THE NEW ZEALAND
MATHEMATICAL SOCIETY (INC.)

NEWSLETTER

CONTENTS

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PUBLISHER'S NOTICE

The Newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was assembled at the University of Auckland and offset printed in Dunedin. The official address of the Society is:

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c/o The Royal Society of New Zealand,
P O Box 598, Wellington, New Zealand.

However, correspondence should normally be sent directly to the Secretary:

Dr Robert Aldred,
Department of Mathematics and Statistics,
University of Otago, PO Box 56, Dunedin, New Zealand.

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LOCAL NEWS

CROWN RESEARCH INSTITUTES
Industrial Research Limited Applied Mathematics (Wellington)

The applied mathematicians are now settled at the Gracefield Research Centre, although we still maintain our links with the Maths Dept at Victoria. The Christmas break and summer vacations have helped put all the changes and disruptions of the last year behind us. Additional stresses were experienced in November and December when we were formulating our bids to obtain Foundation funding for 1993/4. However, since the New Year we have once again been able to concentrate on our scientific research.

There is a minor administrative matter that should be mentioned. The phone numbers for direct dial access to staff will change at the end of March. At that stage a voice mail system will be operating. The number for this system is unknown at this stage. However the number for the Gracefield campus remains unchanged - viz 566 6919.

Sarah Harper, one of our statisticians, left towards the end of 1992. We are currently looking for a suitably qualified person to replace her. Two vacation students were employed over the summer: Shaun Hendy from Massey and Howard Silby from Victoria.

John Burnell, Warwick Kissling, Graham Weir, Steve White and Roger Young attended the New Zealand Geothermal Workshop at Auckland University in November. Graham Weir presented a paper at the Australian Applied Maths Conference. Steve White spent his long service leave in January working on hot brine problems with Alex McNabb at Massey.

Donal Krouse, David Rhoades and Kit Withers presented papers at the International Biometrics Conference in Hamilton. Kit has just left for a 4 month visit to the States, where he will work with Ross Leadbetter; visit the National Institute of Science and Technology; present a paper at the Extreme Studies Conference; and spend a month at Stanford. Hugh Barr visited Australia in February for discussions with various groups on meat industry modelling.

The group has recently acquired two HP Snake workstations, the fastest of which runs at about 75 specmarks. This now provides us with the capabilities to model complicated porous media flow problems, and expands our abilities to graphically display the results.

John Burnell

UNIVERSITY OF AUCKLAND
Engineering Science

Andrew Mason and Poul Nielsen have taken up their lectureships. (See elsewhere in this issue for more information about them.) Sue Byrne in on a two-year secondment, full-time in the Department of Management Science and Information Systems. Mervyn Rosser, though "retired", is still teaching some courses. David Panton, from the School of Mathematics, University of South Australia, is visiting us for the first term in order to work with David Ryan.

Our enrolment numbers are generally up, and we have had to turn away some students who wanted to enrol in our first- and second-year courses.

Seminars

Prof. Masao Iri (U. Tokyo) "Fast automatic differentiation".
Dr Ian Hunter (McGill U.) "Micro-surgical robotics".
Dr John Wilson (Case Western Reserve U.) "Group replacement policies for stochastically failing parallel machines".
Dr. David Panton (U. South Australia) "Network models for shift assignment".

D.A. Nield

Mathematics and Statistics

On February 1st, the Department of Mathematics and Statistics and the Department of Computer Science collaborated to found the School of Mathematical and Information Sciences. Associate-Professor Ivan Reilly is the Interim Director, with Professor Bob Doran as Deputy Interim Director, and Jill Reid has become the School Registrar. Greater cooperation between the departments has got under way, with the new Student Resource Centre now catering for students of both departments. A Board of Studies for the Mathematical and Information Sciences has also been created, for coordinating research and teaching in the mathematical and information sciences throughout the university.

Over 21,000 students had enrolled by the end of enrolment week, and another 1000-2000 are expected to enrol later during the year. Tamaki Campus has 900 of those students, but the city campus is very crowded. The enrolments in this Department (at the end of enrolment week), in terms of Effective Full-Time Students, are listed here for the past few years:

Year	Stage 1	Stage 2	Stage 3	Graduate	Ph.D.	Total
1989	581	211	73			
1990	612•3	231•8	74•2			
1991	708•4	244•0	95•2			
1992	808•7	253•3	93•5	14•7	4	1174•2
1993	812•4	310•7	106•7	23•3	10	1263•1

Several new Lecturers have arrived: Bill Barton (Education Unit, from Auckland College of Education), Dr Robert Gentleman (Statistics Unit, from University of Waterloo), Dr David McIntyre (from Reading University), Dr Philip Sharp (Applied and Computational Mathematics Unit, from Queen's University, Ontario), Dr Arkadii Slin'ko (from Moscow Lomonosov State University) and Dr Ilze Ziedins (Statistics Unit, from Herriot-Watt University). The Computer Science Department has acquired Dr Cristian Calude (from the University of Bucharest), Professor Herman Maurer (from Graz Institute of Technology, Austria) and Dr Mark Titchner (to the Tamaki Campus).

Dr Peter Gibbons has been promoted to Associate-Professor of Computer Science. Dr Peter Danaher has transferred from Mathematics and Statistics to MSIS, but he will continue to teach some of our courses in Statistics.

Professor David Gauld has accepted another term of office as Head of Department, in succession to Alastair Scott.

Recent visitors include Prof. Peter Schmid (Tübingen), Dr Simo Puntanen (Helsinki University), Dr Terry Quinn (University of Alaska, Juneau), Prof. Ernie Cockayne (University of British Columbia), Prof. Jim Verner (Queen's University, Ontario), Dr Gennadii Bocharov (Russian Academy of Sciences, Moscow), Dr Pëtr Shirkov (Institute for Mathematical Modelling, Moscow), Prof. Marc Spijker (Leiden University), Prof. Paul Smith (University of Washington), Prof. Aimo Hinkkanen (Tempere University, Finland), Prof. David Brillinger (Berkeley) and Dr Bill Jackson (University of London).

Associate-Professor Ivan Reilly and Alastair McNaughton escorted the NZ Olympiad team to the 1992 Mathematics Olympiad at Moscow, where our team performed very creditably.

Prof. Peter Lorimer, Dr Mike Lennon and Dr Paul Hafner attended the Conference on Computational Algebra and Number Theory, at Sydney, on 1992 November 17-19. Peter Lorimer spoke on "Using CAYLEY to study the Coxeter Group [4,3,5]", and Paul Hafner spoke on "New results for the Degree/Diameter Problem".

An International Workshop on Matrix Methods for Statistics was held in this Department, on December 4th

and 5th. About 35 people participated, including George Styan, Shayle R. Searle, Simo Puntanen, Bill Farebrother, David Vere-Jones, Graham Wood, Harold Henderson, Jeff Hunter, Alastair Scott and John Maindonald.

SCADE 93, an International Conference on Scientific Computation and Differential Equations, was held in the Department of January 4th to 8th. The conference was held to honour Professor John Butcher for his 60th birthday (on March 31st), and it was attended by 150 numerical analysts from all over the world. John Butcher advanced greatly the theory of numerical solution of ordinary differential equations by applying the algebraic theory of trees. Dr Syvert Nørsett (Trondheim) has dedicated his forthcoming book to John, and he presented John with a T-shirt printed with a version of the Butcher Tree. The Conference was regarded as a great success, and at the closing ceremony John was presented with a young kauri tree, in a terracotta pot with a bronze plaque naming it as a Butcher Tree.

The opening of the School of Mathematical and Information Sciences was celebrated by a 2-day mini-seminar entitled "DOES GOD PLAY DICE?". Several members of both departments contributed lectures about various aspects of randomness and chaos.

Professor Vaughan Jones is to be awarded an honorary D.Sc. by the University of Wales, during the celebrations of its centenary.

The Forensic Science Society in the U.K. made the P. W. Allen Award for the best paper published in the Society's journal in 1991 to Dr Chris Triggs and his colleagues John Buckleton and Kevan Walsh (Institute for Environmental Health and Forensic Science, Mt. Albert), for their paper: "A continuous model for interpreting the positions of bands in DNA locus-specific work", *Journal of the Forensic Science Society* **31**(3), 353 - 363, 1991. Their work is concerned with the evidential interpretation and statistical analysis of data from DNA probes.

The University of Auckland held an Open Day on 1992 September 20th, which proved to be quite a success. Hubert Reynolds Bach graduated as B.Sc. (majoring in Mathematics) in 1928. He became Chief Engineer of the Hutt Valley Water Supply, President of the NZ Institute of Engineers and City Engineer of Lower Hutt, retiring in 1965. He came to the Open Day as guest of this Department and of the School of Engineering, and much enjoyed his visit.

Seminars

Prof. Peter Schmid (Tübingen), "Schur indices and Schur groups", and "Crossed products, Galois algebras and Green's indecomposability theorem".

Prof. R. Voloch (Austin), "The Mordell-Lang Conjecture".

Dr Rick Laugesen (Washington University), "Extremal problems involving logarithmic and hyperbolic capacity".

Dr Bill Jackson (University of London), "Circuit covers of graphs".

Prof. Mark N. Spijker (Leiden), "On the error committed by stopping the Newton iteration in implicit Runge-Kutta methods".

Prof. Steve McCormick (University of Colorado), "Multigrid projection methods".

Dr Gennadii Bocharov (Russian Academy of Sciences), "Numerical solution of DDEs by linear multistep methods".

Dr Petr Shirkov (Institute for Mathematical Modelling, Moscow), "Some aspects of L-decremented schemes".

Prof. Peter Duren (University of Michigan), "Robin capacity and extremal length"

Prof. Lionel Pereira-Mendoza (Memorial University of Newfoundland), "How children misunderstand graphs".

Prof. Ernie Cockayne (University of British Columbia), "Optimal Connection of New Geographical Points into an Existing Plane Road Network".

G. J. Tee

UNIVERSITY OF CANTERBURY
Mathematics

Professor Roy Kerr has now retired. Roy's scholarly achievements in relativity are well known. However, within this department, Roy will be best remembered for persuading the University to give us a much more appropriately sized slice of the financial cake. Roy intends to spend much of his retirement cruising. He has recently tested his tolerance to sea sickness by circumnavigating the South Island. A very successful and well attended retirement party was held at the Staff Club in late February.

Congratulations to Chris Price on the successful completion of his PhD on non-linear semi-infinite programming. Congratulations are also due to John Hannah who is no longer an eligible bachelor!

Numerous chocolate fish have been awarded for solving the weekly departmental problem. The reward can be changed to a glass of wine given a sufficiently compelling medical reason. It's an ill wind ... .

The department had another very successful rafting trip in November. Salary savings sufficient for purchase of another computer were almost achieved when one department member was crushed against a rock.

Gerhard Kristensson recently visited on an Erskine fellowship doing joint work with David Wall.

A joint research proposal by Bill Baritompa, Rick Beatson, Peter Bryant, and Graham Wood has resulted in the purchase of a SUN SPARC 10 machine. On the student computing front the laboratory of SUN 3/50's running as X-terminals continues to go from strength to strength. The lab is mainly used for Matlab, Maple, SAS and Minitab.

