

statistical  
society of  
australia

# newsletter

29 february 1988

number 42

## THE NATIONAL MATHEMATICAL SCIENCES CONGRESS

**C.C. Heyde**

*Congress Director, Australian National University*

The 9th Australian Statistical Conference and the 32nd Annual Meeting of the Australian Mathematical Society are being subsumed by the (Bicentennial) National Mathematical Sciences Congress which will take place at the Australian National University, Canberra from the 16-20 May 1988. This will be a broad spectrum conference, the first of its kind to be held in Australia. Its aim is to highlight developments and achievements, with an emphasis on Australian contributions, as well as to encourage communication between mathematical scientists of different specializations.

The Congress has been arranged through the National Committee for Mathematics of the Australian Academy of Science with the Australian Mathematical Society and the Statistical Society as the principals. The Australian Society for Operations Research, the Australian Regional Committee of the Biometric Society, the Australian Association of Professors of Computer Science and the Combinatorial Mathematics Society of Australasia are also cooperating. In addition, official delegates are being sent by the London Mathematical Society, New Zealand Mathematics Association, Royal Statistical Society and Society for Industrial and Applied Mathematics.

The framework for the Congress is based on programmes organized in parallel by the SSA and AMS but with a common set of plenary lectures.

Plenary lecturers include R.J. Baxter (ANU), J. Coates (Cambridge U.), W. Cleveland (Bell Laboratories), J. Gani (U. California, Santa Barbara), G.H. Golub (Stanford U.), R.B. Melrose (M.I.T.), J.A. Nelder (Imperial College).

Invited lectures for the Statistical Society Programme include: R.J. Adler (Technion), T.C. Brown (U.W.A.), G.K. Eagleson (C.S.I.R.O. and U. N.S.W.), D. Ford (U. Washington), J.H. Friedman (Stanford U.), J. Hajnal (L.S.E.), J. Hartigan (Yale U.), G. Morgan (Morgan Gallop Polls), T.M.F. Smith (Southampton U.), J. Tukey (Princeton U.).

Contributed paper and poster sessions will, in addition, make up a major part of the proceedings. Joint activities with AMS include a Session on Mathematical Sciences in Industry (speakers W. Armstrong, N.G. Barton) as part of a day with emphasis on Operations Research.

Those wishing to present papers should submit an abstract by 29 February 1988 to the Congress Director, Professor C.C. Heyde, Department of Statistics, Institute of Advanced Studies, Australian National University, GPO Box 4, Canberra ACT 2601 (Phone (062) 49 3697). Individuals who miss the deadline for abstracts and wish to contribute a paper should contact Professor Heyde as early as possible.

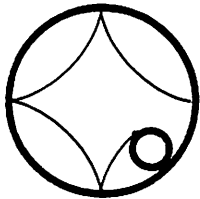
Activities associated with the Congress include possible continuing education courses and a Workshop on Statistical Methods for the Analysis of Life History Data (14-15 May). Expressions of interest on possible

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*The views of contributors to this Newsletter should not be attributed to the Statistical Society of Australia.*



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*For further information please contact*

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**W.A. Regional Manager**  
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topics for continuing education courses are being sought. One possible topic is Log-linear Models.

Courses would occupy half a day and would give the attendee a basic understanding of the topic, together with references for further reading and knowledge of computer software suited for use in the area. Enquiries should be directed to Dr K. Russell, Biometry Section, Department of Agriculture, PO Box 500, East Melbourne Vic. 3002 (Phone (03) 651 7718).

The Workshop on Statistical Methods for the Analysis of Life History Data (14-15 May) is being organized by the Medical Sciences Section of the Society. The principal speaker will be N. Keiding (U. Copenhagen)

## MACQUARIE UNIVERSITY

### STATISTICAL GRAPHICS COURSE

Dr W.S. Cleveland, a statistical scientist from AT&T Bell Laboratories in Murray Hill, New Jersey, will be presenting a two-day course in Statistical Graphics at Macquarie University on Friday 13 and Saturday 14 May 1988.

This course will cover recent developments in Statistical Graphics and will involve hands-on use of modern computers. Some knowledge of statistical methods will be assumed. The course cost is \$425 and the enrolment is limited to 30.

