Lusk
Public Issues & Awareness:	Mr A.T.G. McArthur
Publications:	Dr H.G. Daellenbach

6. Council agreed to the Society applying for affiliation with the Royal Society of New Zealand. Notes on the Royal Society and Council's reasons for making the application are contained elsewhere in this newsletter. (Application has since been accepted - Ed).
7. An S.G.M. is to be held in conjunction with the A.G.M. to put a Constitutional amendment designed to provide for branch bank accounts.
8. The President said that although he believed in postal elections for Council and that such balloting would be more democratic than the present system, he was concerned about the practical implications for the functioning of Council. In particular he seriously doubted whether Council could function effectively by correspondence and the burden of travel expenses would be unreasonable if widely scattered Council members had to be flown to a meeting place. He therefore felt unable to recommend a switch to postal elections for Council at this time although he hoped that this would soon be feasible.
9. Council requested the Treasurer to provide funds in the draft budget for air trips to two Council meetings by each Branch Chairman (or nominee). This arrangement was agreed to as a compromise to increase branches' involvement in Council without increasing administration expenses too much.
10. It was reported that the Annual Conference had been highly successful, about 60 people attending.

BRANCH NOTES

1. Auckland

Mr P. Stanes, Manager of Management Information and Systems at A.H.I spoke to a July meeting of the Auckland Branch. His theme was "Communications" and he based his talk on the Departments under his control at Alex Harvey Industrys.

An introductory explanation of the General Management structure was presented, and the position of Management Information and Systems (i.e Operational Research, Data Processing Systems and Data preparation and Processing) explained. Being a centralised function, the relationship with each of the Groups forming Alex Harvey Industries was also covered.

Communications here, is dealing with General Management, Company Management and staff and the specialists under their control. There also arises the problem of controlling liaison between specialists and Company staff.

Mr Stanes then traced the life of a project (i.e. an Inventory Control System) from initial contact with a company, introductory studies, project proposal submission, through team activities on project development to implementation and monitoring the completed and installed system.

The emphasis on education of Company staff and related communications was strong and easily detected. Another necessity noted was the support from upper management and liaison between those working on the project.

The post auditing of a system that had been implemented is also important. The measure of success must be shown to retain confidence and prove the value of Management Services.

Mr Stanes indicated the importance of "selling a project" to Management, and this was strongly endorsed by Mr. T. Naylor who thanked the speaker on behalf of those present for his most interesting and informative talk.

The evening finished with a light supper. An increase in the informal discussions between members at supper was also distinct.

2. Canterbury

2.1. Two meetings were held. For the first on July 27, Mr R.A. Clements, Operations Manager with D.H. Brown (Peerless Feeds) talked about "Linear Programming in the Stock-feed Business."

Sales of manufactured animal feeds in New Zealand are estimated at 308,000 tons per year. Nearly all of this is fed to poultry, kept in controlled conditions in high-density housing. The

existence of the business depends on accurate formulation of least-cost feeds containing all the necessary nutrients. The grower has the alternative of mixing his own feed from grain, meat-meal and vitamin premix at a lower cost per ton but with reduced performance of his stock.

The formulation problem is well-known in linear programming. Each ingredient contains from 1 to 40 chemical nutrients. Minimum and maximum limits are known for the 40 nutrients required. The required mixture must satisfy all the conditions at the least total cost.

Additional restrictions, such as a fixed ratio between certain nutrients and reasonable feed densities can be included in the programme, but palatability and inter-dependent digestibility cannot and variability of ingredient content restricts the attainable efficiency.

The computer output gives not only the least-cost formula but also the extent to which prices can vary before a change of formula is called for. In practice, this has enabled a set of formulations to be used for up to a year at a time.

Savings are measured in terms of the cost of producing eggs or chicken-meat, bearing in mind that the grower wants the maximum output per dollar of feed rather than per ton of feed. Commercial-scale comparisons show that the saving is often as much as 10% of the feed cost and can be 20% compared with home-mix establishments.

Consequently linear programming has become essential to the industry; the remaining question is how much further refinement is economically advisable?