Seminars

Simon Bernau (Univ of Texas at El Paso) "Isotone Projection Cones in Hilbert Space."
Rebecca Gower (Univ of Queensland) "Minimal defining sets for an infinite family of Steiner triple systems."
Thomas Mathew (Univ of Maryland) "Combining independent tests of linear models."
Chris Drake (Univ of California at Davis) "Bias of estimators of treatment effect due to omitted covariates."

Rick Beatson

MASSEY UNIVERSITY
Mathematics

New staff this year include Glenda Anthony, Assistant Lecturer, formerly attached to the School of Aviation at Massey. Dr Hong Wang, Massey University Postdoctoral Fellow, is to join the Department in mid-year to work on graph theory. Dr Julie Falkner will take up a lectureship in Mathematics in June; she will teach in Operations Research papers offered by the Department.

Wolfgang Vogel (Martin Luther University, Halle, Germany, presently visiting Cornell University, US) will take up the new Chair in Pure Mathematics in July this year. His research areas include algebraic geometry and commutative algebras, especially intersection theory; he also has interests in computer algebra and combinatorics. Graeme Wake's chair has been renamed; he is now Professor of Applied Mathematics (and continues as HoD).

Mathematics Masters student Catherine Rivers has been awarded the Women's Suffrage Scholarship for 1993, enabling her to study full-time this year. Instituted by Massey University and the Manawatu Branch of the NZ Federation of University Women Inc.to mark the centenary of the Suffragette Movement, the scholarship will enable Ms Rivers to complete her Masters thesis on numerical aspects of combustion. She will be supervised by Graeme Wake and Adrian Swift. Prof. Wake is delighted that Catherine was selected for the award but says "there are still insufficient women doing advanced mathematics in spite of positive encouragement from many groups around the country. I hope Catherine's success shows the way for other women to follow in her footsteps."

The NZ Aluminium Smelters Scholarship for support of a Masters thesis study in Applied Mathematics/Statistics has been awarded for 1993 to Christopher Palliser, a student of Applied Mathematics. Supervised by Robert McKibbin, Chris will construct and study a heat transfer model for the cooling sections of furnaces used for baking the carbon anodes used in the electrolysis of aluminium.

Forty mathematicians and biologists from NZ, Australia and the US gathered at Massey for a week-long

collaboration during December. Following a Workshop on Molecular Evolution in Rotorua the previous weekend, the Forum on Phylogenetic Methodology was aimed at analyzing different ways of reconstructing evolutionary history from genetic information. Mathematicians and biologists compared and attempted to improve existing computer-based methods. Mike Hendy, one of the active group working here on evolutionary issues, was involved with organising the forum from the Massey end.

A new interdisciplinary paper, Biological Modelling, is being provided by the Department of Mathematics in association with those of Statistics and Plant Biology. All departments are active in research in biological modelling and this third-year paper is designed to bring those studying it to the cutting edge of the field.

Last year's successful weekly seminar series on Mathematical Physics is to be continued this year with a new set of contributions from the Mathematics and Physics Departments.

Nicola Jayne has successfully defended her PhD thesis on foliations and contact metric structures on manifolds. She is now to be found as an Associate Lecturer in the Mathematics and Computing Section at the Lismore campus of the University of New England, NSW, Australia.

Peter Kelly reports the successful running of the first level paper Methods of Mathematics as an extramural summer course. Most completed the paper successfully, although the heavy demands of the Christmas period helped to defeat some.

Seminars

Prof. Murli M. Gupta (George Washington University) "High order finite difference schemes for elliptic equations"

Assoc. Prof. Michael C. Hendy (Massey) "$x^2 + x + 41$"

Dr Graham Wood (University of Canterbury) "From abstract algebra to management transformation"

Dr Brailey Sims (University of Newcastle) "Fixed-point theory for nonexpansive maps"

Prof. Roger B. Eggleton (University of Newcastle) "Scheduling with graph theory"

Dr Werner Ricker (University of Tübingen) "Commutativity of systems of self-adjoint matrices"

Prof. Wolfgang Vogel (Halle and Cornell Universities) "Ancient history and current problems in intersection theory"

Dr Andy McIntosh (University of Leeds) "Flames under pressure"

Dr K. Tuoc Trinh (NZ Dairy Research Institute) "The wall layer in turbulent shear flows"

Robert McKibbin

OTAGO UNIVERSITY
Mathematics and Statistics

Things move along at a hectic pace in the deep south as we battle the deepening snows at the onset of another winter. The summer was busy for all, whether preparing for the start of 1993 or darting off to the northern hemisphere to work with colleagues.

In December/January John Shanks visited England and spent time at Manchester University where he met up with numerical analyst Len Freeman and discussed latest techniques for several numerical problems. It was interesting to hear of the revised funding scheme being introduced in Britain where each university department is being classified as "T" (Teaching), "R" (Research) or "X" (both), this categorization then being used to specify what type of funding will be provided. Hopefully not New Zealand in 10 years time (?).

Robert Aldred spent much of the summer/winter in Nashville Tennessee working with Bob Hemminger at Vanderbilt University on some research problems involving contractible edges in 3-connected graphs. It was a fruitful visit which should lead to several papers.

Back in Dunedin, many hours were put in by many people working on documentation for the departmental review currently being undergone.

The number of students enrolled for mathematics/statistics papers remained approximately the same as last year with perhaps a slight drop in overall EFTS numbers. More precise information will be available in a few weeks time.

Robert Aldred

VICTORIA UNIVERSITY
Mathematics

Mrs Christine Cameron has recently been appointed Assistant Lecturer. She graduated BSc(Hons) in mathematics from Strathclyde and has been working recently in the Porirua Language Project.

Congratulations to Michael Kelly and David Stevenson. Both have recently been elected FRS; both were students here in the late 60s - early 70s. Michael did a Mathematics MSc, David a Physics one, having included a Mathematics paper in his BSc(Hons). Both then went on OE which still continues; Michael is now Professor of Physics at the University of Surrey, David Professor of Geophysics at Caltech. So far as I know this is the first time two VUW contemporaries have ever been elected to the Royal Society of London together.

Congratulations also to Chris Scott who has completed his MSc on geometry of planar motions.

Rod Downey has returned from his sabbatical. Chris Atkin is currently away, at DPMMS, Cambridge.

Irene Pestov has started working for her PhD on geothermal modelling, super-vised by Mark McGuinness.

Sandra Chapman has started working for her MSc on geometry of spatial motions, supervised by Peter Donelan.

J F Harper

VUWISOR

Last summer brought some exciting events to ISOR. On Christmas Eve there was the reported sighting of 3 Moas working on the SUNs in the Computing Laboratory. Unfortunately the only photo taken of them was rather blurred so we didn't bother alerting the media. On January 18 Alistair Gray moved up the hill, leaving the Department of Statistics and joining ISOR. It's great to have Alistair working with us and he strengthens our expertise in the areas of survey techniques, time series and short haircuts. At some ill-defined date Peter Thomson was back from Sabbatical, having visited the US Bureau of Census, Washington (David Findley), LSE (Peter Robinson) and Hans Künsch (Seminar für Statistik, ETH). Finally in early February we were very pleased to see not one but two weddings. Leigh Roberts married Phillipa Smith and Megan Clark married David Crossan. Congratulations and best wishes to both couples from all at ISOR. More recently we are glad to welcome Simon Jurke and Paul O'Connor to ISOR as part-time programmers.

On to more routine matters, and there have been some new course developments. STAT 193 has split into 2 streams each containing over 200 students. Thomas Mikosich and Peter Thomson are offering a new graduate course on Financial Time Series and Stochastic Differential Equations and the 2nd year Biometrics course is being expanded to an Applied Statistics course.

Another bout of hard slog on S-PLUS implementation has seen S-PLUS made available to all mainstream courses in Statistics and OR form first year through to graduate level. Other courses are now using SYSTAT, so the demise of MINITAB is now complete.

But what of rest and recreation? Well the ISOR staff cricket team achieved a second impressive loss against the students. A trivial pursuits quiz night was held and won by a staff team among accusations of conservative questions from the students. An overnight tramp in the Tararuas saw a party of 10 braving blisters and severe inclines to be rewarded by great weather and Wang Qiang's bottle of vodka.

Summer visitors have included Murray Cameron (CSIRO), Ken Russell (University of Wollongong) and Lionel Pereira Mendoza (Halifax, USA). Summer departures include Bernard (BAYES) Robertson who has left Victoria for the Law Department at Massey. HIs left wing views will be sadly missed in the tea room.

Peter Smith

UNIVERSITY OF WAIKATO

Our statisticians, including those in WCAS, are now recovering from their massive efforts to organise the 16th International Biometric Conference, which attracted more than four hundred statisticians from all over the world to our campus. Although the University's catering apparently left something to be desired (a palatable meal), the Conference was a great success, and its organisers are to be congratulated on their work, which was all carried out over and above the normal calls of university duty.

The large research contract secured by Kevin Broughan and Alfred Sneyd with Electricorp has now been fulfilled. Kevin and Alfred, exhausted but triumphant, are looking forward to a less stressful year in 1993. Carolyn Mackenzie has already left after her year as a Research Assistant on the contract; our loss is Telecom's gain. Yan Wang, the other Research Assistant, is staying on for a few more months with us before joining her husband, who is going to Melbourne for the second part of his DPhil sponsored by Comalco.

Our enrolments have dropped sharply form last year. This drop is largely accounted for by the Management School's decision to require of their students only one Statistics course, rather than a Mathematics course and a Statistics course. Bute there is a worrying downturn in our third-year numbers.

Jeff Knowlton has resigned unexpectedly and will return to the USA in April. We shall be advertising soon for his replacement and for a pure mathematician to replace John Turner, who retires in January 1994.

Douglas Bridges

NOTICES

IBC92 A GREAT SUCCESS!

The XVIth International Biometric Conference was held at Hamilton, New Zealand, 7-11 December 1992.

There were 461 delegates (with 70 accompanying persons) representing 36 countries. More than half came from outside the Australasian Region. The number of registrants by region were: New Zealand 128, Australia 95, North America 99, Europe 99, Asia 28, Africa 8 and 4 from elsewhere.

The conference was opened by Len Cook, the New Zealand Government Statistician. Niels Keiding gave the Presidential address on "The Biometric Society: Diversity and Unity".

Proceedings

A limited number of copies of the IBC92 proceedings are available at $NZ 40 for the set airmail postpaid. The "Invited Proceedings" has 19 published papers in the 10 invited sessions (289 pages) and the "Contributed Proceedings" has 263 abstracts (268 pages) from the contributed programme.

Order from (including payment VISA/MASTERCARD, NZ cheque) IBC92 Secretary, Statistics Section, Ruakura Agricultural Centre, Private Bag 3123, Hamilton, New Zealand, Fax +64 7 838 5012, Phone +64 7 838 5151, Email ibc@ruakura.cri.nz

Social Programme

Highlights of the social programme included:

- A cultural function on Tuesday evening at the Turangawaewae Marae. Dinner was followed by a presentation of Maori culture and action songs by the Ngaruawahia High School Concert Party.
- Six mid-conference tours on Wednesday took people on a wide range of activities. All eighty survived the Tongariro hike and had earned their swim in hot thermal pools in Taupo on the way back. Another group of thrill seekers went Black Water Rafting at Waitomo. Other tours took in sights at Auckland, Rotorua, Waimangu Thermal Valley and Waitomo. A memorable day was had by all!
- The conference dinner on Thursday night at "Vilagrad Wines" was a fun evening with excellent food, local wines, music and dancing. A video of the evening was shown the next day with copies available in plain brown wrapper.