For further information call Professor Don McNeil or his secretary (Mrs Aldridge or Mrs Olliffe) on (02) 805 8553 or 8554 or 8555.

who will discuss modern methods for the analysis of data on the evolution of life history events. Contributed papers on related subjects, such as survival analysis or longitudinal studies, are being sought. The cost, including lunch, morning tea and afternoon tea on both days, will be \$125 (\$50 for students). Enquiries should be directed to Dr J. Hopper, University of Melbourne, Faculty of Medicine, Epidemiology Unit, 151 Barry Street, Carlton Vic. 3053 (Phone (03) 344 6990/6991).

Registration for the Congress is being handled by the NMSC Secretariat, Capital Conferences Pty Ltd, PO Box E345, Queen Victoria Terrace, Canberra ACT 2600 (Phone (062) 85 2048).

## NEW SOUTH WALES BRANCH

### Andrews' Plots

The Christmas meeting of the Branch on 24 November heard Dr Agnes Herzberg (Imperial College) speak on *Graphical Data Analysis: Some Applications and Generalizations of Andrews' Plots*.

Dr Herzberg first gave an historical survey of graphical multivariate clustering techniques ranging from glyphs, ideographs, triangles to castles and trees. After describing Andrews' function plots several applications were provided.

The second part of the talk concerned the use of Andrews' plots to study variation over time. Examples included temperatures in Britain and US unemployment data. These illustrated the method as a technique for the examination of changes over time in the parameters of a time series model and for the detection of outliers.

Finally, modifications and extensions were described, in particular the effect of omitting a variable and the use of alternative orthogonal systems.

## Log-linear Models for Survey Data

The final meeting of the Branch for 1987 was addressed by Professor Alastair Scott (University of Auckland) on *Log-linear Models for Survey Data*.

The main theme was that standard analyses may be very inadequate when data arise from a sampling

scheme involving stratification or clustering, rather than from a simple random sample.

The procedure and null distribution for testing independence in a two-way table were covered in detail. Corrections were provided for the output obtained from standard analysis programs which ignore the sample structure.

## VICTORIAN BRANCH

### Sequence-slotting

Dr Malcolm Clark of Monash University spoke at the October 27 meeting on the topic *Sequence Slotting, Time-warps and Travelling Salesmen*. His talk was centered on the problem, common in the earth sciences, of comparing or amalgamating two or more sequences of measurements, subject to constraints on the order of the observations within each sequence. Several very efficient algorithms using dynamic programming techniques have been devised for this problem, which may also be regarded as a special case of the travelling salesman problem. Such algorithms produce an optimal solution, no matter what data are used; hence some statistical procedure is needed to assess how well any given pair of sequences are matched.

Dr Clark described a simple randomisation test for doing this, based on re-matching randomly-selected sub-sequences of the original full sequences. This test was demonstrated by applying it to several sets of data, including some intriguing data on the wobble of the earth's spin axis relative to its crust. The test appears to work well, and is particularly useful in situations where standard time-series methods cannot be used.

### Belz Lecture

Dr Richard Jarrett, Director of the Statistical Consulting Centre at the University of Melbourne gave the 1987 Maurice H. Belz Lecture on November 24, with the title *Statistics - the way forward*.

In his address Dr Jarrett focused on statistics in relation to the research worker, the student and the workplace. In the face of often negative reactions to the usefulness of statistics (and statisticians!) he emphasised the need for statisticians to become more involved in research problems, ideally as joint researchers, and especially in following through the work so that results lead to action. Statisticians need to become better communicators, with the ability to sell themselves and the work they can do.

Students of statistics will need greater preparation for consulting, and specific help to develop the interpersonal skills needed for this task. Students of disciplines that use statistics need to be on to the value of statistical methods. Above all else they require a good appreciation of the common-sense approach of statistics in dealing with the variation that is inherent in data.

In the workplace statistics can help in the quest for improved productivity and efficiency, but it is the responsibility of management to provide the necessary environment in which people with different responsibilities can contribute cooperatively to improvements. The work of Shewhart, Deming, Joiner and Taguchi is relevant here.

In all these areas, *the way forward* will be more successful if there is deeper involvement of statisticians in research, education and management so that statistical thinking becomes the norm rather than the exception.