- 2.2. In the second meeting on September 28, as a first of a hopefully recurrent feature, three students of the University of Canterbury presented short papers on ongoing research and practical projects in Operations Research. The first two by W.S. Yn and M.P. Ong (Supervisor: Professor H. McCallion, Mechanical Engineering) dealt with certain aspects of Job Shop Scheduling, particularly the effect of systematic fluctuations on load factors and lead time estimation. Simulation is used as the tool of analysis both cases. The third paper by D. Stott (Supervisor: Dr. H.G. Daellenbach, Economics) presented some preliminary analysis in of programming student nurse training at Christchurch Hospital. The objective of this phase was to generate the k best training programmes, where the criterion for "best" is co-ordination between practical and theoretical training. The problem was formulated as a transportation problem.

3. Wellington Branch

- 3.1. The Wellington Branch combined with the Work Study Society for its July meeting. Thirty six attended the meeting at which Professor Tony Vignaux and students from his Information Science Department at Victoria University introduced the subject of Simulation and led discussion on the possible application of the technique.

As a prelude to the August meeting Lester O'Brien of Unilever (N.Z.) Ltd. outlined an industrial process which was being studied as a simulation exercise for their course.

- 3.2. The August meeting was run as a working session at Victoria University with members of the Work Study Society again present. The example outlined at the previous meeting concerned manpower requirements for factory maintenance. Simulation had been used by the Information Science students to assess the relative values of various manpower policies. Members had the opportunity of discussing the modelling of the problem and to carry out computer runs during the evening.

- 3.3. Mr Jean-Claude de Verrier of Systems & Programs (N.Z.) Ltd spoke to our September meeting on "The Role of Simulation in Management".

The meeting, which was preceded by a buffet meal, centred around a presentation of slides. This was divided into 4 parts:

Part 1 gave a brief description of Simulation and the computer languages that have been developed for it.

Part 2 described 4 case studies involving DYNAMO, a language developed for dynamic systems. The case studies looked at were:

- (i) A production-distribution system with 3 levels of inventory.
- (ii) The detection and subsequent conflict between enemy and friendly aircraft.
- (iii) The simulation of a Town: a planning & management model for Public Administrators.
- (iv) Jay Forrester's "World Simulation" model. Jean described the model with which Forrester simulated the World in a month. It describes the inter-relationships between Pollution, Natural Resources, Food & Capital Investment and how they effect "The Quality of Life". The model, while being interesting from a: "What happens if we do this?" stand-point, highlighted how the solution of one

problem can easily result in another. e.g. If the problem of a high current usage of Natural Resources was "solved" by increasing the Capital Investment, the resulting increase in Pollution would have a catastrophic effect on Population, as well as lowering the Quality of Life.

Part 3 described how DYNAMO could be used to Simulate New Zealand.

Needless to say, a lively discussion ensued involving the merits & demerits of Simulation and other techniques of Macro-Model building. This was stopped at 9.15 with Andre Milkop thanking Jean while paroding his very interesting presentation.

- 3.4. At the October meeting J. Paul Heyler spoke on "Marketing O.R." Mr Heyler distinguished the topic of his address from that of the Annual Conference, at which he had spoken on "Selling the O.R. Product". Marketing involved the whole process of identifying and satisfying needs. To market operational research required satisfying the needs of management, some of which were rational like O.R., but many of which were emotive. To do this Management must be made aware of O.R., understand O.R. and be favourably disposed towards it. In many cases the first condition was not met.

A study of the image of O.R. made recently by Mr Heyler showed that people had a respect/fear approach to O.R. because they were not well acquainted with it. Operational researchers were regarded as mathematicians who were academic (i.e. not practical) and who used a lot of jargon. To overcome this image barrier, Mr Heyler suggested that the Society concentrate less on internal matters, such as conditions of membership, and more on public relations.

This provoked a lively discussion, following which the meeting concluded.

CONFERENCES

1. Australian National O.R. Conference,
August 20 - 22, 1973

The Australian Society for Operations Research will hold a National Conference at Monash University, Melbourne to review progress in the use of planning models, and to discuss the role of these models in the future.

The theme is "The Pursuit of the Best Solution."

For further information about presenting papers and/or attending the Conference, write to the Chairman, 1973 National Conference, Australian Society for Operations Research Inc., 332 Albert Street, East Melbourne, Victoria 3002, Australia.