Email and Telnet Facilities

Email and Telnet facilities were made available for delegates at IBC92. More than 150 setup accounts on the University of Waikato Vax to enable them to use email and/or to telnet to their home machine and then work just as if they were at home! The programme includes email (internet) addresses of about 70% of registrants. The local organising committee found these useful to quickly (and cheaply) distribute information. And judging by the number of email messages that came to IBC92 so did delegates.

Acknowledgement

The Local Organising Committee thank the organisations (listed in the programme) that provided financial and technical help and other support. Particular thanks go to SAS Institute for generous sponsorship.

Thank you

A big thank you to all those who came to IBC92 and to the nine satellite conferences. You helped make the meetings successful.

1993 NEW ZEALAND MATHEMATICS COLLOQUIUM
Canterbury University Monday 23 – Thursday 26 August, 1993

The colloquium will incorporate the annual meeting of the New Zealand Mathematical Society, and also the annual meeting of the New Zealand branch of ANZIAM. The last day of the colloquium will be devoted to Mathematics in the Biological Sciences.

You should be receiving a first circular shortly. However, if you wish to communicate with the organisers before then please contact us at: NZMC93, Mathematics Department, University of Canterbury, Private Bag, Christchurch or nzmc93@math.canterbury.ac.nz

A provisional list of invited speakers follows:

General Session

Jim Ansell (Victoria) Geophysics
Noel Barton (CSIRO Sydney) Industrial Mathematics (ANZIAM--NZ speaker)
Peter Hilton (SUNY Binghampton) On a class of nilpotent groups and non-cancellation phenomena
Will Light (Leicester) Analysis/Approximation Theory
Curt Lindner (Auburn) Combinatorics
Jean Pedersen (Santa Clara) Probabilities associated with generalized dice throwing
Michael Stiassnie (Technion) Fluid Mechanics

Mathematics in the Biological Sciences Day

Mike Hendy (Massey) Mathematical problems arising from DNA sequence analysis
Bruce Robson (Lincoln) Mathematical modelling in the Natural Sciences

This years colloquium will mark the start of two weeks of mathematics conferences at Canterbury. The NZ Statistical Association will meet Wednesday 25 August through Friday 27 August, and the Maths with Class conference on Mathematics Education will run Monday, 30 August through Friday, 3 September.

We look forward to welcoming as many of you as possible to the colloquium in August.

Rick Beatson

NOTICE OF MOTION FOR THE 1993 AGM
Proposed changes to the Constitution of the NZMS

Proposed by: Kee Teo, Gillian Thornley, John Giffin, Michael Hendy, Michael Carter.

The purpose of the following changes is to reaffirm our main objective as being a Scientific Research Promoter.

ARTICLE II: OBJECTS

The clause

(1) To promote the development, application and dissemination of mathematical knowledge within New Zealand.

be replaced by

(1) To promote research in mathematical sciences and to promote the development, application and dissemination of mathematical knowledge within New Zealand.

The clause

(2) To assist Mathematicians in New Zealand to maintain effective cooperation with one another and with mathematicians and mathematical societies in other countries.

be replaced by

(2) To assist Mathematicians in New Zealand to maintain effective cooperation with one another and with mathematicians and mathematical societies in other countries, and to facilitate collaborative research in the mathematical sciences as a consequence of such cooperation.

ARTICLE XI: DISSOLUTION

The last sentence

> Any assets remaining after all the debts have been paid shall be given to organizations whose objects are similar to those of the Society.

be replaced by

> Any assets remaining after all the debts have been paid shall be given to organizations established mainly to promote or encourage scientific or industrial research

ARTICLE VIII: AMENDMENTS

At the end of this article insert

> Notwithstanding the forgoing provisions, no amendment to the clauses relating to pecuniary interest (Article II)* and dissolution (Article XI) provisions, including this clause, are permitted.
>
> ---
>
> * The society shall be administered with these ends in view and not for the purpose of financial gain for the members.

DIVISION OF APPLIED MATHEMATICS (AUSTRALIA)
New Zealand Branch

At the meetings in South Australia during the 29th Applied Mathematics Conference in February, it was agreed that a NZ branch of the Division of Applied Mathematics of the Australian Mathematical Society would be formed. An interim committee of

Professor Graeme Wake, Mr Adrian Swift (Massey)
Dr Graham Weir (IRL, Wellington)

has been formed to initiate activities and a new committee will be elected at the inaugural meeting in August during the colloquium. Rules of the Branch will be available at the Colloquium.

Arrangements are in hand to have a NZ Branch Lecture at the Colloquium (if the organisers agree).

Members of the NZMS are reminded that they can join the Division for the annual fee of (currently) $A7. These can be sent to Adrian Swift at Massey University (who is Interim Treasurer).

During the Adelaide meetings it was agreed to change the name of the Division so as to align it to the INTERNATIONAL COMMISSION FOR INDUSTRIAL AND APPLIED MATHEMATICS (ICIAM). The precise name is subject to a postal vote but it is likely to have the acronym ***IAM with *** to represent the region. Further details will be available when the vote has taken place.

Graeme Wake
Massey University

UNIVERSITY OF AUCKLAND
Lectureships in Statistics

Auckland University invites applications for two Lectureships in Statistics within the Statistics Unit of the Department of Mathematics and Statistics (vacancies UAC.251) which is now part of the School of Mathematical and Information Sciences. Applicants should have a proven record in teaching, research and consulting in some branch of Statistics or Applied Probability. Commencing salary will be determined in accordance with qualifications and experience within the scale for Lecturers, namely $37,440 to $49,088. The successful applicants will take up their duties on a date to be arranged after 1 August 1993. Applications close on 30 May, 1993. Further information may be obtained from Professor G A F Seber, telephone (64) (9) 373 7599 ext 8745, fax (64) (9) 373 7457 or by e-mail (seber@mat.aukuni. ac.nz).

UNIVERSITY OF WAIKATO
School of Science and Technology Jubilee

To: All past and present staff and students

In 1969, the first staff to teach in the School of Science were appointed, and in 1970 the doors were opened to students. In 1988, in recognition of the long-standing commitment to technology within the School, both in research and in teaching, the name of the School was changed to The School of Science and Technology.

It is felt by the present staff of the School that the first 25 years should be commemorated in the form of a Jubilee, so the past and present staff and students can renew old acquaintances and memories.

In order to gauge the amount of interest in such a Jubilee, it would be appreciated if you would contact Mrs Emma Sammes so that information can be sent to you. The address is: School of Science and Technology, Private Bag 3105, Hamilton, New Zealand, fax (07) 838 4218), or on a direct line (07) 838 4053. The level of interest indicated by past graduates will dictate whether or not a Jubilee to commemorate the past 25 years should be held.

I look forward to your response.

Professor K M Mackay
Dean

THE FORDER LECTURESHIP

The late Professor Henry Forder was born near Norwich on 27 September 1989. After education at Cambridge he took up secondary school teaching in 1910 but after 20 years began to seek other challenges, which brought him to Auckland University College at the beginning of 1934. He was the Professor of Mathematics at AUC until his retirement in 1955 and remained in Auckland until his death on 21 September 1981. Although his primary mathematical interest was in geometry he was actively interested in all branches of mathematics and its applications: his students from Auckland (including those he taught right up to the 1970's) would remember him for his courses not only on projective geometry but also on, eg. relativity, quantum mechanics, number theory. Stories illustrating his immersion in his subject abound, particularly those suggesting his giving a physical being to his aerial 3-dimensional geometry constructions. One favourite was him walking around an "object" to see whether it is clear to the class from their point of view. For his contributions to this profession Professor Forder was awarded an honorary DSc by the University of New Zealand and elected a fellow of the Royal Society of New Zealand.

In terms of his will, Professor Forder bequeathed a sum of money to the London Mathematical Society to use as they saw fit. After discussions and negotiations with mathematicians from the University of Auckland and the New Zealand Mathematical Society, the London Mathematical Society decided to set up the Forder lectureship. The intention is to appoint a Forder lecturer every second year, the appointee being a prominent mathematician. He or she will tour New Zealand for a period of 3 weeks or more and present lectures as appropriate.

Professor Christopher Zeeman of the University of Warwick (now Oxford) was the first Forder lecturer in 1987, and in 1989 (the centenary of Henry Forder's birth) the appointee was Professor Sir Michael Atiyah, Royal Society Research Professor at the University of Oxford and a Fellow of the Royal Society.

In 1991, the appointee was Professor Peter Whittle, University of Cambridge (but originally a New Zealander and a Graduate of Victoria University of Wellington). Thus the 4 term sequence is

Zeeman	Atiyah	Whittle	Penrose
1987	1989	1991	1993

NEW MATHEMATICAL SOFTWARE FIRM
Hoare Research Software

Hoare Research Software is a firm that has recently been formed by Dr Ray Hoare, to provide distribution, sales and support of technical computer programs, too sophisticated and too infrequently used to be of interest to the major software distributors. Dr Hoare has been distributing **SYSTAT** statistical products for 5 years, and now also supplies **Mathcad, Mathematica, Lindo**, and a selection of market research, forecasting, and other mathematically based programs.

Statistical programs can be used for data presentation and many modelling tasks, and not only for analysis of variance. (For instance, you can do non-linear curve fitting). **Mathcad** can let you write down mathematical equations or matrices, just as you would on a sheet of paper, and perform algebra on them, solve them, or substitute numeric values for symbolic variables. It is much more straightforward and powerful than using a spreadsheet, and easy to check.

Mathematica allows you to do similar things to Mathcad, but because it works with a language based on functions, it can be used to build programs for handling very complex tasks. **Lindo** is used for linear or quadratic programming, where you want to find an optimum solution to a problem in which many equations constrain the relationships between resources.

There are too many other programs to describe here, in many areas of mathematics and science. Your enquiries will be welcomed by Dr Hoare. Contact HRS at phone (07) 856 2675, fax (07) 856 2797, or PO Box 4153 Hamilton East, if you have been wondering what modern software can do for you.

RSNZ INTERIM BOARD ELECTION
Mathematical Sciences Position

Three candidates were nominated for the Mathematical Sciences position on the Interim Board. As a result of the recent election, I declare **Graeme Wake**, Massey University to be our representative for 1993. I have informed the Royal Society and the candidates.

The election raised a number of issues. It is clear that some people are members of both the NZMS and the NZSA. Consequently, they were sent two voting papers. In future it will be necessary to keep a list of voters and ensure that each person has only one vote.

There was some discontent with the voting procedure which required a vote for only one of the three candidates. If sufficiently many people would prefer some other system, this could be arranged for next year.

Spurred on by the need to take combined action regarding the Interim Board, a meeting of Presidents and Vice-Presidents of NZMS and the New Zealand Statistical Association, the President and a representative of the New Zealand Association of Mathematics Teachers along with a representative of the Operations Research Committee of New Zealand took place on Friday March 5th. The New Zealand Computer Society did not send a representative but asked to be kept informed of any developments.