## SOUTH AUSTRALIAN BRANCH

### Cancer registry data

In November the Branch was treated to an extensive display of trends in incidence and mortality rates for various types of cancer from the Cancer Registry.

David Roder, Director of Epidemiology for the S.A. Health Commission guided members through this wealth of data adding an intriguing and interesting array of comments and comparisons with rates for other diseases and for other countries. The extended question time reflected the wide ranging interest generated by the topic.

### Student success at University

The final speaker for 1987 was Margaret Meyler from the Economics Department at the University of Adelaide. Margaret presented some preliminary results from work done at the University of Adelaide relating both success at first year University and completion of a degree to performance in matriculation subjects. Two techniques were described viz. discriminant analysis and CART (classification and regression tree analysis).

With the rising demand for tertiary places in Australia, student selection assumes ever greater importance. The need to select students who will benefit appropriately

from their studies and to exclude those whose chances of success are small becomes increasingly pressing. It is very important to do this in a way which is seen by the community at large to be 'fair'. Suggestions based on the findings of Power and Robertson or those of Dunn and West and other authors, that girls or members of certain social classes, ethnic groups etc., should be given advantage in the selection procedures are not always welcomed by other kinds of aspiring students or their parents.

It is the case though, that a matriculation score alone is not a very reliable instrument for choosing students who will succeed. The attrition rates and failure rates provide abundant evidence of this. There is also the problem of the Type II error of selection, that is, how many potential students who did not gain a University place could have been successful if admitted? We have no way of knowing this while we adhere to the conventional selection methods. The group of people who just miss out on selection, because their matriculation scores were marginally too low, certainly contains some who would do well at University given the chance. Refinement of selection techniques would benefit these individuals, and indeed could be regarded as benefiting people who fail after admission using current criteria and who would be correctly excluded under an improved scheme.

The data from students enrolled since 1980 provided the basis for the analysis. Whilst discriminant analysis produced an interesting mixture of expected and

unexpected results (e.g. Matric Math1 predicts success in almost all degrees) there were in these data violations of the assumptions underlying the technique. Consequently Margaret has commenced to use the CART approach which she outlined to members. Work with this technique was in the very early stages and only a few preliminary but encouraging results were available.

## Annual barbecue and wine bottling

On Sunday 13th December members found the best way to deal with the heat was to relax under the trees at John and Rosemary Field's home. In a leisurely fashion, members bottled and sampled 125 litres of the SSASA 87 red and 125 litres of the SSASA 87 white while they ate their steaks and sausages and reflected on the happenings of 1987.

## Diagnostic Statistics in Regression

On Wednesday, October 14th, Dr Tony Robinson of the University of Bath spoke on the topic *Was linear regression ever simple*. Dr Robinson looked at the use of certain ancillary statistics (VIFs,  $C_p$ , DFFITs, and such) in model selection and for checking the assumptions underlying linear regression. He also discussed the importance of including some of these statistics in output from regression packages. The talk concluded with a lively discussion on the general usefulness of such statistics.

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## CANBERRA BRANCH

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### Seminar on analysis of survey data

The Branch held a one day seminar on the *Analysis of Survey Data* on Monday 23 November 1987. The main speaker was Professor Alastair Scott of the University of Auckland, who presented lectures on the analysis of contingency tables and the fitting of discrete multivariate models (log-linear, logistic) to sample survey data based on clustered sampling of clustered populations. The other speakers were Dr David Steel of the Australian Bureau of Statistics, who spoke on the problem of ecological inference with survey data, and Dr Ray Chambers of the Australian Bureau of Agricultural and Resource Economics, who spoke

about techniques for fitting linear regression models to stratified survey data with non-response.

### Knibbs lecture

Professor Scott also gave the Branch's annual Knibbs lecture on Tuesday 24 November on *Interpreting Confidence Intervals for Opinion Polls*. In his lecture Professor Scott looked at the various methods used by opinion polls to give an indication of the likely extent of sample error. He then focussed on the standard method used to derive a confidence interval for a single binomial proportion, and showed that such intervals also have high simultaneous coverage properties.

