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:

The New Zealand Mathematical Society,
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:

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

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Peter Smith	Statistics and Operations Research (Victoria University)
Garry Tee	Mathematics and Statistics (University of Auckland)

LOCAL NEWS

DEPARTMENT OF STATISTICS
Wellington

Len Cook took up his appointment as Government Statistician in January.

In Math Stats, Karen Wong has left to travel overseas, David Fitzgerald has returned after his travels, and Claire Cameron has left for further study. Andrew Bruce, who we shared with Victoria, has also left and returned to the US. Frank Nolan and Mary had a daughter, Catherine. Mike Doherty is attending The Bureau of the Census Annual Research Conference in Washington. He and Andrew Bruce will give a demonstration at the US Bureau of the graphical editing program developed by Gary Houston and Andrew.

Mike Doherty

UNIVERSITY OF AUCKLAND
Engineering Science

Ian Collins and Roger Nokes have spent part of the summer in Australia. Ian was mainly at the Department of Civil Engineering, University of Newcastle and Roger at the Research School of Earth Sciences, Australian National University. Vincent Hart (Department of Mathematics, University of Queensland) is here during March-April in order to work with Peter Hunter on the applications of finite elasticity to biomechanics.

Seminars

Ijsbrand Haagsma (U. Groeningen) Numerical studies of nonlinear water waves.
Prof. Alistair Mees (U. Western Australia) Real-time railway scheduling.
Malcolm C Pullan (U. Cambridge) An algorithm for a class of continuous linear programs.
Prof. John W S Hearle (ex U.Delaware) The interaction of textile technology and composites engineering.
Prof. K.L. Johnson (U. Cambridge) Plastic flow of surfaces in rolling and sliding contact.
Prof M.J.D. Powell (U. Cambridge) (1) On the number of iterations of Karmarkar's algorithm for linear programming, (2) A direct search method for small constrained optimization calculations, (3) Tabulation of thin plate splines on a very fine two-dimensional grid.
Dr R.F. Henry (Institute of Ocean Sciences, Canada) Interactive design of irregular triangular grids for finite element models.
Deidre MacKenna (U.Calif.San Diego) The role of the extracellular collagen matrix in ventricular function.

D.A. Nield

Mathematics and Statistics

Gaven Martin gained his PhD at the University of Michigan, and he returned here as Lecturer in 1988. His work on Geometry of Discontinuous Groups has attracted much attention, and in 1990 he was promoted to Senior Lecturer. He was promoted 7 months later to Associate-Professor, and now after 5 months he has been awarded a Personal Chair in Mathematics, at the age of 32!

Marston Conder has been promoted to Associate-Professor. Recently, Marston was sent by Lee Peng-Yee (at Singapore National University) a published Chinese translation of a paper by Marston.

M. K. Vamanamurthy has been promoted within the Associate-Professor scale, Chris Wild has been promoted above the bar in the Senior Lecturer scale, and Peter Danaher has been awarded a double increment within the Lecturer scale.

A Mathematics Education Unit has now been formed within the Department, in addition to the existing Units of Statistics and of Applied & Computational Mathematics. Ivan Reilly is the Head of Unit, and some people from other Departments of this University, and from Auckland College of Education, are associate members of the new Unit. Ivan was Acting Head of Department for most of 1991, and now he is Deputy Head of Department for 1992.

Dr An Jianbei has arrived from the University of Chicago as a Lecturer here. Dr Constance Brown has completed her PhD at Harvard, and she has been appointed as Lecturer in the Statistics Unit, and also in the Mathematics Education Unit. Bill Barton (at Auckland College of Education) has been appointed as Lecturer in the Mathematics Education Unit, from 1993. Dr Paul Bonnington is a Lecturer, on a 1-year appointment. Dr Warren Moors, who has recently completed his PhD at Newcastle, is an Assistant Lecturer for the first half of 1992.

Several other appointments as Lecturer are pending; but there is currently much confusion and uncertainty within the Immigration Department about providing entrance visas for people who are not NZ citizens. Some of the people who have accepted Lectureships here, and some of our visitors, have experienced extreme delay and muddle in getting entrance visas. Dr Guyan Robertson (at Edinburgh) had accepted a Lectureship here, but he was so disgusted by the confusion and delay over getting a visa that he resigned his Lectureship here, and he has accepted an appointment in Australia instead!

