ELEMENTARY PROBABILITY IN SOME POPULAR GAMES
by John C. W. Rayner

Introduction

There is, I believe, ample evidence that young children learn to read more quickly if the first words taught are from their immediate environment. So using books from an earlier or a foreign culture is counterproductive. So I believe that too many of the examples used in teaching elementary probability are sterile and inappropriate, and inhibit the learning process. Imagine my pleasure then, when one of my children asked for my advice about what to do in playing a popular board game. The questions were statistical in that I wasn't asked for a foolproof winning technique, but rather for what was most likely to happen, and for a good strategy.

As a consequence I've put together here four examples from games played by at least one member of my family. Even if these examples are not relevant to your situation, the ideas are transferable.

Monopoly

On your previous turn you completed the set, The Angel Islington, Euston Road, Pentonville Road. An opponent is on Go, 6, 8 and 9 spaces away from your properties. You are approaching a difficult stretch yourself and will need as much money as possible on your next turn to get through that stretch. The dilemma is whether to build or not. Houses cost $50 each. A reasonable approach is to calculate the expected return for building the same number of houses or a hotel on each property in the set.

Specifically the expected income from building one house on each property is $30 x 5/36 + 30 x 5/36 + 40 x 4/36 = $12.78. The details are set out in Table 1.

Table 1. Data and expected income from one turn for an opponent on Go.

Opponent throws		6	8	9	22/36	Expected Income	Cost
Probability		5/36	5/36	4/36			
1 House	Income	30	30	40	0	$12.78	$150
2 Houses		90	90	100	0	$36.11	$300
3 Houses		270	270	300	0	$108.33	$450
4 Houses		400	400	450	0	$161.11	$600
Hotel		550	550	600	0	$219.44	$750

These calculations have been repeated for an opponent on The Old Kent Road, 5, 7 and 8 spaces from your properties, and for an opponent on the Community Chest 4, 6 and 7 spaces away. The expectations from all three opponents are summarised in Table 2.

Table 2. Expected income from 3 opponents.

Opponent on	Buildings on each property				
	1 House	2 Houses	3 Houses	4 Houses	Hotel
Go	$12.78	$36.11	$108.33	$161.11	$219.44
Old Kent Road	$13.89	$38.89	$116.67	$173.61	$236.11
Community Chest	$13.33	$36.67	$110.00	$163.89	$222.22

From Table 2 the rate of return is greater the more you build. If there were three opponents in the game, on the spaces suggested, the expected return would not exceed the cost, no matter how much building was done. On the other hand if there were four opponents in the area indicated, then building 4 houses or a hotel on each property could be expected to yield a profit.

Ratrace—Racetrack

This aims to simulate betting on a horse race. A horse numbered between 2 and 12 is selected. Two dice are thrown. If their total matches your choice of horse number on the first, second or third throw, your horse comes first, second or third respectively. Otherwise it is unplaced. The return is indicated in Table 3.

If you bet on horse 2 the probabilities of it coming first, second and third are respectively 1/36, (35/36)/36 and $(35/36)^2/36$. For a $1 investment the expected profit is

$ 40/36 + 20(35/36)/36 + 10(35/36)^2/36 - 1 = \$0.91$.

Data and expected profits are shown in Table 3.

Table 3. Data and expected profit per $ bet.

Horse No.	Probability	Win	Return Second	Third	Expected Profit
2	1/36	$x40	$x20	$x10	$0.91
3	2/36	$x20	$x10	$x5	$0.88
4	3/36	$x12	$x7	$x4	$0.81
5	4/36	$x10	$x5	$x3	$0.87
6	5/36	$x7	$x4	$x2	$0.66
7	6/36	$x6	$x3	$x1	$0.53
8	5/36	$x7	$x4	$x2	$0.66
9	4/36	$x10	$x5	$x3	$0.87
10	3/36	$x12	$x7	$x4	$0.81
11	2/36	$x20	$x10	$x5	$0.88
12	1/36	$x40	$x20	$x10	$0.91

The expected profit is always positive, so with these odds a bookmaker would quickly go bankrupt. Also the return is greater for betting on the more extreme numbers, the horses less likely to win.