As a result of this meeting we plan to form the Mathematical Sciences Council of New Zealand. This body will work to maintain and improve the health of the mathematical sciences in this country. Its board will consist initially of the Presidents and one nominee from NZAMT, NZMS, NZSA and ORSNZ plus our representative on the Interim Board of the RSNZ. Marston Conder will be the first President and Alistair Gray, the Secretary.

At the moment a Vision statement is being prepared. It is hoped that this will be available by the AGM of the NZMS Colloquium in August. Briefly though the Council will act as a means of networking existing bodies with interests in the mathematical societies and will try to raise the profile of the mathematical sciences.

The next meeting will take place in Christchurch during the period of the Colloquium and the NZAMT conference.

Derek Holton

GRANTEE REPORTS

MARSTON CONDER

In December 1991 I attended the conference on Groups and Combinatorics at R.I.M.S. Kyoto (the Research Institute for Mathematical Sciences at the University of Kyoto) in Japan, with the help of a $500 travel grant from the N.Z. Mathematical Society.

The conference ran for three days (19–21 December), with over 60 participants, mostly from Japan. The speakers included Richard Weiss (generalized polygons), Satoshi Yoshiara (polar spaces), Eiichi Bannai (association schemes), and Noburo Ito (Hadamard tournaments). I gave a talk myself on Schreier coset graphs and their applications, and other talks covered topics ranging from groups and generating-functions to differential posets and characters of Hecke algebras. Most of the talks were delivered orally in Japanese, but written in English on the board or screen — and therefore not difficult to follow, even for someone with as little knowledge of the Japanese language as me!

I very much appreciated the opportunity to meet such notable mathematicians as Bannai and Ito, and to discuss matters of common interest with some of the other participants I knew, including Richard Weiss (symmetric graphs), Hiroyuki Ohmori (Hadamard matrices) and Izumi Miyamoto (combinatorial group theory). Also it was good to see a little of Japan and to experience some of the local hospitality — although I was disappointed that the Imperial Palace was closed for security reasons (due to the impending arrival of U.S. President Bush).

For anyone interested in attending future meetings at R.I.M.S. Kyoto (which are advertised in the N.Z.M.S. Newsletter): I flew in and out of Osaka International Airport, which is served by a direct bus service to the main bus and rail station in Kyoto, with departures every 15–20 minutes for most of the day. The journey took 90

minutes one way (on a weekday) but only 35 minutes the other way (on a Sunday). There is a good bus and sub-way service within Kyoto, with stops usually announced in both English and Japanese. I stayed in the Hotel Kuni-so, which is reserved for government workers (such as the staff of state universities); this was very comfortable, and a room costs about NZ$60 (without private bath) or NZ$110 (with private bath) per night. A dressing-gown and slippers were provided, but no towel. Eating out can be expensive, however most restaurants display their menus outside with prices alongside pictures or samples of each course, and this not only helpful, but also very interesting!

I am very grateful to the N.Z.M.S. for supporting my attendance at this conference.

KEN LOUIE

The grant received from the council of the NZMS was used to assist my travel to the 29th Applied Mathematics Conference, organised by the Division of Applied Mathematics of the Australian Mathematical Society and held this year at Hahndorf, near Adelaide. This conference, being the summer meeting of the Australian Mathematical Society, traditionally maintains an informal atmosphere. This year proved to be no exception, with a well-balanced programme of social activities provided throughout the 4 days.

I spoke on work done over the past year with Graeme Wake (Massey) and Mick Roberts (AgResearch, Wallaceville) involving the geographic spread of bovine tuberculosis in possums. The talk was quite well-received, despite my blaming the Aussies for introducing the problem in the first place! Most of the speakers appeared a little rushed; understandable as the sheer number of contributed talks meant a reduction in time available to everyone. However, it was pleasing to see that one of the reasons for this was the large number of student talks (about 45 out of 150). In this regard the conference can be highly recommended to any NZ post-graduate students wanting to talk about their research in a lively and encouraging forum (with the added incentive of a A$250 prize for the best student talk!)

Thanks once again to the council of the NZMS for the grant which made this trip possible.

Ken Louie

33RD IMO
Moscow, 1992

The 33rd International Mathematical Olympiad took place in Moscow from the 10th to the 21st July 1992. Despite communication difficulties and delayed invitations, 322 students from 56 countries participated. An additional 29 students from 8 former Soviet republics took part as unofficial participants.

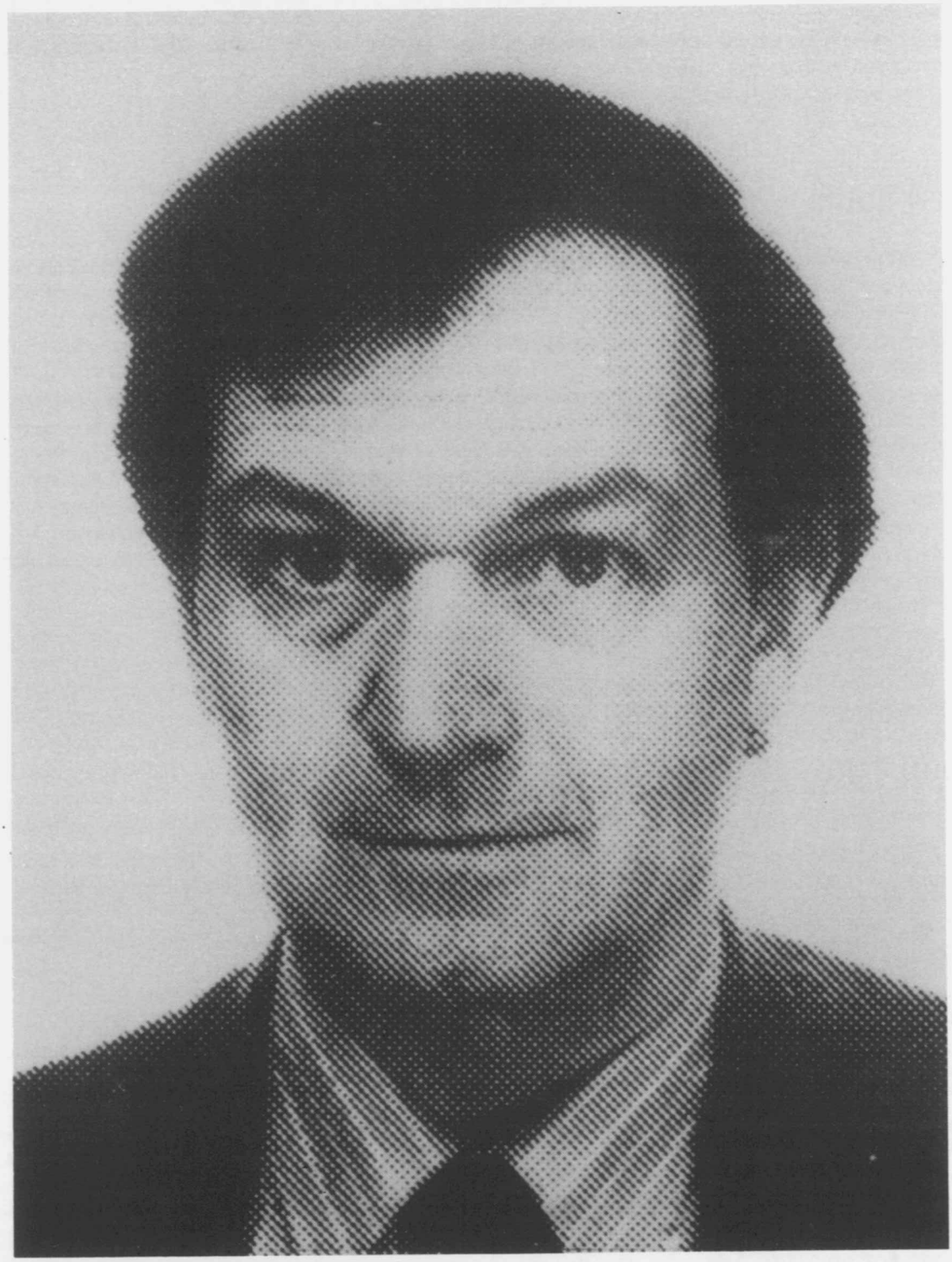
New Zealand has sent a team to each IMO since 1988. The 1992 NZ team was the youngest ever, containing two fifth formers, one sixth former and three seventh formers. Members of the team were Kirk Alexander (Ashburton College), Andrew Currie (Tauranga Boys High School), Andrew Firth (Otago Boys High School), Jeremy Johnson (Havelock North High School), Kahn Mason (Shirley Boys High School), and Lara Wilcocks (Waihi College). Accompanying the NZ team were Gillian Heald (Principal, Rangi Ruru Girls School, Christchurch) and Alastair McNaughton (Tamaki Campus, University of Auckland).

This is the fourth successive year that there has been a girl in the NZ team, and this seems to be unprecedented at the IMO. Kahn Mason won a bronze medal, and overall the NZ team was ranked in the low 40s, out of the 64 teams competing. The Irish and Danish team leaders were especially happy in Moscow because their teams each ranked above NZ for the very first time. It cost me a couple of rounds of drinks!

China came first with a remarkable team score of 240 out of a possible 252, gaining 6 gold medals in the process. Then followed USA (181), Romania (177), CIS (176), UK (168), Russia (158), Germany (149), Hungary and Japan (142), France and Vietnam (139).

All Team Leaders assembled in Moscow on 10th July and constituted the IMO Jury, which then spent three days selecting 6 problems from 30 problems previously short-listed by the Organizing Committee from all problems submitted. The two papers, so chosen, were then translated into 26 languages. Deputy Team Leaders arrived with their Teams on Monday 13th July in time for the Opening Ceremony on the following day. Before the actual competition the Leaders, who knew the questions, were accommodated in a different part of the city and allowed no contact with Deputies or Teams. *(Continued on page 18)*

CENTREFOLD



Professor Roger Penrose

ROGER PENROSE

by Mike Steel

A world renowned theoretical physicist seems an unlikely person to be specializing in the study of the human brain and the nature of consciousness. But Oxford-based mathematics professor, Roger Penrose, who arrives in New Zealand in late March, believes there may be an essential link.

Penrose, aged 61, is visiting for five weeks as the 1993 Forder Lecturer. Author of the recent "The Emperor's New Mind", he is best known for the tilings bearing his name, and for his pioneering work with famous Cambridge colleague Stephen Hawking. In the words of Hawking, they have "showed that Einstein's general theory of relativity implied that the universe must have a beginning, and possibly, an end." More precisely, in 1965 Penrose established a mathematical theorem, which showed that when a large object collapses under its own gravity it must, according to Einstein's theory, necessarily end up containing a "singularity" or point of infinite space-time curvature. This has been a fundamental result of the theoretical study of black holes. Hawking's joint contribution with Penrose five years later removed some of the assumptions Penrose had made in his proof, and also showed that the original result could be turned on its head — any large expanding object, such as our universe, must have necessarily begun from a singularity — the "big bang". According to Hawking this result cause some initial resistance, especially from Russian scientists who perceived it as a threat to their Marxist belief in scientific determination.