Of the other new Lecturers announced in the December 1991 Newsletter, Dr Vivien Kirk (at Berkeley) is expected to arrive here in June, and Dr David McIntyre (at Reading), and Dr Ilze Ziedins (at Heriot-Watt University) will now arrive in 1993.

Alastair McNaughton (from Papatoetoe High School) and Matt Regan (from Epsom Girls Grammar School) have been appointed as Senior Tutors for the Tamaki Campus, and Judy Baillie has been appointed as Tutor for the Wellesley Programme. Dr Ian Hawthorn has completed his PhD at the University of Minnesota, and he is here for 1992 as a Tutor. Shane Henderson, Ian Painter and Dale Winter are the Temporary Tutors for the first 2 terms.

Wiremu Solomon has gone on leave for 1992 to the University of New England and the University of Queensland, and Chris King has gone on leave to San Diego, Berkeley and several German universities.

Alastair Scott has returned from leave at Southampton, Ottawa and Berkeley; and John Butcher has returned from leave at many places in Great Britain, Europe and North America.

Dr Wessel Hendrik Moolman, from the University of Durban, is visiting the Statistics Unit for 1992. Dr Peter J. Collins, a topologist from Oxford University, is a University of Auckland Foundation Visitor for the first term. Professor Zbigniew Piotrowski, a topologist from Wroclaw University, is visiting for the first term. Professor Kari Astala, a Complex Analyst from Helsinki University, visited here for a month.

For the first time, all students taking any Stage 1 courses at this University had to pre-enrol; a process which was intended to reduce the muddle and delay of enrolment here. As a consequence of the pre-enrolment procedure which had been programmed, students who had applied for Stage 1 courses in Mathematics & Statistics were directed to come to our Department on 1992 February 20th to get their enrolment forms corrected. And almost all of those 4638 applicants did come on that day!!

By the end of enrolment week, over 20,000 students had enrolled at the University of Auckland for 1992! Another thousand or two are expected to enrol later during the year. The University of Auckland now has more students than does any British university, except for the University of London (which is a loose federation of institutions on many separate sites). The undergraduate 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
1989	581	211	73
1990	612·3	231·8	74·2
1991	708·4	244·0	95·2
1992	774·8	272·4	98·7

About 15 students are now enrolled for PhD within this Department.

The *Mathematical Chronicle* has been published since 1969, by a committee of members of this Department. Volume 20 was published in November 1991, with an announcement that the journal will be

succeeded by *The New Zealand Journal of Mathematics*, to be published in conjunction with The New Zealand Mathematical Society as the official research publication of the NZMS. It is hoped that the new journal will be published twice-yearly, with the first issue (comprising invited addresses from the 1990 and 1991 NZ Mathematics Colloquia) appearing early in 1992. The new Journal will not publish reviews, and it will not publish Colloquium Abstracts: rather, reviews will hereafter be published in this *NZMS Newsletter*.

Seminars

Peter Johnston (MSc Project Seminar), "A method of local truncation error estimation for Runge-Kutta methods".
Bill Barton (Auckland College of Education), "I teach me, not Maths".
Prof. Takayuki Hibi (Hokkaido University), "The Ehrhart polynomial of a convex polytope".
Dr P. W. Sharp (Queen's University, Kingston, Canada), "The state of the art of numerical methods for delay differential equations".
Joyce O'Halloran (Portland State University), "What is an algebraist doing in control theory?",
Prof. Pavel Wintenitz (Montréal), "Lie group theory and analytical solutions of non-linear partial differential equations".
Prof. Kari Astala (Helsinki), "The limit sets of quasi-Fuchsian groups", and "The Cauchy integral and the dimension of quasicircles".
Dr Peter Collins (Oxford), "The metrisation of topological spaces".
Prof. Melvin Hendriksen (Harvey Mudd College, Claremont), "Hausdorff spaces".
Prof. John Howie (St. Andrews), "Arithmetical aspects of semigroup embeddings".

G. J. Tee

UNIVERSITY OF CANTERBURY
Mathematics

Enrolment is marginally up from last year. Our computer laboratory exists at last. It is filled with refurbished SUN 3/50's running as X-terminals. The server is a single SPARC 2 soon to be filled with copious amounts of memory. The department had a very successful non-commercial raft trip in February.