2. The 8th New Zealand Mathematics Colloquium will be held on the 15th, 16th and 17th of May, 1973, at the University of Waikato, Hamilton. The Colloquium and the New Zealand Section of the Australasian Association of Philosophy Conference will be co-sponsoring a meeting of the American Association of Symbolic Logic on 15th May. The Computer Society and Operational Research Society are being asked to co-operate in organising additional sessions on 18th May, for which papers of special interest to their members are invited.

Contributed papers from all fields of pure mathematics, applied mathematics, statistics, computing, operational research, mathematical physics, and the teaching of mathematics are called for. Also of interest are papers with a substantial mathematical content from other disciplines, e.g., physical, natural and social sciences. There will also be some invited speakers.

Further information on accommodation, registration etc can be obtained from the Ed, or A.G. French, University of Waikato, Hamilton.

CLASSIFIED ADVERTISEMENTS

1. Senior Lecturer or Lecturer in Operations Research

The Council of Victoria University of Wellington invites applications from suitably qualified persons for appointment as senior lecturer or lecturer in Operations Research within the Department of Information Science.

The salary scale for lecturers is in the range of \$NZ5589 to \$NZ7149 p.a., and for senior lecturers in the range of \$NZ7278 to \$NZ8579 p.a., where there is a bar, then from \$NZ8839 to \$NZ9358 p.a.

Further details and conditions of Appointment may be obtained from Prof. G.A. Vignaux, Head of the Department of Information Science or from the Registrar, Victoria University, Box 196, Wellington.

2. A young OR scientist from the UK wishes to find an OR position in New Zealand. He completed an M. Sc. in October, including a practical project involving the simulation of appointments systems. Replies to Prof. G.A. Vignaux, Department of Information Science, Victoria University of Wellington, P.O. Box 196, Wellington will be treated in confidence and passed on.

INTERNATIONAL ABSTRACTS IN OPERATIONS RESEARCH

L. F. Jackson, Past Convener, International Affairs Sub-Committee

Some members have wondered about the delays in receiving copies of International Abstracts in Operations Research. In the past International Abstracts in Operations Research have been mailed to members of the Society using mailing labels which we have supplied prior to the mailing date. For each issue this meant that members were receiving issues for which mailing labels were forwarded at the beginning of the year. Members who had requested subscriptions since that time would not have received any issues under this arrangement.

To reduce these delays the Society will in future receive the copies in bulk from the publisher and mail them on arrival in New Zealand.

Subscribers should receive volume 12 No. 4 as the first mailing under these new arrangements. This issue has been received and despatched to members.

Members of the Society who request International Abstracts in Operations Research will from this year all receive the full volume for the year in which their subscription commenced. This means that subscribers who receive volume 12 No. 4 under the arrangements outlined above, will also receive at about the same time, back issues to the beginning of volume 12.

Any member who wishes to purchase other back numbers may do so at a reduced rate through the Society.

AFFILIATION WITH THE ROYAL SOCIETY OF NEW ZEALAND

By: G.A. Vignaux, Past President. & B.K. Campbell, Hon Sec.

1. Background

The Royal Society of New Zealand is established by an act of Parliament (latest version, 1965 No. 38) from which the following extracts are taken:

"8. Objects of Society

- (a) To promote science ...
- (b) To inform the Minister of fields in which ...
the scientific effort of N.Z. should be increased ...
- (c) To initiate and maintain contacts between N.Z. scientists
and scientists in other parts of the world ...
- (d) To administer funds for scientific research or scientific
projects.
- (e) To initiate meetings ...
- (f) To initiate and maintain contacts between scientists in
N.Z. ...
- (g) To publish and disseminate scientific knowledge ...
- (h) To do all other lawful things conducive to the
attainment of the objects of the Society.

9. Obligation to initiate investigations - The Society shall, whenever called upon by the Minister of Science or any other Minister of the Crown, initiate investigations and procure reports upon any scientific subject."

Besides the various local branches of the Royal Society of N.Z. the following organisations are also member bodies of the Society.