More recently Penrose has turned from studying top level theoretical physics and the structure of crystals and tilings to the operations of the brain, and the nature of human consciousness. He is currently crusading against a prevailing philosophy which goes under the tag of "strong AI" (AI meaning "Artificial Intelligence"). This position, favoured by certain computer scientists and philosophers, holds that all human mental qualities — our awareness, thoughts, feelings and so on — arise simply from our brains executing very complicated algorithms ("software"), and has essentially nothing to do with the actual biological "hardware", the brain. This position has an interesting corollary; one could, in principle, programme these algorithms on a sufficiently powerful computer, and this computer would then be truly "conscious", like we are, when operating. Advocates of strong AI believe that the Turing Test — a series of questions (by a person) and answers (by a "being") can be the only gauge of whether that "being" is conscious or not. Opponents, such as Penrose, counter with the "Chinese Room" experiment, originally proposed by John Searle.

But Penrose believes that there's more to it than that. "I believe that conscious minds are *not* algorithmic entities", he says. Penrose speculates that the true nature of human (and animal) consciousness may depend on linking the fine structure of the brain to recent and future discoveries at the fringes of modern physics, in particular quantum theory — the branch of physics which deals subatomic particles and interactions. "I hold also to the hope that it is through science and mathematics that some profound advances in the understanding of mind must eventually come to light," he says.

This controversial position has some support from neurologist Sir John C Eccles who recently also attempted to link quantum theory into brain functioning ("Evolution of consciousness," Proceedings of the National Academy of Sciences, USA, Vol. 89: pp 7320-7324, 1992).

For the last 20 years Penrose has been both Rouse Ball Professor of Mathematics at Oxford, and a Fellow of the (London) Royal Society, and has written dozens of papers, mostly on relativity and quantum theory. He has also authored or co-authored seven books, including, most recently, "The Emperor's New Mind", a 600-page whirlwind tour of physics and mathematics, and technical alternative to his colleague Stephen Hawking's bestseller "A brief history of time." Unlike the latter work, Penrose does not shy away from details, and consequently his book is littered with equations and formulae which must have given the publisher nightmares — one page is devoted entirely to writing out a certain number. Despite this, the book has sold well, though much less than Hawking's (whose sole equation is Einstein's famous $E = mc^2$). Penrose is currently writing a second book, tentatively titled "Shadows of the mind" which continues his analysis of the links between modern physics and the mind.

(Continued from page 15)

1992 was the first year that the NZ Mathematical Olympiad Committee had submitted a problem. It was a problem created by Emeritus Professor Ted Zulauf (University of Waikato). This problem was well-received by the Jury, and was selected as question (1) on the First Day's paper, 15 July 1992. Congratulations to Ted Zulauf.

One of the best features of the 33rd IMO was the high standard of marking coordination under the chairmanship of Dr Arkadii Slin'ko. It is worth noting that Dr Slin'ko is now in New Zealand as a Lecturer in the Department of Mathematics and Statistics, University of Auckland. We are looking forward to his contribution to the work of the NZ Mathematical Olympiad Committee.

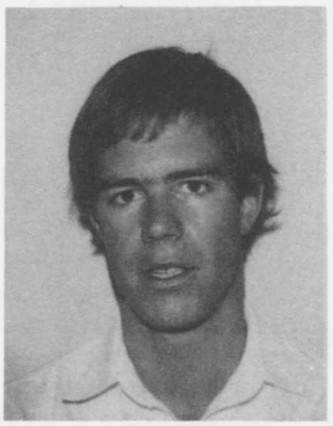
Of course there were some disappointments, but from my point of view the NZ team performed excellently and were always great ambassadors for their country. Their success was the culmination of several years of training through cluster group programmes, our national correspondence Certificate, training camps and personal tutoring. Their success is also due, in no small part, to the relatively few dedicated and enthusiastic mathematicians, including several former IMO team members, who have willingly assisted in these training programmes (David Wallace of Wellington, Michael Burns, Diane Maclagan and Timothy Sturge of Christchurch).

The major financial sponsor of the 1992 NZ IMO team was the Ministry of Research, Science and Technology through its programme for the promotion of science education. It is a pleasure to place on record my appreciation for the interest and support of the current Minister of Science, Hon. Simon Upton. The financial support of the NZMS is also most gratefully acknowledged as teachers and students appreciate practical help from members of the profession.

Ivan Reilly
IMO Team Leader

NEW COLLEAGUES

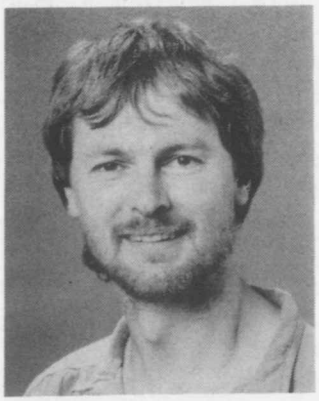
ANDREW MASON



Andrew Mason has recently been appointed to a lectureship in the Engineering Science Department at the University of Auckland Engineering School. His research interests include optimal and heuristic solutions to combinatorial problems and most recently the role Genetic algorithms can play in solving these.

Andrew was born in 1966. He studied at the University of Auckland, where he graduated with a BE with Honours (1st class) in 1987. In 1988 he was awarded a Commonwealth Scholarship to undertake study towards a PhD within the Management Studies Group at the University of Cambridge Engineering Department. Andrew was an active member of Darwin College during his time in Cambridge. His thesis, entitled "Genetic Algorithms and Scheduling Problems" was completed in 1992. A number of publications have resulted from this work, aspects of which were also presented at the 1991 International Conference on Genetic Algorithms in San Diego.

POUL NIELSEN



Dr. Poul Nielsen has recently been appointed to a lectureship in the department of Engineering Science at the University of Auckland. His current research interests include bioengineering and confocal imaging.

Poul graduated at the University of Auckland with BSc in Physics and Mathematics 1978, BE with Honours in Engineering Science 1981, and PhD in 1987. His thesis was titled "The Anatomy of the Heart: A Finite Element Model". After completing his PhD, Poul spent two and a half years as a Post-Doctoral Fellow in the Department of Biomedical Engineering and a Visiting Scientist in the McGill Research Centre for Intelligent Machines, McGill University, Montréal. He returned to the University of Auckland in 1990 lecturing for one year in the department of Electrical and Electronic Engineering. During 1991 and 1992 he was supported by the New Zealand Heart Foundation as a Post-Doctoral Fellow.

BOOK REVIEWS

Perspectives on the History of Mathematical Logic, edited by Thomas Drucker. Birkhäuser, Boston, 1991, 284pp, DM 128. ISBN 3-7643-3444-4.

Most of the articles in this slim volume were originally presented as papers at a special session at the American Mathematical Society's meeting in Chicago in March 1985. They cover a surprisingly wide range and some of them (notably that of Ruitenberg) are technically nontrivial. The following questions and answers may give the reader some idea of the flavour of the book.

•*In which century did Russell first discover a set-theoretic paradox?*

Despite a common belief that Russell first announced a paradox (the one dealing with the set of all sets that are not members of themselves) in 1901, the article by Annelis reveals that the first written reference by Russell to his discovery of a paradox concerns Cantor's proof of the nonexistence of a greatest cardinal and appears in a letter from Russell to Couturat on 8 December 1900. So the answer to the the question above depends on whether you believe (as mathematicians ought?) that the twentieth century began on 1 January 1901.

•*What is the significance of Russell and Whitehead's* **Principia Mathematica** *in the development of automated theorem proving?*

The first two major published works in automated theorem proving—the *Logic Machine* (Newell, Shaw and Simon) in 1956, and the work of Wang in 1958—both attempted to prove theorems of propositional logic from *Principia Mathematica.*

•*What role did Oswald Veblen play in mathematical logic?*

To those of us who think of Veblen as a leading figure in geometry and topology in the first half of

this century, it will come as a surprise to learn that he had a deep interest in logic, as a branch of mathematics rather than philosophy. He introduced Church to logic, directed his doctoral thesis on the axiom of choice, and in 1929 convinced the Princeton faculty to hire Church as an Assistant Professor (in the pre-Gödel days when logic was not taken seriously by many mathematicians). Veblen's strong support of logicians such as Church and Gödel at Princeton, and of logic as a mathematical discipline, was a crucial factor in the subsequent development of logic in the USA.

•*How were Gödel's incompleteness theorems received by his contemporaries?*

Perhaps in view of Hilbert's belief in his programme (prior to the publication of Gödel's work in 1931) it is not surprising that Gödel had his critics. In the early 1930's, Zermelo and Finsler were sharply critical of his work on philosophical and methodological grounds; Perelman in 1936 asserted that Gödel had actually discovered an antinomy; and even as late as 1940 Birkhoff, in the first edition of *Lattice Theory*, expressed skepticism [*sic*] about Gödel's methods of proof. On the other hand von Neumann, who was present when Gödel announced his first incompleteness theorem (at Königsberg on 7 September 1930), immediately recognised its significance and asked Gödel for fuller details. Two months later von Neumann informed Gödel that he had proved as a corollary to the latter's theorem the unprovability of consistency; Gödel had already discovered that corollary which we now know as Gödel's second theorem.

•*Does intuitionistic logic have any significance beyond intuitionism?*

Ruitenberg's article *The Unintended Interpretations of Intuitionistic Logic* includes a condensed introduction to topos theory in which intuitionistic logic plays a key role. A topos is a certain type of Cartesian closed category in which the internal logical structure is intuitionistic type theory; so the natural way to prove things in a topos is to do so constructively. There appear to be rich possibilities for the application of topos theory in analysis, topology, differential geometry, algebra, set theory, ... ; for example Cohen's forcing is really a topos-theoretic technique. As Ruitenberg says,

> The applications [of topos theory] to classical mathematics confirm in a concrete way that proving something constructively really means proving something more.

Inevitably some articles in a collection such as the one under review are less interesting or less well-written than others. But, with a few exceptions, the standard of the articles in Drucker's book is high and the book can be recommended to anyone interested in the history and development of mathematical logic this century.

Douglas S. Bridges
University of Waikato

The Iteration of Rational Functions, by Alan F. Beardon. Graduate Texts in Mathematics, Volume 132, Springer-Verlag, Berlin-Heidelberg-New York, 1991, xvi + 280pp, DM 74. ISBN 3-540-97589-6.

In the last decade there has been a great surge of interest in the study of various nonlinear dynamical systems. It is of course no surprise that this has occurred over roughly the same period of time as the advent of the modern personal computer which provides the stunning pictures we have all come to associate with the area. Chaos, Bifurcation and Fractal are modern mathematical buzz-words, in the same way that Catastrophe was in the 70's. Several books have recently been written responding to the publicity that has been generated in this area. Many of these books are on the subject of "Fractal-Geometry" and many of these delve (albeit to a shallow depth) into the area of complex dynamical systems and iteration theory largely because this is the easiest way to present a comprehensible dynamical system which exhibits many of the more popular phenomena, such as pretty pictures, period doubling, non-integral dimension, scale invariance and chaotic behaviour. One also gets to look at complicated parameter spaces, such as the ubiquitous Mandelbrot set. These books often then try to relate these pictures in one way or another to the "real world", some more successfully than others (I have yet to

understand why the non-integral dimension of the coast of England is so important).