Professor Anne Penfold Street of the University of Queensland visited in November and gave a series of seminars on shared security systems in banks.

Rick Beatson and Allan McInnes both attended the Seventh Texas International Symposium on Approximation Theory at Austin in January.

Professor M.J.D. Powell of Cambridge University is currently visiting. He has given talks on tabulation of thin plate splines on a very fine two dimensional grid and on a direct search method for small constrained optimisation calculations.

Professors Stephen and Myra Samuels of Purdue University are also currently visiting. Stephen is a visiting Erskine Fellow and is giving a seminar series on secretary problems, probability inequalities and related topics.

The departmental seminar series for the year is about to start. A number theory seminar has started -- working through problems in Ireland and Rosen's *A classical introduction to modern number theory*.

Rick Beatson

MASSEY UNIVERSITY
Mathematics

As far as we can tell, enrolments in 1992 will continue the upward trend of the last few years, though administrative delays mean that the extramural enrolments are not yet finalised. Two particularly interesting features are a steep rise (about 20%) in first year calculus enrolments (largely due to an increase in the Technology Faculty), and a much higher enrolment that we expected in a new paper for students in the Finance option of the Business Studies degree.

Ken Louie arrived recently from Oxford to take up a two-year NZVCC postdoctoral fellowship. Ken graduated BSc(Hons) from Victoria University (Wellington) in 1986, and then went to Oxford to work towards a DPhil under the supervision of John Ockenden, modelling inviscid hypersonic flow. At Massey he is still

modelling, but the process is a good deal slower—the spread of TB in possums.

Mike Steel has returned from a fruitful year in Germany to take up a position at Canterbury University. Despite taking a detour through South America, he found time to visit us for a couple of weeks in February, to continue his collaboration with Mike Hendy.

Also during February, a number of Massey applied mathematicians went to Australia for the Applied Mathematics Conference, and Robert McKibbin visited the Government Research Institute, Tohoku, Japan.

Charles Little is back from leave in Vermont, where he worked on planar graphs with Dan Archdeacon and others, obtaining a number of interesting results. Adrian Swift is also back from Manchester, working with the Numerical Analysis group there. At the moment nobody is away on leave, which means office space is at a premium!

Seminars

Peter Frizzell (Massey), "On the split delivery vehicle routing problem"
Mark Byrne (Massey), "On the vehicle routing problem with pick-up and delivery"
Simon Woodward (Massey), "Application of simple mathematics to the management of an agricultural grazing system (Old Macdonald meets Differential Calculus)"
Dr M. A. Steel (Canterbury), "Evolutionary trees: from $\mathbb{Z}_2$ to abelian groups"
Charles Little (Massey), "An algebraic characterisation of planar graphs"
Clive Davies (DSIR Industrial Development, Wellington), "Transient behaviour of particulate solids flowing through a vertical opening: theory and experiment"
Ken Louie (Massey), "Some mathematical problems arising in inviscid hypersonic flow"
Chris Price (Massey), "Semi-infinite optimisation"

M. R. Carter

Statistics

The Statistics Department is well-established in its new location and feeling so secure that four staff have moved overseas, (temporarily we hope). Dick Brook is in Europe, Charles Lawoko is in Brisbane, Doug Stirling is in Wollongong and Chin Diew Lai is in China. Travel is not all outwards however. Our third Fulbright Professor, Sandford Thayer has arrived from Colorado University, Fort Collins. Sandy has expertise in quality control and reliability engineering, and he will be helping us extend our knowledge in those areas. He will be travelling New Zealand, including the Mathematics Colloquium, looking forward to meeting other New Zealand mathematicians and statisticians.

Greg Arnold.

OTAGO UNIVERSITY
Mathematics and Statistics

Our student numbers appear to be about 10% down on last year at the same time. This is probably due to the government policy on student allowances which hit Otago because most of our students come from the North.

At the last Senate meeting, Otago voted to have semesters rather than terms from 1994. This change was precipitated by the changeover to a credit point degree system this year. Surprisingly, the changeover from units appears to have gone smoothly.