Ratrace—Stock Exchange

This aims to simulate investing on the stock exchange. Possible price indices are the numbers 2 to 12, simulated by throwing two dice. You have almost as many decisions to make as opponents, for each in turn throws the dice to decide that day's price index. Each day after the index is announced you have to decide whether to sell or wait for another day. However on the last day of trading you have to accept the return at the close of the market.

In Table 4 the profit for each index is indicated for a $100 investment. The probabilities assume 3 opponents in the game. The strategy I adopt is to accept the first positive profit available. So a loss of $100 will result from two consecutive throws of 7 or less followed by a 2. This happens with probability $(7/12)^2/36 = 0.009452$. A gain of $150 may result from obtaining an 8 on the first throw, or 7 or less followed by an 8, or two throws of 7 or less followed by an 8. This happens with probability

$$5/36 + (7/12)(5/36) + (7/12)^2(5/36) = 0.267168.$$

Proceeding in this way the probabilities in Table 4 can be calculated. The strategy yields an expected profit of $245.96. Readers may like to attempt to find a more profitable strategy. Nevertheless, the probability of not making a profit is less than 20% with my strategy. We always invest heavily in this stock exchange!

Table 4. Profit and probability corresponding to each price index.

Price Index	2	3	4	5	6	7	8	9	10	11	12
Profit	-$100	-$90	-$75	-$50	-$25	$0	$150	$200	$300	$600	$1100
Probability	.009	.019	.028	.038	.047	.057	.267	.214	.160	.107	.053

Dungeons and Dragons

Not being a player of this game myself, I must admit to imperfect understanding of its intricacies. My understanding is that characters may be constructed, and at one level of play, the degree of their skill, luck, experience and other attributes are determined each time by taking the sum of three dice when thrown. At a higher level the degree of each attribute is found by throwing four dice, and using the sum of the three largest.

Having seen me work out the probabilities for the sum of two fair dice, my thirteen year old thought I should be able to solve this important problem! So I derived the probabilities for the sum of the best two when three dice are shown, and we sat down together to work out the sum of the best three when four dice are thrown. With only a little help he worked out that there are 24 permutations of (a,b,c,d), 12 of (a,a,b,c), 6 of (a,a,b,b), 4 of (a,a,a,b) and only 1 of (a,a,a,a).

Now to obtain a total of 5 either the best three dice will be 1,1, and 3, and a smallest die of 1, and these will have 4 permutations, or the best three will be 1, 2, and 2, with 1 again smallest, and this will have 6 permutations. Our shorthand for this is
Sum: 5 . Possibilities: 1(1,1,3)[4] , 1(1,2,2)[6] .
Total: 10.

For a sum of 15 there are 131 possibilities. In our shorthand they are 1(3,6,6)[12] , 2(3,6,6)[12] , 3(2,6,6)[6] , 1(4,5,6)[24], 2(4,5,6)[24], 3(4,5,6)[24], 4(4,5,6)[12], 1(5,5,5)[4], 2(5,5,5)[4], 3(5,5,5)[4], 4(5,5,5)[4], 5(5,5,5)[1].

Proceeding in this manner we produced all the probabilities, with each of us occasionally correcting the other. These are shown in Table 5 along with the three dice probabilities.

Table 5. Comparison of p_1, the probabilities of the sum when three dice are thrown, and p_2, the probabilities of the sum of the largest three when four dice are thrown.

Sum	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1296 p_1	6	18	36	60	90	126	150	162	162	150	126	90	60	36	18	6
1296 p_2	1	4	10	21	38	62	91	122	148	167	172	160	131	91	54	21

We graphed these, and my thirteen year old correctly interpreted the shift to the right, answering correctly what will the graph of the sum of the best three from five dice thrown look like? and what will the graphs of the sum of the three smallest dice when four or five dice are thrown look like?

Incidentally these curves look like a natural way to introduce the idea of skewed distributions, and suggest how to deal with kurtosis. But such matters are not of immediate interest to players of Dungeons and Dragons!

BOOK REVIEW
by P. Colin Cryer
"Methodological Issues for Health Care Surveys", by Brenda G. Cox and Steven B. Cohen. Marcel Dekker, Inc., New York, 1985. Price $US78.00 (outside USA).