Much of what has recently appeared has focused on the glitzy areas, presenting admittedly beautiful pictures and describing how they are obtained, but not really giving any clue as to why the pictures are like they are and what they really show. The beauty of the ideas and mathematics behind what you see is all too often overlooked. (Devaney's book on one-dimensional dynamical systems, Benjamin/Cummings 1986, is an exception to this, though that book has its own problems). Also the depth of the current mathematical research into these areas is often trivialised even though it is sometimes quite formidable; for instance the efforts to understand renormalisation, entropy and pressure and their relationship to other dynamical properties is deep and difficult as is the work on holomorphic surgery and so forth. Moreover "real" applications abound.

The book under consideration here is of an altogether different nature. There are no colour pictures (!) and only a few pictures of Julia sets and one of the Mandelbrot set. The text is devoted to the study of the iteration of rational functions (as the title suggests). In the introduction the author states that his goal is to provide "a modest attempt to lay down the foundations of the theory" in a "completely rigorous" and "relatively painless" way. I think the author has succeeded admirably.

The book begins and ends with examples. Initially these are simple and motivational (after all you're not supposed to know too much yet). At the end they are more complicated and rely on the developed theory to conclude that they exhibit the desired phenomena. These include dendrites, infinitely and finitely connected components of the Fatou set, infinitely many non-degenerate components of the Julia set, an example where the Julia set is a Cantor set of circles, and so forth. (For the uninitiated, Fatou set = Stable region with nice dynamics, Julia set = Unstable region with chaotic dynamics).

The mathematical highlight of this book is surely the relatively accessible proof of Sullivan's no wandering domains theorem. This result states (roughly) that there are only finitely many distinct forward images of any component of the Fatou set. The first seven chapters are more or less aimed at this recent development which really rejuvenated the mathematics of this area after Fatou and Julia's pioneering work earlier this century. (In fact the major new idea in the area was the introduction, by Sullivan, of the theory of quasiconformal mappings into the study of such dynamical systems). Thus the first few chapters recall the basic properties of families of analytic functions, define the Fatou and Julia sets and discuss their basic properties. We then move on to the classification of the periodic components of the Fatou set. As there are no wandering domains (Chapter 8), this completely classifies the dynamics occurring in the stable regions. Then before the concluding examples we find a discussion of the critical points, the number of cycles in the Fatou set (actually this is another highlight giving Shishikura's proof of the sharp bound), some dynamical properties and a discussion of Hausdorff dimension and a proof of a sharp lower bound on the dimension of Julia sets.

I have had an earlier draft of this book for a number of years and have taught a masters level course out of it here at Auckland. These students had already had an advanced complex analysis course (at the level of Ahlfors' book). The course, which quite closely followed this book, turned out to be popular and well received. The students were able to follow the course with only minor difficulties (which mostly occurred in Chapters 5 and 8, the former because of a lack of familiarity with such things as covering maps and Riemann-Hurwitz and the latter chapter basically because it's the hardest part of the book). I think that this level of course is more or less exactly the audience for which this book is aimed. The proofs are clear and details spelled out (sometimes a little too much for my taste). There is a good bibliography for those wanting to find out more about a particular subject (and there are enough leading questions in the text to encourage one to do so). The book is perhaps a little too easy and slow paced for someone with a strong background in complex analysis (presumably such people are the experts for whom the author says the book is not written).

There are a lot of additional topics that I would like to see covered in a book of this type (but not necessarily this book). There is plenty of important stuff not covered, for instance Yocoz and Shishikura's work on holomorphic surgery, Branner and Hubbard's work on iteration of cubics, Sullivan's work on renormalisation. However much of this is well beyond the scope of this book. Perhaps we will have to wait for the Grundlagen version of Iteration Theory as opposed to the Graduate Text version given here.

This book clearly hits the mark it was aimed at and I hope it popularises the mathematics of the subject among students and others. Behind the nice pictures is some nice mathematics, and here anyone with a modest background in complex analysis can see it. I'd strongly recommend a graduate student with an interest in complex analysis to read it.

Gaven Martin
University of Auckland

Essentials of Statistical Methods in 41 Pages, by T. P. Hutchinson. Rumsby Scientific Publishing, P.O. Box Q355, Q.V.B., Sydney, 1993, $13.

This manuscript covers the content of a standard introductory statistics course at first year university level. It has been written as a companion to such a course. "My assumption is that you are attending a course of clearly-presented lectures, and that you are missing neither any of these nor ... you will find this book a very useful 'memory jogger'." Because the format enables a lot of information to be included on an (A4) page, the 41 pages of the title include the content equivalent of more like 60 or 70 pages of a standard sized book. Much of the work is like a summarised set of lecture notes, although the depth of coverage in uneven. On topics of particular interest to the author the coverage can be quite expansive, and even include strategies for answering standard types of problems and advice about exams. Other topics get very short treatment, e.g. an example of stem-and -leaf plot is given with virtually no explanation of how it was constructed.

First year statistics is an area on which many statisticians have strong (and contrary) opinions. To me, for example, calculations emphasising the use of formulae like $\sum x_i^2 - n\bar{x}^2$ (the author does warn about cancellation error in the calculations) and its alternative versions and counterparts in other areas like regression essentially by hand are a historical anachronism. Where the use of formulae conveys no statistical insight and the calculations are done automatically by very inexpensive calculators, surely we can just let these topics die.

A more important consideration is the place of a manuscript like this. It is inexpensive, and for this reason the author sees it being used in some environments in place of a text with the instructor fleshing it out. There are tradeoffs to be considered between using an inexpensive booklet which the instructor then supplements in class with handouts and problem sheets, and using a much more expensive comprehensive source which allows the instructor to concentrate on the most important issues. There may be environments where economics plays a large part in resolving such a conflict. What the manuscript is clearly good for is as a handy reference for formulae and way of recalling to mind the contents of the statistics course the reader took some years ago.

We conclude with an amusing typo from page 13 which says that if your calculated probability is greater than one, then "YOU'VE MADE A MISKATE."

Chris Wild
University of Auckland

MATHEMATICAL VISITORS TO NEW ZEALAND

We apologise to readers of the Newsletter for the omission of the greater part of this list from the last Newsletter. The error seems to have been in electronic transmission of the list between Christchurch and Auckland. Steps have been taken to prevent a recurrence.

List No. 34 : 5 March 1993

One of the main purposes of this list is to enable other institutions to invite visitors to spend time with them. Anyone wishing to issue such an invitation should do so through the principal contact person.

The information for each item is arranged as follows:
Name of visitor; home institution; whether accompanied; principal field of interest; dates of visit; principal host institution; principal contact person; comments.

###############

Professor Ernie Cockayne; University of Victoria, British Columbia; unaccompanied; combinatorics; February 23 to March 28, 1993; University of Auckland; Prof. Peter Lorimer.

Professor Andreas Dress; University of Bielefeld, Germany; accompanied by wife and son; algebra and combinatorics; March 1 - April 8 1993; Massey University; A-Prof Mike Hendy; 1993 NZMS Visiting Lecturer.

M. Fellows; University of Victoria, B.C. Canada; combinatorics, complexity, theoretical computer science;second half 1993; R. Downey; Victoria University of Wellington; probable.

Professor Robert Hemminger; Vanderbilt University, Nashville, Tennessee, USA, unaccompanied, graph theory, July to December 1993; University of Otago; Prof. Derek Holton.

Professor John Herzog, Pacific Lutheran University; statistics; September to December 1993; University of Canterbury; Prof J. J. Deely

Professor Peter Hilton; SUNY at Binghamton, New York, USA; accompanied by Prof. Jean Pedersen (q.v.); nilpotent group theory and nilpotent homotopy theory algebraic topology, homological algebra, categorical algebra and maths education; September to December 1993; University of Otago; Prof. Derek Holton.

Professor Aimo Hinkkanen; University of Chicago, Urbana; spouse Porama; complex analysis; March to August 1993; University of Auckland; Dr G Martin; very likely.

Dr Karel In t'Hout; University of Leiden; numerical solution of differential equations; September 1992 - September 1993; University of Auckland; Prof. John Butcher.

S. Lempp; Univ. of Wisconsin, Madison; recursion theory; January 1994, for two weeks; Victoria University of Wellington; R. Downey; probable; supported by NSF under a US/NZ binational grant.

Dr Adrian Lewis; University of Waterloo, Canada; accompanied by wife (Heather); nonlinear optimization and analysis; April 1993 Department of Engineering Science, University of Auckland; Dr Andy Philpott.

Professor W. A. Light; Leicester University, U.K.; approximation theory and numerical analysis; July to October 1993; University of Canterbury; Dr R. K. Beatson; Visiting Erskine Fellow.

Professor C. C. Lindner; Auburn University, Alabama; accompanied by wife; combinatorics, Steiner triple systems; second term 1993; University of Canterbury; Dr D.R. Breach; Visiting Erskine Fellow.

Dr Colin Maclachlan; University of Aberdeen, Scotland; accompanied by wife (Dorothy); group theory and topology; February - May 1994; University of Auckland; A/Prof Marston Conder.

Dr. Dan Mateescu; McGill University; January-May 1993; Mechanical Engineering Dept, University of Canterbury; Dr A. J. Bowen.

Dr Dave Panton; University of South Australia; unaccompanied; operations research; February to May 1993; Department of Engineering Science, University of Auckland; Prof. David Ryan.

Professor Jean Pedersen; Santa Clara University, California, USA; accompanied by Prof Peter Hilton (q.v.); geometry, combinatorics, number theory, mathematics education; September to December 1993; University of Otago; Prof. Derek Holton.

Professor Roger Penrose; University of Oxford; accompanied by wife; cosmology and theoretical computer science; March 28 to May 1 1993; all NZ universities; Prof. Graeme Wake; Massey University; Forder Lecturer 1993.

Dr Terry Quinn II, Assoc. Prof. of Fish Population Dynamics; University of Alaska, Fairbanks; fisheries, statistics; March to June 1993; University of Auckland; Prof George Seber.

R. Shore; Cornell University; recursion theory; January 1994, for two weeks; Victoria University of Wellington; R. Downey; probable; supported by NSF under a US/NZ binational grant.

Dr S. Paul Smith; University of Washington, Seattle; accompanied by wife and child; ring theory and non-associative algebra; September 1992 to June 1993; University of Auckland; Ivan Reilly.

Professor M.N. Spijker; Leiden University, The Netherlands; accompanied by wife Marijke; theoretical numerical analysis; January to April 1993; University of Auckland; Prof. John Butcher.

Dr Michael Stiassnie; Technion, Israel Institute of Technology; accompanied by wife; ocean wave dynamics, fractal analysis; March 1993 to August 1993; University of Canterbury; Dr Peter Bryant; Visiting Erskine Fellow.

M. Stob; Calvin College; recursion theory; January 1994, for two weeks; Victoria University of Wellington; R. Downey; probable; supported by NSF under a US/NZ binational grant.

Professor Takeshi Sugimoto; Saitama Inst. of Technology; 1 April 1993 to 31 May 1994; University of Waikato; Assoc. Prof. Alfred Sneyd.