Also concerning teaching, Derek Holton was the sole South Island representative on the Policy Advisory Group for the new Draft Mathematics Curriculum. He urges you all to read it and send in your comments to the ministry.

Bryan Manly spent most of January in Colorado, teaching a one week workshop on the Statistics of Resource Selection in Durango for biologists, and finishing a jointly authored book with colleagues in the U.S. In April he travels to Tampere, Finland, to give some lectures on Statistical Ecology and to Montpellier where he is an invited speaker at the Euring '92 conference on the use of marking in the study of bird population dynamics.

There are also people travelling from overseas to visit our department. Already here are Prof. John Moon

and Prof. Dinh van Huyn while Prof. Mel Nyman will be coming in second term.

As usual, the action packed schedule in Otago is also expected to include seminars from various sources as well as all of those university type things that seem to go on in places like this.

Robert Aldred.

VICTORIA UNIVERSITY
Mathematics

We are very pleased to welcome two new lecturers: Vladimir Pestov from Siberia (analysis and mathematical physics) and Geoffrey Whittle from Tasmania (combinatorics); also three new teaching assistants: Nina Herries, Richard Johnston and David Wallace.

We are sad to see Doug Harvie's retirement. About half the present staff including your correspondent learnt some of their mathematics from him; would that we could teach it as well as he did.

Lindsay Johnston's capacity as Chairperson was tested very soon after his term of office began, by a fire in the new computer lab, with water damage all over the Department. Parts of our new building still stink of smoke at the time of writing.

Recent overseas visitors include Peter Cholak (U of Michigan), mathematical logic, until late June; Bill Gasarch (U of Maryland), recursion theory, until late March; Alan Smith (U of Cambridge), geological plate tectonics, until April; David Spence (U of Oxford), fluid mechanics and elasticity, yesterday (one of his typical flying visits)

J. F. Harper

NEW COLLEAGUES

VLADIMIR PESTOV

Dr Vladimir G. Pestov has taken up an appointment as Lecturer at the Mathematics Department of Victoria University as of February 1992.

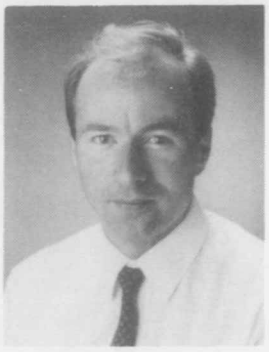
Born in USSR, he received his PhD from Moscow State University in 1983 where his thesis title was "Topological Groups and algebraic envelopes of topological spaces". He has since taught and worked at Tomsk State University, the Novosibirsk Science Centre, University of Genoa and University of Victoria (Canada).

His current research interests are topological algebra (including infinite-dimensional Lie theory), mathematical physics (superanalysis and supergroup theory), and model theory (nonstandard analysis and topoi).

He is here with his wife Irina (MA in theoretical mechanics and fluid dynamics) and two children aged 13 and 8. His hobbies include reading, chess and swimming.

His e-mail address is vova@kauri.vuw.ac.nz

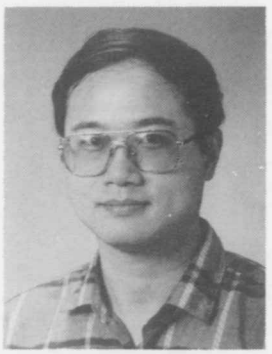
PETER DANAHER



Dr Peter Danaher recently joined the Statistics Unit within the Department of Mathematics and Statistics as a lecturer. He received his undergraduate degree at Auckland, his Masters at Purdue and his PhD from Florida State. After leaving sunny Florida he settled in hazy Dublin for a year at University College. He returned to New Zealand in 1988 to take up a lectureship at Waikato University.

Peter's research interest is the application of statistical methods to estimating the audience for magazine advertising campaigns. He also has strong interests in sample surveys and forecasting.