The preface to this book states that: 'This book is written primarily for health care professionals who wish to learn more about methodological issues associated with health care surveys.' It is not a first text in survey methods for those working in the health area. It only touches on some areas of sample design and methods of analysis of survey data and effectively gives little consideration of questionnaire design. Rather, it is a vehicle for the authors to discuss some methodological issues that have arisen in two major health surveys in the USA, the 1977 National Medical Care Expenditure Survey (NMCES) and the 1980 National Medical Care Utilization and Expenditure Survey (NMCUES).

The authors consider the book to be loosely divided into three parts: sample design issues, missing and faulty data concerns and analysis considerations. The sample design issues include an overview of sample design, a discussion of the effect of different sampling units (individual versus dwelling unit) in the context of the above surveys, the effect of different survey organisations on the outcome, consideration of an optimal allocation problem and an investigation of the discrepancy between survey responses and documented data. Missing and faulty data concerns includes some of the analysis strategies that are available for dealing with nonresponse, incomplete response, inadequate frames, etc. These include the development of weights and imputation procedures. The final part of the book, which deals with analysis, includes consideration of variance estimation and some of the variance approximation strategies for survey estimates, a brief summary of some of the methods of analysis including indications of how to incorporate appropriate variance estimates, consideration of particular analysis problems when dealing with family units and finally a study of some alternative methods for obtaining estimates for small areas based on national survey data and auxiliary small area information.

The book is interesting for several reasons. Not only does it discuss cross-sectional surveys but also longitudinal surveys. A longitudinal design has been employed in the NMCES and the NMCUES in order to reduce recall bias, i.e. health behaviour and expenditure over one year is obtained by administering a questionnaire approximately every 12 weeks to respondents and details of their behaviour in the previous 12 weeks obtained rather than trying to obtain valid data for the whole one year period at one interview. The advantages and some problems are discussed. Additionally, the extensive sections on imputation and variance estimation look very useful. I am an occasional user of the survey method and having a text with these procedures easily accessible will be useful.

On the other hand, certain aspects of the book are disappointing. With regard to sample design and analysis, it concentrates on only a few issues to which it gives extensive treatment, e.g. choice of sampling unit, the effect of the survey organisation on the outcome, optimal allocation of resources. Some of these read

more like a research report rather than a text book for health professionals. The messages imbedded in this work are relevant to fields other than health; however, the amount of space dedicated to them does seem excessive when one considers the amount of information provided. As stated, the consideration of variance estimation is quite extensive; however, the description of the other aspects of analysis are quite brief. I am uncertain how useful they would be to the stated audience. Since the text does not systematically address basic issues of survey methodology, I was disappointed to find that the reader was not directed to texts where discussion of many of the issues omitted or only touched upon could be found.

I doubt whether, in the New Zealand context, this book is likely to be accepted by health professionals. However, it is likely to be useful as a reference text for those (statisticians) with some survey experience who need to know more about, for example, imputation and variance estimation, or for those who want some insight into some of the problems encountered in health care surveys.

PROFESSOR PETER WHITTLE TO VISIT NEW ZEALAND

Professor Whittle, Director of the Statistical Laboratory at the University of Cambridge, will shortly be holidaying in New Zealand. One of the most distinguished mathematicians to have graduated from Victoria University of Wellington and the DSIR Applied Mathematics Division, Professor Whittle is internationally famous for his contributions to Time Series Analysis, and more recently to Optimisation and Stochastic Equilibrium in Operational Research.

Professor Whittle will be giving three talks at Victoria University of Wellington:

(i)   Tuesday 6 May 1986, 1-2 p.m.
      Room HM1, Hugh Mackenzie Building, VUW
      OPTIMAL ROUTING IN NETWORKS OF
      QUEUES

The optimisation of design for a queueing network suggests adaptive routing rules for the network, which have good properties. The differing concepts of social, individual and bureaucratic optimisation emerge naturally.

(ii) Wednesday 7 May 1986, 1-2 pm
      Room HM1, Hugh Mackenzie Building, VUW
      TRACTABLE MODES OF INTERACTION
      IN MULTI-COMPONENT SYSTEMS

Simple statistical-mechanical models, queueing networks, and models in which otherwise independent events are linked by an 'excitation' variable will be reviewed. Particular attention will be made to models of resource induced ecological competition, a stochastic version of the 'principle of competitive exclusion', and an extremal characterisation of the surviving species.