Professor M. H. Taibleson; Washington University; Analysis; May to August 1994; University of Canterbury; Dr H-Q Bui; Visiting Erskine Fellow.

Professor Roland Thomas; Carleton University, Ottawa, Canada; accompanied by wife and son, statistics; September 1993 to May 1994; University of Auckland; Prof. Alistair Scott.

Dr Nicholas Tufillaro; Center for Non-linear Studies, Los Alamos National Laboratory, New Mexico; chaos; June 14 to December 17; University of Otago; Professor Vernon Squire; temporary lectureship.

Ms M. Vancliff; University of Seattle, Washington; unaccompanied; non-commutative algebra; September 1992 to March 1993; University of Auckland; Ivan Reilly.

Professor Andrew Vince; University of Florida; wife and child; graph theory; July 1993 - July 1994; Massey University; Dr Charles Little; possible.

Dr Nicholas Dudley Ward; United Kingdom; analysis; April 19 to August 6 1993; University of Otago; Peter Fenton; temporary lectureship.

Professor Zelda Zabinsky; University of Washington; global optimisation; March-April 1993; University of Canterbury; Dr Graham Wood.

CONFERENCES IN NEW ZEALAND:

When arranging visits it might be useful to remember the following:

NZ Mathematics Colloquium; University of Canterbury; 22 to 26 August 1993
NZAMT Conference 'Maths with Class'; University of Canterbury; August 29 - September 2 1993
20th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing; University of Waikato; 5 to 9 December 1994.

Please note: Production of these lists is dependent on my receiving information. When you know about a visit (whether it be definite, very likely, or possible), would you please forward the details to me at the earliest convenient time. Thank you.

David Robinson
N.Z. Mathematical Society Visitors' Co-ordinator
Department of Mathematics
Private Bag 4800
University of Canterbury
email: dfr@math.canterbury.ac.nz

CONFERENCES

Note: As from this issue of the Newsletter, conference listings will include only conferences scheduled on dates at least three months after the month of publication of each Newsletter, except for conferences in New Zealand and Australia, for which complete listings will continue to be given.

** 1993 **

July 5-9 (Wollongong, New South Wales) **37th Annual Meeting of the Australian Mathematical Society**
Contact Associate Professor M. W. Bunder, Department of Mathematics, University of Wollongong, NSW 2500, Australia.

July 7-9 (Sydney) **Australasian Meeting of the Econometric Society**
Contact Denzil G. Fiebig, Department of Econometrics, University of Sydney, NSW 2006, Australia.

July 12-16 (Geelong, Victoria) **CHAOTIC NUMERICS: An International Workshop on the Approximation and Computation of Complicated Dynamical Behaviour**
Contact Professor P. E. Kloeden, Department of Computing and Mathematics, Deakin University, Geelong, Victoria 3217, Australia.

August 1-7 (Oberwolfach, Germany) **Abelsche Gruppen**
Contact MFOG: see (1) below.

August 1-14 (Galway, Ireland) **Groups 93 Galway/St Andrews**
Contact James Ward, Department of Mathematics, University College, Galway, Ireland.

August 2-6 (Regensburg, Germany) **International Symposium on the Mathematical Theory of Networks and Systems**
Contact MTNS 93, U. Helmke, Department of Mathematics, University of Regensburg, D-8400 Regensburg, Germany.

August 2-6 (München, Germany) **Second Gauss Symposium**
Contact Rudolf Fritsch, Mathematisches Institut, Universität München, Theresienstrasse 39, W-8000 München 2, Germany.

August 2-13 (Athens, Georgia) **Georgia International Topology Conference**
Contact W. Kazez, Mathematics Department, University of Georgia, Athens, Georgia 30602, U.S.A.

August 4-6 (San Francisco, California) **SIAM Conference on Simulation and Computational Probability**
Contact SIAM: see (6) below.

August 4-6 (Colchester, England) **Semigroups of Transformations**
Contact Dr. Peter M. Higgins, Department of Mathematics, University of Essex, Wivenhoe Park, Colchester C04 3SQ, England.

August 7-21 (York, England) **Monoids and their Applications**
Contact Dr John Fountain, Department of Mathematics, University of York, Heslington, York YO1 5DD, England.

August 8-14 (Oberwolfach, Germany) **Konstruktive Approximationstheorie**
Contact MFOG: see (1) below.

August 9-13 (Szeged, Hungary) **Analysis Colloqium**
Contact The Bolyai Mathematical Society, Budapest, Fo u. 68 II. 224, H-1027, Hungary.

August 13-17 (Plovdiv, Bulgaria) **Second International Colloquium on Numerical Analysis**
Contact Ass. S. Zlatev, Mathematical Faculty of the Plovdiv University, Tsar Assen Str. 24, Plovdiv 4000, Bulgaria.

August 14-17 (Plovdiv, Bulgaria) **First Workshop on Oscillation Theory**
Contact D. Bainov, PO Box 45, 1504 Sofia, Bulgaria.

August 15-21 (Oberwolfach, Germany) **Noncommutative Algebra and Representation Theory**
Contact MFOG: see (1) below.

August 16-19 (Seattle, Washington) **Third SIAM Conference on Linear Algebra in Signals, Systems and Control**
Contact SIAM: see (6) below.

August 16-20 (Hamburg, Germany) **First European Nonlinear Oscillations Conference**
Contact Ing. E. Kreuzer, Arbeitsbereich Meerestechnik II, Technische Universität, Hamburg-Harburg, Eissendorfer Str. 42, D-2100 Hamburg 90, Germany.

August 17-20 (Innsbruck, Austria) **International Symposium on Statistics with Non-Precise Data**
Contact Professor R. Viertl, Institut f. Statistik u. Wahrscheinlichkeitstheorie, Technische Universität Wien, A-1040 Wien, Austria.

August 17-20 (Dublin) **The Mathematical Heritage of Sir William Rowan Hamilton**
Contact B. Goldsmith, Department of Mathematics, Statistics and Computer Science, Dublin Institute of Technology, Kevin Street, Dublin 8, Ireland.

August 17-21 (Las Vegas, Nevada) **Second International Conference on Finite Fields: Theory, Application and Algorithms**
Contact P. Shiue, Dept. of Math. Sci., University of Nevada, Las Vegas, NV 89154, U.S.A.

August 18-22 (Plovdiv, Bulgaria) **Fourth International Colloquium on Differential Equations**
Contact Ass. S. Slatev, Mathematical Faculty of the Plovdiv University, Tsar Assen Str. 24, Plovdiv 4000, Bulgaria.

August 21-24 (Bologna, Italy) **ISI Satellite Meeting on Chemometrics and Environmetrics**
Contact Professor Daniela Cocchi, Dipartimento di Scienze Statistiche, "Paola Fortunati", Universita di Bologna, via Belle Arti 41, 40126 Bologna, Italy.

August 22-27 (Lillafured, Hungary) **Topology Colloquium**
Contact The Bolyai Mathematical Society, Budapest, Fo u. 68 II. 224, H-1027, Hungary.

August 22-28 (Oberwolfach, Germany) **Special Complex Varieties**
Contact MFOG: see (1) below.

August 22-29 (Zaragoza, Spain) **Twenty-ninth International Congress of History of Science**
Contact XXIX International Congress of History of Science, Faculdad de Ciencias (Matematicas), Ciudad Universitania, 50009 Zaragoza, Spain.

August 23-26 (Christchurch) **1993 New Zealand Mathematics Colloquium**
Contact Peter Renaud, Department of Mathematics, University of Canterbury, Christchurch, New Zealand.

August 23-27 (Szeged, Hungary) **16th Algebraic Conference: Lattices, Ordered Sets and Universal Algebra**
Contact Gabor Czedli, JATE Bolyai Institute, Szeged, Aradi vertanuk terc 1., H-6720, Hungary.

August 23-28 (Krasnoyarsk, Russia) **International Conference on Algebra Dedicated to the Memory of M. I. Kargapolov**
Contact Organising Committee of the International Conference on Algebra, Institute of Mathematics, Novosibirsk, 630090, Russia.

August 25 - September 3 (Firenze, Italy) **49th Biennial Session of the International Statistical Institute**
Contact ISI Permanent Office, 428 Prinses Beatrixloan, P.O. Box 950, 2270 AZ Voorburg, Netherlands.

August 26-30 (Hanoi) **International Conference on Applied Analysis**
Contact Professor Nguyen Dinh Tri, Hanoi Polytechnical University, Dai Co Viet Str, 10,000 Hanoi, Vietnam.

August 29-September 2 (Christchurch) **Maths with Class - NZAMT Biennial Conference**
Contact The Conference Secretary, "MATHS WITH CLASS", Centre for Continuing Education, University of Canterbury, Christchurch, New Zealand.

August 29-September 4 (Oberwolfach, Germany) **Random Graphs and Combinatorial Structures**
Contact MFOG: see (1) below.

August 30-September 3 (Potsdam, Germany) **Inverse Problems: Principles and Applications in Geophysics, Technology and Medicine**
Contact G. Anger, Rathausstr. 13, Wg 11/09, D-0-1020 Berlin, Germany.

August 30-September 3 (Marseille, France) **Representations des Groups et Analyse Complexe**
Contact CIRM: see (8) below.

August 31-September 4 (Paris) **4th Conference of the International Federation of Classification Societies**
Contact INRIA Secretariat, INRIA - Rocquencourt, Bureau des Colloques, Domaine de Voluceau - BP 105, 78153 Le Chesnay Cedex, France.

September 1-3 (Egham, Surrey) **The Mathematics of Dependable Systems**
Contact IMA: see (7) below.

September 5-11 (Antwerp) **Nonlinear Numerical Methods and Rational Approximation**
Contact A. Cuyt, Dept. of Math. and Comp. Sci., University of Antwerp (UIA), Universiteitsplein 1, B-2610 Wilrijk-Antwerp, Belgium.

September 5-11 (Oberwolfach, Germany) **Novikov Conjectures, Index Theorems and Rigidity**
Contact MFOG: see (1) below.

September 5-12 (Varna, Bulgaria) **First World Conference on Branching Processes**
Contact N. M. Yanev, Dept. of Probability and Statistics, Institute of Mathematics, Bulgarian Academy of Sciences, 8 G. Bontchev str., Sofia 1113, Bulgaria.

September 5-18 (Il Ciocco, Italy) **Algorithms for Continuous Optimization: The State of the Art**
Contact Professor E. Spedicato, Universita di Bergamo, Dipto di Matenatica, Via Salvecchio 19, 24100 Bergamo, Italy.

September 12-18 (Oberwolfach, Germany) **Topologie**
Contact MFOG: see (1) below.

September 13-15 (Eastbourne, England) **Mathematics and Computer Science - The UK Contribution**
Contact IMA: see (7) below.

September 13-18 (Warsaw) **Different Aspects of Differentiability**
Contact Conference D-A-D, Institute of Mathematics, Polish Academy of Sciences, Katowice Branch, Staromiejska 8/6, 40-013 Katowice, Poland.

September 17-20 (Birmingham, England) **Technology in Mathematics Teaching**
Contact Pam Bishop, CTICMS, Faculty of Education, The University of Birmingham, Edgbastan, Birmingham, B15 2TT, U.K.