JIANBEI AN



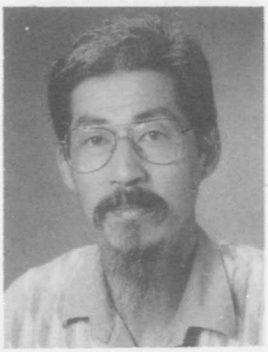
Dr Jianbei An was recently appointed to a Lectureship in the Department of Mathematics and Statistics at Auckland University. Jianbei received his BSc at the Harbin Shipbuilding Engineering Institute, P. R. China, in 1981. After teaching in Mathematics at the Institute for four years and publishing eight papers on groups he started his PhD study at the University of Illinois at Chicago. His PhD was completed in 1991 with thesis title "Two-Weights for Finite General Linear Groups and Two-Blocks of Classical Groups." Jianbei's current research interests include the modular representation of finite groups and the classical groups over a ring.

CONSTANCE BROWN

Dr Constance Brown was recently appointed as a Lecturer in the Statistics Unit of the Department of Mathematics and Statistics at Auckland University. She completed her BSc(Hons) in the same department in 1985, and with much encouragement from Alastair Scott and George Seber, went on to study for her PhD at Harvard.

Having graduated with her doctorate and many rich experiences in June last year, she seriously considered a job in London with the Home Office. In the nick of time, however, Constance came to her senses and realised that there is indeed no place like home. Her research interests are in the field of time series; specifically Bayesian estimation of cross spectral densities, the analysis of long memory bivariate processes, and bias in spectra due to finite sample size.

ROBERT CHAN



Dr Robert Chan was recently appointed to a lectureship in the Department of Mathematics and Statistics based at the Tamaki campus of Auckland University. Robert was raised in Malaysia and completed his secondary education at Auckland Grammar School. He received his BSc at Auckland University and his following MSc studies included a thesis in nuclear physics. After teaching at Papakura High School for ten years and studying mathematics and statistics extramurally through Massey University, he returned to Auckland University and held tutorship appointments in the Department of Mathematics and Statistics where, in due course, he completed an MSc and a PhD under the supervision of John Butcher and Kevin Burrage.

His PhD research was on extrapolation methods based on symmetric Runge-Kutta formulae for the numerical solution of stiff initial value problems. He has since taken up a post-doctoral fellowship at the University of Toronto where he worked with Professor Wayne Enright on the development of a robust code for the numerical solution of ordinary differential equations based on Runge-Kutta methods. More recently, he took up a Raybould research fellowship at the University of Queensland and worked with Professor Kevin Burrage. Robert's current research interests include numerical methods for differential-algebraic equations, stochastic differential equations and inverse problems, and the dynamical behaviour of numerical methods for nonlinear problems.

NOTICE OF ANNUAL GENERAL MEETING AND COUNCIL VACANCIES

The Annual General of the Society will be held on Tuesday May 12 during the 1992 Mathematics Colloquium at Victoria University of Wellington. There are three positions on the NZMS Council that need to be filled at that meeting, including Incoming Vice-President, Secretary and Treasurer. Nominations should be forwarded to Dr R.E.L. Aldred, Mathematics and Statistics, Otago University, as soon as possible. All nominations should have a proposer and a seconder as well as the consent of the nominee.

NOTICES

NZMS VISITING LECTURER 1992

The NZMS Visiting Lecturer for 1992 is Professor John Loxton of Macquarrie University, New South Wales. His research area is number theory. John will be visiting New Zealand from 26 April to 16 May. His itinerary is as follows.

26 April	Sydney to Auckland
29 April	Auckland to Hamilton
1 May	Hamilton to Palmerston North
5 May	Palmerston North to Dunedin
7 May	Dunedin to Christchurch
10 May	Christchurch to Wellington
16 May	Wellington to Sydney

NZMS VISITING LECTURER 1993

In 1993, Professor Andreas Dress will be the NZ Mathematical Society Visiting Lecturer. Andreas has a wide range of interests from classical algebra to various applications of combinatorics. Professor Dress is expecting to be in NZ between mid February and mid April 1993. His visit is being coordinated by Mike Hendy at Massey University.

FORDER LECTURER 1993

The 1993 Forder Lecturer will be Professor Roger Penrose. Professor Penrose is well known internationally and should be a stimulating visitor. When further details of his visit are known they will be published in this *Newsletter* and circulated to all universities.

NZ JOURNAL OF MATHEMATICS

Let me remind you all, first of all, just in case you haven't realised yet, that the NZMS is joining with the Department of Mathematics and Statistics, University of Auckland, to produce the *New Zealand Journal of Mathematics*. This Journal is metamorphosing from the *Chronicle*, and its first issue should appear before the Colloquium this year. (For further details see David Gauld's article in the last *Newsletter*.)