(iii) Friday 9 May 1986, 12.30-1.30 pm
      ISOR Seminar Room, 42 Kelburn Parade,
      VUW
      RECENT DEVELOPMENTS AT
      CAMBRIDGE

An informal talk outlining current work and research interests. Bring your lunch. Tea and coffee will be available.

His visit to Wellington is co-sponsored by...
Victoria University of Wellington Mathematics
    Department and the Institute of Statistics and
    Operations Research
DSIR Applied Mathematics Division
Operational Research Society of New Zealand
New Zealand Statistical Association
For further information contact...
Tony Vignaux, ISOR, VUW, tel:(04)721-000/ext.998
Bruce Benseman, AMD, DSIR, tel:(04)727-855/ext.842

ANNUAL CONFERENCE, June 24-26, 1986, Victoria University of Wellington

Planning for our association's 37th Annual Conference is underway with our President and two or three trusty helpers nobbling speakers. If you haven't been nobbled and wish to present a paper in the general sessions contact:
    Garry Dickinson
    Department of Statistics
    Private Bag
    Wellington.   Telephone (04) 729-119
Or, if you wish to present a paper in the Medical Statistics session contact:
    Colin Cryer
    Dept of Community Health
    Clinical School
    Wellington Hospital
    Wellington 2.   Telephone (04) 855-959

Definite and tentative speakers to date include: J. A. John (University of Southampton via AMD, Mt Albert and the Deming Institute), C. M. Triggs (AMD, Mt Albert), B. F. Manly (University of Otago), C. J. Thompson and M. K. Mara (AMD, Wellington), J. H. Maindonald (AMD, Mt Albert), P. J. Thomson (VUW, Wellington), M. A. Jorgensen (University of Waikato), D. Esslemont (Massey University), R. J. Marshall (University of Auckland) and R. H. Morton (Massey University).

The executive committee have decided to charge a nominal registration fee for this year's conference. Conference participants will be asked to pay a fee of $10 to help recover the cost of the three day conference. The 1984 conference cost $715 (Room hire was $300, Morning and Afternoon Teas were $315 and the Evening Social was $100). While some members may deplore this development, it should be remembered that many New Zealand professional societies charge a hefty fee for their annual conference and require the conference to pay for itself. In the past, the NZSA conference has been subsidised by those members who have been unable to attend and by the modest profits (resulting from a huge amount of voluntary organisational work) from the calculator, microcomputer and software displays. The executive committee feel that the conference should be run on a user-pays principle and that money raised from special projects, such as software displays and the publication of the casebook, should be used to seed new projects.

UNIVERSITY OF OTAGO
Dunedin, New Zealand
LECTURER IN STATISTICS
or
ASSISTANT LECTURER IN STATISTICS

Applications are invited for appointment to a position of Lecturer or Assistant Lecturer in Statistics in the Department of Mathematics and Statistics. Applicants should be prepared to take up the position on or after 1 February 1987. The University will provide direct, excursion-rate fares and a contribution towards removal expenses.

Salary:
Lecturer: $28,000-$35,000 per annum
Assistant Lecturer: $20,000-$24,000 per annum

Intending applicants are invited to write for further particulars, available from the undersigned, P.O. Box 56, Dunedin.

Applications quoting reference number A86/15 close in Dunedin on 30 June 1986.

D.W. Girvan
REGISTRAR

ERRATATA

The previous issue of the newsletter contained a short report, by someone who wasn't present, on a Wellington Regional Meeting of the association. It was mistakenly reported that David Harte spoke about a CUSUM program. In fact, David spoke about a BASIC program that evaluates the operating characteristics of multistage sampling plans. The program can be used to compare various sampling schemes. The user gives the acceptance and rejection numbers and the sample sizes at each stage. Then given a certain fraction defective, the program will calculate the probability of acceptance under the specified sampling plans. The numbers of defectives can be assumed to have a Normal, Poisson, Binomial, Hypergeometric, Beta-Binomial or Negative Binomial distribution. For both the Beta-Binomial and Negative Binomial distributions, the value of an additional parameter needs to be given. This might be useful when defectives occur in clusters. For further information or a copy of the program contact:

David Harte
Biometrics Section
MAF
Private Bag
Wellington

The news items also intimated that Bill Armstrong might be planning further lunchtime meetings in Wellington. This is very unlikely as Bill is now working for DMS/CSIRO in Clayton, Victoria, Australia!