September 19-25 (Oberwolfach, Germany) **Mathematical Game Theory**
Contact MFOG: see (1) below.

September 20-22 (Leeds) **Complex Stochastic Systems and Engineering**
Contact IMA: see (7) below.

September 20-24 (Marseille, France) **Methods Numeriques dans la Theorie des Surfaces de Riemann**
Contact CIRM: see (8) below.

September 26-October 2 (Oberwolfach, Germany) **Diophantische Approximationen**
Contact MFOG: see (1) below.

October 17-23 (Oberwolfach, Germany) **Geometrie**
Contact MFOG: see (1) below.

October 25-29 (Seattle, Washington) **Third SIAM Conference on Geometric Design**
Contact SIAM: see (6) below.

October 27-30 (Pennsylvania) **7th International Conference on Domain Decomposition Methods**
Contact Ms. R. Manning, Dept. of Mathematics, Penn. State University, University Park, PA 16802, U.S.A.

October 31-November 6 (Oberwolfach, Germany) **Algorithmische Methoden der Diskreten Mathematik**
Contact MFOG: see (1) below.

November 21-27 (Oberwolfach, Germany) **Mathematische Modelle in der Biologie**
Contact MFOG: see (1) below.

November 28-December 4 (Oberwolfach, Germany) **Nonlinear Equations in Many-Particle Systems**
Contact MFOG: see (1) below.

December 6-10 (Perth, Western Australia) **International Congress on Modelling and Simulation**
Contact Michael McAleer, Department of Economics, University of Western Australia, Nedlands, WA 6009, Australia.

December 13-17 (Raleigh, North Carolina) **International Cornelius Lanczoz Centenary Conference**
Contact Robert J. Plemmons, Department of Mathematics and Computer Science, Box 7388, Wake Forest University, Winston-Salem, North Carolina 27109, U.S.A.

December 20-22 (Egham, Surrey) **EURO-COLT '93: Conference on Computational Learning Theory**
Contact IMA: see (7) below.

** 1994 **

January 1-7 (Calcutta) **International Symposium on Mathematical Physics with Special Sessions on Bose's Works**
Contact Professor B. N. Mandal, S. N. Bose School of Mathematics and Mathematical Sciences, Calcutta Mathematical Society, AE-374, Sector 1, Salt Lake City, Calcutta - 700 064, India.

January 5-7 (Hobart) **Conference on Semigroup Theory**
Contact Dr. P. G. Trotter, Department of Mathematics, University of Tasmania, Hobart 7001, Tasmania, Australia.

February 2-4 (Vienna) **IMACS Symposium on Mathematical Modelling**
Contact I. Troch, Inst. für Analysis, Technische Mathematik und Versicherungsmathematik, TU Wien, Wiedner Hauptstr. 8-10, A-1040 Wien, Austria.

April 24-26 (Manhattan, Kansas) **Conference on Applied Statistics in Agriculture**
Contact James R. Schwenke, Kansas State University, Department of Statistics, Dickens Hall, Manhattan, Kansas 66506-0802, U.S.A.

May 24-27 (Isle of Rügen, Germany) **Conference on Hermann G. Grassman (1809-1877)**
Contact G. Schubring, Institut Für Didaktik der Mathematik, Universität Bielefeld, Postfach 100131, D-W 4800 Bielefeld, Germany.

June 13-17 (Stony Brook, New York) **5th International Conference on Hyperbolic Problems Theory, Numerical Methods and Applications**
Contact T. Mills, Dept. of Applied Mathematics, University at Stony Brook, Stony Brook, New York 11794-3600, U.S.A.

July 4-8 (Armidale, New South Wales) **38th Annual Meeting of the Australian Mathematical Society**
Contact Dr C. Radford, Department of Mathematics, Statistics and Computing Science, University of New England, Armidale, NSW 2351, Australia.

July 11-15 (Atlanta, Georgia) **14th IMACS World Congress on Computational and Applied Mathematics**
Contact W. F. Ames, World Congress 14, School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332-0160, U.S.A.

July 25-29 (Marseille, France) **Representation des Groupes Reductifs p-adiques**
Contact CIRM: see (8) below.

August 1-5 (Chiba, Japan) **3rd World Congress on Computational Mechanics**
Contact T. Kawai, WCCM III Office, Dept. of Electrical Engineering, Science University of Tokyo, 1-3 Kagurazaka, Shijukuku, Tokyo 162, Japan.

August 3-11 (Zürich, Switzerland) **The International Congress of Mathematicians 1994**
Contact R. Jeltsch, Seminar für Angewandte Mathematik, ETH, CH-8092 Zürich, Switzerland.

August 15-19 (Ann Arbor, Michigan) **15th International Symposium on Mathematical Programming**
Contact 15th International Symposium on Mathematical Programming Conferences and Seminars, 541 Thomson Street, Room 112, University of Michigan, Ann Arbor, MI 49109-1360, U.S.A.

December 5-9 (Hamilton, New Zealand) **Twentieth Australasian Conference on Combinatorial Mathematics and Combinatorial Computing**
Contact Professor Les Foulds, Department of Management Systems, University of Waikato, Private Bag, Hamilton 3105, New Zealand.

** 1995 **

(Italy) **Second International Conference on Numerical Methods for Volterra and Delay Equations (A conference to celebrate the 100th anniversary of Volterra's birth.)**
Contact A. Feldstein, Dept. of Math., Arizona State University, Tempe, Arizona 85287, U.S.A.

April 23-25 (Manhattan, Kansas) **Conference on Applied Statistics in Agriculture**
Contact James R. Schwenke, Kansas State University, Department of Statistics, Dickens Hall, Manhattan, Kansas 66506-0802, U.S.A.

** 1996 **

April 28-30 (Manhattan, Kansas) **Conference on Applied Statistics in Agriculture**
Contact James R. Schwenke, Kansas State University, Department of Statistics, Dickens Hall, Manhattan, Kansas 66506-0802, U.S.A.

Special Contact Addresses:

(1) **MFOG:** Mathematisches Forschungsinstitut Oberwolfach Geschäftstelle, Alberstrasse 24, D-7800 Freiburg in Breisgau, Germany.

(2) **MSRI:** I. Kaplansky, Director, MSRI, 1000 Centennial Drive, Berkeley, California 94720, U.S.A.

(3) **IMA:** Institute for Mathematics and its Applications, University of Minnesota, 514 Vincent Hall, 206 Church Street S.E., Minneapolis, Minnesota 55455, U.S.A.

(4) **RIMS:** Research Institute for Mathematical Sciences, Kyoto University, Kitashirakawa, Sakyo-ku, Kyoto 606, Japan.

(5) **ICTP:** International Centre for Theoretical Physics, P.O. Box 586, 34100 Trieste, Italy.

(6) **SIAM:** SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, Pennsylvania 19104-2688, U.S.A.

(7) **IMA:** Miss Pamela Irving, Conference Officer, The Institute of Mathematics and its Applications, 16 Nelson Street, Southend-on-Sea, Essex SS1 1EF, England.

(8) **CIRM**: Centre International de Rencontres Mathematiques, Case 916, Luminy, 70 Route Leon-Lachamp, 13288 Marseille, Cedex 9, France.

(9) **CRM:** S. Chenevert, Centre de Recherches Mathématiques, Université de Montréal, CP 6128-A, Montréal, Quebec H3C 3J7, Canada.

(10) **FIRMS:** E. Reidt, The Fields Institute for Research in Mathematical Sciences, 185 Columbia St. West, Waterloo, Ontario N2L 5Z5, Canada.

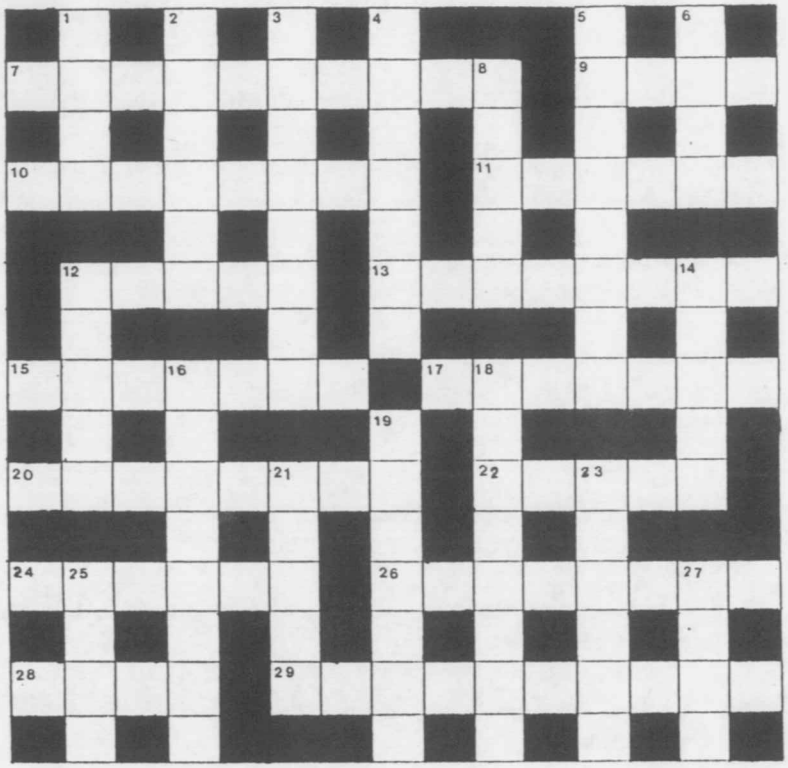
M.R. Carter

Solution to Crossword No 38

The winner of the competition for No 38 was D.J.McCaughan, of the Mathematics Department at the University of Otago, again. Congratulations, Dennis.

CROSSWORD

No 39 Elles by Matt Varnish



Across

The across answers are linked by a common theme

7. Mary at Cambridge the conveyance maker (10)
9. Mina of NY is a backward observer (4)
10. Put nothing before material adornment, a Byronic issue (8)
11. See in grid, in graph or in small layout (6)
12. Mary Ellen in topology takes every other round sign (5)
13. Bird's offspring headed the AMS (8)
15. Quarters the fruit of Wollongong's security (7)
17. Eager group following public relations in Perth (7)
20. Send peer around for American geometer (8)
22. Recursive Hungarian, if blue, flag (5)
24. Admiral mother of COBOL in shop perchance? (6)
26. Courant's director from either a warm or a wet zone (8)
28. Nina (could be Washington's Ruth) places drinking space before me (4)
29. A dutch treat before her initial let Emilie (translated into French) (2,8)

Down

1. Attar of roses with inner food root (4)
2. Be there for a sober finish (6)
3. He decrees a troubled Scot to be in order (8)
4. Greaser slides around yes-men (7)
5. Red canon fodder for big guns (8)
6. Call Hilary or Trinity (4)
8. Beating pulse in broth (5)
12. Is there ever an official within? (5)
14. Nothing listen! After Tennyson's hark (1,4)
16. Like 22 nothing odd with the brace (4,4)
18. Death-wish song over Pole concerning the river-bank (8)
19. Ergonomics less ore for the older maximal(?) Greek poets (7)
21. State measure for the young cod cooked (5)
23. To where without right ground robin (6)
25. Eggs pound squashed circle (4)
27 To be on these 10 is alert (4)