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## QUEENSLAND BRANCH

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### Experience as a statistical expert witness

On October 22, Dr Richard Tweedie addressed our branch on the intriguing topic *But you admit it is multi-modal...!* He discussed some of his experiences in the unenviable job of expert witness, often defending the sound scientific basis of variation, randomness,

errors and bias - all of which are seen legally as difficult and often unsound concepts. In one instance, the court's decision did not seem very sensible because of the silly questions being asked of the statistician. In another example the statistical investigation resulted in the client winning the case by settling out of court. It was advocated that statisticians should be appointed as 'friends of the court', rather than be solicited from one

side or the other.

Richard was previously Managing Director of SIROMATH, but has now accepted a challenging position as Foundation Professor of Information Science at the Bond University on the Gold Coast. We wish him well in this new venture and welcome him to the Queensland Branch of the Statistical Society.

## Statistical methods in quality

*Quality by the numbers* was the title of Mr Ian Ogle's talk on November 30. Ian is from the Department of Mathematics and Computing at the Queensland Institute of Technology and he gave a general non-technical look at the application of statistics ... the role of the statistician ... within the philosophy of 'company wide quality and achievement'.

Ian clearly defined quality and the importance of the fundamental principle of reducing variation to improve quality. By emphasising total quality in the business world, statistics is identified as a key tool. This results in a new role for statisticians who must also understand the management issues involved. Statisticians need to understand their jobs broadly so that there is increased interaction with the outside world. They can be leaders and facilitators to managers, scientists, engineers and product workers to achieve a statistically minded generation.

## Regression analysis of relative survival rates

Professor T. Hakulinen, of the Finnish Cancer Registry, in Helsinki, Finland addressed our final meeting for 1987 on December 14. The relative survival rate is defined as the survival rate of cancer patients when deaths due to other causes of death than the cancer of the patients have been eliminated. For its calculation the actual causes of death of the patients are not needed. Instead, general population life tables, routinely available in almost every developed country, are employed. A generalization of the well-known Cox' proportional hazards regression method using the GLIM package was developed for quantification of the impact of various prognostic factors on the relative survival rate.

Using data on over five thousand lung cancer patients diagnosed and reported in Finland in 1968-1970, Professor Hakulinen illustrated the new method. It provides a convenient analysis and a parsimonious description of the results, especially if, e.g., due to confidentiality laws or to poor quality of data on causes of death, the traditional cause-specific analysis cannot be used. Some interesting points about the necessary follow-up time for cancer patients were identified in that some need periods of up to 10 years.

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## MISCELLANEA

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### Back Copies of *Australian Journal of Statistics*

The Society is offering to members, for a limited period of time, back copies of the *Australian Journal of Statistics* at much reduced rates. Volumes 13-21 are available to members at a cost of \$12 per volume, or \$90 for all nine volumes. Subsequent volumes are available at the same price, provided the order is linked to a set of these earlier issues. Payment must accompany the order.

Single copies are available at \$6 per issue for Volumes 13-21, \$8 for Volumes 22 onwards.

Orders and payment should be sent to:

Dr D.J. Daley, Secretary-Treasurer  
Australian Statistical Publishing Assoc. Inc.  
Statistics Department, I.A.S.

A.N.U., G.P.O. Box 4,  
Canberra, ACT 2601.

### Want to be a Statistician?

As a follow-up to the Careers in Statistics booklets, the SSA has produced a leaflet *Want to be a Statistician?* which will be more widely distributed than the booklet. If you are interested in seeing a copy or want copies to distribute at your own place of employment, please contact your Branch Secretary.

The leaflets will be distributed to schools, universities, public libraries (especially local government libraries) and the media. They look very professional and should stimulate a lot of interest in statistical careers. Jim Douglas has been mainly responsible for the leaflets and the Society is very appreciative of his efforts.

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## CONFERENCES

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### ICOTS 3 - August 1990

The Third International Conference on the Teaching of Statistics (ICOTS3) will be held in Dunedin, New Zealand, 27-31 August 1990.

Further information can be obtained from: The Secretary, ICOTS3, Department of Mathematics and Statistics, University of Otago, PO Box 56, Dunedin, New Zealand.

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## VISITORS

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*The details in this section are laid out in the order: visitor's name; visitor's home institution; whether accompanied or not; areas of interest; date of visit; host institution; principal contact.*

Dr W. Schucany; Southern Methodist University, Dallas; ; September 1987 - June 1988; ; ANU; Professor C.C. Heyde.