NEWS FROM SAS INSTITUTE (NZ)

Approximately 2,600 people attended the 11th Annual SAS User Group International Conference in Atlanta, USA, February 9-12. New Zealand was represented by four members of the local SAS Institute Office, Bevan Mutch, Steven Mayo-Smith, Colin Harris and Terry Friel as well as Anne Owens from Air New Zealand.

At the opening address, SAS Institute President Jim Goodnight announced a number of new developments.

For mainframe users, the most significant development was the announcement of an enhanced release of Version 5 of the SAS System under OS and CMS. This release features support for user-written procedures in FORTRAN and C, a native device driver for IBM's 3179G graphics terminal that requires no additional software, and animation and graphics capabilities for SAS/AF applications.

New produce announcements began with the unveiling of SAS/SHARE software. This new product, which will be available later this year, permits users to simultaneously access the same SAS data library. For example, one user can perform data entry while another prepares a report based on the same data.

SAS/QC software, a statistical quality control package was also featured during the new products presentation. With this product, users can organise and analyse data, create charts that demonstrate when processes are within specified control limits and produce reports to provide that information to staff responsible for quality control. Working together with the graphics capabilities of SAS/GRAPH software, SAS/QC software can also present high resolution graphic output.

For minicomputer users, Dr Goodnight announced support for the SAS System on Digital Equipment Corporation's (DEC) MicroVAX II computer running under MicroVMS, as well as micro-to-host communications linking PC's with the DEC VAX series of minicomputers.

The SAS System for personal computers was also highlighted during the opening session. Joining base SAS software for the PC were SAS/STAT software, which features the statistical procedures; SAS/IML software, an interactive matrix programming language and SAS/RTERM software, a stand-alone terminal emulation package for high-resolution, hard copy graphics from personal computer screens.

Approximately 190 papers were presented at the Conference and 32 of these were in the Statistics category. There was also a huge demonstration area where attendees were given a close-up look at new SAS software products while vendors displayed the very latest in computer hardware. A new feature of this year's conference was the Problem Solving Booth where anyone could discuss a particular SAS problem with one of the Institute's developers. This proved very popular and local SAS Institute General Manager, Steven Mayo-Smith says he hopes to provide something similar at this year's NZ conference.

Overall the Conference was a great success and for those who might wish to attend SUGI 12 next year, it has been scheduled for February 8th to 11th in Dallas, Texas.

NEWS FROM AMD/DSIR

Jocelyn Dale (AMD, Mt Albert) is spending April in Australia with DMS/CSIRO. Donal Krouse has joined the Industrial Statistics Section in Wellington and Phillipa Safey has left the Lincoln Substation to continue music studies in Melbourne.

NEWS FROM INVERMAY A.R.C. AND WELLINGTON MAF

Ken Dodds has recently joined the MAF Biometrics Section at Invermay, replacing Stuart Crosbie as a consulting statistician. Ken graduated from the University of Otago with a BSc(Hons), and has just completed his PhD at North Carolina State University.

His thesis research, under the direction of Dr Bruce Weir, investigated resampling methods in genetics and the effect of family sampling in genetics. His research interests include Population and Quantitative Genetics.

Murray Jorgensen is leaving the MAF Biometrics Section in Wellington to take up a Senior Lectureship in Statistics in the Mathematics Department at the University of Waikato. Murray has been with the Biometrics Section since 1974.

DEADLINE FOR NEXT ISSUE

The deadline for submitted material for the July, 1986 issue of this newsletter is July 11. Please send all notices of seminars, news items, letters-to-the-editor, etc. to...

John Reynolds,
Newsletter Editor,
AMD/DSIR,
P.O. Box 1335,
Wellington.

The deadline for "News and Announcements" for the May, 1986 issue of *The New Zealand Statistician* is May 1.

OVERSEAS CONFERENCES

Statistical Methods in Medicine and Pharmacology

Sponsored by the Nordic Region of the Biometric Society this conference is to be held in Koge, Denmark, October 6 to 8, 1986. For further information write to Philip Hougaard, Biostatistical Department, Novo Research Institute, DK-2880 Bagsvaerd, Denmark.

42nd Annual Conference on Applied Statistics

To be held in Newark, New Jersey, USA, December 3 to 5, 1986. For further information write to W. R. Young, Medical Research Division, American Cyanimid Company, Building 60, Room 203, Pearl River, NY 10965, USA.