Geological Soc., N.Z. Inst. of Chemistry, N.Z. Ecological Soc., N.Z. Soc. of Soil Science, N.Z. Inst. of Agricultural Sciences, The Inst. of Physics and the Physical Soc., N.Z. Hydrological Soc., Royal Astronomical Soc., N.Z. Archaeological Assn, N.Z. Microbiological Soc., N.Z. Inst. of Fuel, Nutrition Soc., The Entomological Soc., Ornithological Soc., N.Z. Psychology Soc., N.Z. Geographical Soc., N.Z. Marine Sciences Soc., Royal Aeronautical Soc., Veterinary Science Soc., N.Z. Inst. of Food Science and Technology, Dairy Science and Technology Soc.

2. Affiliation

Now that the O.R. Society is well established it is time for it to become more outward looking and to consider how it can contribute more to the wider society of which it is a part. One obvious way is for it to become a member of the Royal Society of N.Z. which is a multi-disciplinary scientific body concerned, amongst other things, with aspects of science which are particularly

relevant to society. For example early in 1972 the R.S.N.Z. held a science congress with the general theme "The Cost of Growth (or Stagnation)" this included papers on such topics as: the allocation of research expenditure; O.R. and economics; cost-benefit analysis and land use; modelling and simulation. A current project of the R.S.N.Z. is the study of the implications for N.Z of the work of Forrester et al on the World model.

The R.S.N.Z. is the most important and comprehensive scientific body in N.Z. It is recognised officially by the Government as the proper channel of communication to the scientific community. O.R. developed with a multidisciplinary approach to problems so it would appear to be a natural and advantageous step to promote this tradition by affiliating with an organisation which is truly multidisciplinary and can encourage inter-disciplinary co-operation. The roots of O.R. are in science and would be further strengthened by such affiliation, just as the branches reach to management and are strengthened by the O.R. Society's relationship with the N.Z. Institute of Management; the memberships of the O.R. Society of both organisations would be complementary. N.Z. recognition of O.R. as a discipline with much to contribute to solving local problems would be enhanced.

The annual cost to the O.R. Society would be \$20 affiliation fee plus about \$20 share of travelling expenses (16.57 last year).

Application to join the Royal Society has since been made by Council and the application was accepted. - Ed.

NEW MEMBERS

Janet Gough. B. Sc(Maths), M.Com(Hons)(Economics). Technician at T.G.M.L.I., Lincoln College.

Christopher Goulding. B.Sc (Hons)(Forestry). Forest Mensurationist with the Forest Research Insitute.

Joseph Heathcote. H.N.C. - B.S. (Econ.). Systems Engineer with ICL (N.Z.)

Bryan Melville. B.Sc., A.R.C.S., Dip. Management (NZIM). Industrial Engineering Manager for General Foods.

David Robinson. PhD (Graph theory). Senior Lecturer in Mathematics at the University of Canterbury, lecturing in algebra, graph theory & L.P.

NEWS OF MEMBERS

Bernard Kaiser has been re-appointed to the Council of the New Zealand Administration Staff College for another 3 years. He has served on this council since 1968.

The N.Z.A.S.C. conducts residential courses for Managers and Executives at Tatum Park near Levin. The courses normally last one month, and covers Managerial, Organisation, Communications, Personnel, Finance & Costs, Planning & Control, Marketing, and Forecasting and Adaptation to Change.

NOTICE OF MEETING

NOTE: Change of venue unless otherwise advised meetings will be at BP House Theatre. Johnson Street Entrance.

October: Monday 11th - 7.30 p.m. Dr Mike Jameson I.C.L. 'Simulation Working for Management' with reference to 'I.C.L. Post'.

Tuesday 26th - 7.30 p.m. Mr Yasuo Yagyu 'Simulation of a Computer Operating System'. Mr Yagyu is currently at the applied Maths Division D.S.I.R. This talk is based on a major project in Japan prior to his coming to New Zealand.

An Invitation is extended to members of the Computer Society.

Further meetings are planned as follows to be confirmed during October.

November: 12th or 15th - Mr Stratton Principle of U.K. Defence Operations Analysis Establishment.

Mr Stratton will speak on the work of the Establishment and his particular speciality application of O/R to navigational problems.

November: 23rd - Annual General Meeting of the Society. (formation of Wellington Branch in keeping with branches already formed in Auckland and Christchurch will also take place at this meeting).