Dr Paul Feigin; Technion, Israel; ; August 1987 - August 1988; stochastic processes, industrial statistics; CSIRO DMS; Ms A. Johnstone.

Professor David Matthews; University of Waterloo; wife and child; 10 January - 31 July 1988; University of Newcastle; Associate Professor R. Gibberd.

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## OVERSEAS CONFERENCES

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SAS User's Group International Meetings, 27-30 March 1988, Orlando, Florida, USA.

Information: SAS Institute Inc., Box 8000, Cary NC 27511, USA.

International Meeting on the Analysis of Multiway Data Matrices, 28-30 March 1988, Rome, Italy.

Information: "Multiway '88", Department di Statistica, Probabilità e Statistiche Applicate, Univ. "La Sapienza", P. le A. Moro 5, 00185 Rome, Italy.

Applications of Statistics in Medicine, 11-12 April 1988, Cardiff, Wales.

Information: The Secretary and Registrar, The IMA, Maitland House, Warrior Square, Southend-on-Sea, Essex SS1 2JY, England.

42nd Annual Quality Congress, 9-11 May 1988, Dallas, Texas, USA.

Information: Shirley A. Halladay, American Society for Quality Control, 230 W. Wells Street, Milwaukee, WI 53203, USA.

Annual Meeting, Statistical Society of Canada, 5-8 June, 1988, Victoria, British Columbia.

Information: A.J. Petkau, Dept. of Stat., Univ. of British Columbia, Vancouver, B.C., Canada V6T 1Y4; or R.R. Davidson, Dept. of Math., Univ. of Victoria, Victoria, B.C., Canada V8W 2Y2.

Twelfth Nordic Conference on Mathematical Statistics, 6-10 June 1988, Turku, Finland.

Information: L. Nordberg, ABO Akademi, SF-20500 Turku, Finland.

8th International Symposium on Forecasting, 12-15 June 1988, Amsterdam, Netherlands.

Information: Jan G. de Gooijer, General Chairperson, Faculty of Econ., Univ. of Amsterdam, Jodengreestraat 23, 1011 NH Amsterdam, Netherlands.

International Biometric Conference, 18-23 June 1988, Namur, Belgium.

Information: E. Feytmans, International Biometric Conference, Centre de Rencontres, Rue de Bruxelles, 53, B-5000 Namur,

Belgium.

International Conference on Biomathematics, 25-30 June 1988, Xi'an, China.

Information: Professor Lansun Chen, Mathematical Institute, Chinese Academy of Sciences, Beijing, The People's Republic of China.

Third International Congress on Computational and Applied Mathematics, 25-30 July 1988, University of Leuven, Belgium.

Information: F. Broeckx, R.U.C.A., Middelheimlaan 1, B-2020 Antwerpen, Belgium.

Institute of Mathematical Statistics Annual Meeting, 14-18 August 1988, Fort Collins, Colorado, USA.

Information: Lynne Billard, Program Secretary, Dept. of Stat. and Computer Science, Univ. of Georgia, Athens, GA 30602, USA.

IMS Symposium on Probability and its Applications, 16-19 August 1988, Fort Collins, Colorado, USA.

Information: R.L. Taylor, Program Chairman, Dept. of Statistics, Univ. of Georgia, Athens, GA 30602, USA.

1988 Joint Statistical Meetings, 22-25 August 1988, New Orleans, Louisiana, USA. Co-sponsored by American Statistical Association, Biometric Society (ENAR, WNAR).

Information: ASA, 1429 Duke Street, Alexandria, Virginia 22314-3402, USA.

COMPSTAT '88 8th Symposium on Computational Statistics, 29 August - 2 September 1988, Copenhagen, Denmark.

Information: Niels E. Raun, Secretary, UNI-C, Vermundsgade 5, DK 2100 Copenhagen, Denmark. Computermail: COMPSTAT@DKCCRE01.BITNET.

9th Scientific Meeting of the International Society for Clinical Biostatistics, ICSB-9, 29 August - 2 September 1988, Innsbruck, Austria.

Information: Honorary Secretary Dr J. Seldrup, Ciba-Geigy Pharmaceuticals, Wimblehurst Road, Horsham, West Sussex, RH124AB, UK.