Second International Conference on Quantitative Genetics

To be held in Raleigh, North Carolina from May 31 to June 5, 1987. The conference is planned to survey advances in Quantitative Genetics since the First International Conference held in Ames, Iowa in 1976.

The programme will include sessions in: Animal Breeding, Ecology, Evolution, Forestry, Human Genetics, Molecular Genetics, Plant Breeding, Mathematical and Statistical Aspects.

The conference will form part of the Centenary Celebrations of North Carolina State University and will also provide an opportunity to mark the 65th birthday of *C. Clark Cockerham* and recognize his contributions to Quantitative Genetics.

For further information write to:
Dr B. S. Weir
Department of Statistics
North Carolina State University
Box 8203
Raleigh, NC 27695-8203
USA.

American Statistical Association/Biometric Society

The 1987 joint meeting is to be held August 17-20, in San Francisco, California. For further information write

to ASA, 806 15th Street, N.W., Washington DC, 20005, USA.

MOVING?

Members are requested to notify the Treasurer, NZSA, P.O. Box 1731, Wellington of any change of address in order that newsletters and journals (and subscription reminders) can continue to be despatched to them.

A CALL FOR NOMINATIONS AND A CALL FOR SUGGESTIONS

Members are invited to submit written nominations for the positions of President, Secretary, Treasurer, five Committee Members and one Corporate Members' Representative to the Secretary of the association. Nominations should include the signatures of the nominator and seconder and the consent of the nominee. Written nominations should reach the Secretary by June 13, 1986. Nominations will also be received from the floor at the AGM.

Nominees whose written nominations are received before May 9, 1986 are invited to include, with their nomination, position statements for publication in the 'News and Announcements' section of the Conference issue of *The New Zealand Statistician*. Association members not seeking office are also invited to send the editor suggestions, for publication (either in this section or in the letters-to-the-editor section), on future directions for this association. Are there new areas the association should be moving into such as the organisation of up-market "continuing education courses" for statisticians and semi-numerate nonstatisticians, the publication of textbooks for secondary and tertiary institutions, the publication of a New Zealand Review of Statistical research, and, lobbying science planning committees?

SCIENCE IN A CHANGING SOCIETY— 56TH ANZAAS CONGRESS

The Australian and New Zealand Association for the Advancement of Science (ANZAAS), The Royal Society of New Zealand, and, Massey University are organising the 56th ANZAAS Congress to be held in Palmerston North from 26-30 January, 1987. Scientific and professional associations are being encouraged to hold specialised meetings within the ANZAAS framework or immediately prior to, or following the Congress.

The theme for the Congress is "Science in a Changing Society" and a series of nine "Interest Groups" have been set-up for programming purposes. The groups and their co-ordinators are:

Physical, Mathematical and Communication Sciences
Dr Ian Watson
Department of Chemistry and Biochemistry
Massey University

Technological and Biochemical Sciences
   Dr Gordon Robertson
   Department of Food Technology
   Massey University

Biological Sciences
   Professor Robert Anderson
   Faculty of Agriculture and Horticulture
   Massey University

Health Sciences
   Professor Nancy Kinross
   Department of Nursing Studies
   Massey University

Social Sciences
   Professor Graeme Fraser
   Department of Sociology
   Massey University

Environmental Sciences
   Dr Richard LeHeron
   Department of Geography
   Massey University

Community Sciences
   Dr Graham Russell
   Applied Biochemistry Division, DSIR
   Private, Bag, Palmerston North

Education Sciences
   Professor Donald Bewley
   Centre for University Extramural Studies
   Massey University

Youth ANZAAS
   Mr Owen Shaw
   Liaison Officer
   Massey University

For further information or suggestions for the proposed group programmes, contact the group co-ordinators.

Invited speakers to date include: Hon. Barry O. Jones (Minister of Science, Australia and author of "Sleepers, Wake!"), D. C. Gajdusek (Epidemiologist and Nobel Prize Winner), and, a well-known carpet-fibre-wrestler and plant-food consultant. For a copy of the first circular, which includes an outline programme of the Congress Symposia which are inter-disciplinary sessions distinct from the group programmes, write to:

Dr Michael Baxter
Organising Secretary
56th ANZAAS Congress
P O Box 5158
Palmerston North
New Zealand