As a result, I sent a letter to all of you earlier this year with various options regarding subscriptions to the new Journal.

The most popular option by far of those offered in my letter was option 1, that a subscription to the *Journal* be part of membership of the Society and be at a cost of approximately $15.

I shall move a motion to this effect at the AGM at the Colloquium in May. However, there are two points which need to be made which will change the motion slightly.

First, it has been pointed out that there are several categories of membership. The NZMS has free student membership as well as honorary memberships. There was a feeling that the people in other than the ordinary category should subscribe to the *Journal* separately.

The second point was made by some statisticians who have queried why they should be forced to pay for a journal whose editorial policy specifically precludes statistics. The Management Committee of the *Journal* will review this policy at its meeting during the Colloquium in May.

I shall therefore put the following motion at this year's AGM:

That all ordinary members receive the Journal, the subscription, of approximately $15, being collected with annual membership fees.

Finally, let me urge you to submit papers to the new *Journal* and encourage your colleagues to do the same.

Derek Holton
President NZMS

DIVISION OF APPLIED MATHEMATICS (AUSTRALIA)
Reciprocity agreement

Recent alterations to the constitution of the Division of Applied Mathematics, Australian Mathematical Society now allow members of Societies with which the Australian Mathematical Society has a reciprocity agreement to join the Division of Applied Mathematics through their own Society rather than through the Australian Mathematical Society. This will be of special interest to NZ applied mathematicians who will be aware of the Division in the areas of journal publication, conferences, branch activities etc.

NZ Mathematical Society members can take advantage of this arrangement either through writing to Dr W. (Bill) Summerfield at the Department of Mathematics, University of Newcastle, Newcastle NSW 230; or by applying to Dr B. Jones, Treasurer, Australian Mathematical Society (Department of Mathematics, University of Queensland, Queensland 4067). The application fee for 1992 is $A7.00 for members of NZMS who wish to join the Division.

G. C. Wake
NZ Co-opted Member
Executive, Division of Applied Mathematics

DIVISION OF APPLIED MATHEMATICS (AUSTRALIA)
A New Zealand Branch?

The Division of Applied Mathematics of the Australian Mathematical Society has recently made significant moves in recognition of increasing NZ involvement in their activities, such as their annual conferences, publications etc. So far

(l) The Executive of the Division has provision for the co-option of a foreign member (so far only NZ has participated) and this has been in operation for more than 3 years;

(2) It has been made possible (by mutual agreement of all concerned) for members of Mathematical Societies with which the Ausalian Mathematical Society has a reciprocity agreement (such as the NZMS) to become members of the Division of Applied Mathematics (Australia) directly without needing to take up the reciprocal membership directly.

The Division of Applied Mathematics has provision for regional branches. A NZ branch of the Division could be formed with a view to promoting applied mathematics in NZ. Your views on this move are sought. A brief meeting to discuss this will be held during the 1992 Mathematics Colloquium at VUW in May.

G. C. Wake

WORLD DIRECTORY OF HISTORIANS OF MATHEMATICS

The Intemational Commission for the History of Mathematics is revising the World Directory. If you would like your name added to the new edition, please write for details to Dr K. E. Pledger, Mathematics Department, Victoria University of Wellington, P.O. Box 600, Wellington.

NZAMT

The President of the NZAMT for the next two years is Bill Ellwood from Christchurch. Bill is Head of Mathematics Department at Burnside High School which is still N.Z.'s largest school. He has been Head of Mathematics since 1974. Before this Bill taught in Toronto, Ontario and Romsey, UK. He is also co-author of the "It's a Mathematical World" series of textbooks which are widely used in Forms 3, 4 and 5 throughout New Zealand. Bill is also editor and writer of the *Mathematical Digest*. The *Digest* enjoys a wide circulation both in New Zealand and Australia.

The Secretary of the NZAMT is Alan Bennett, who is a senior mathematics teacher at Christchurch Boys' High School.

An Executive Committee has been selected to organise and prepare policy statements for New Zealand mathematics teachers. It is the intention of the Association to have a much greater profile and say in mathematics teaching and education in New Zealand.

The Executive Committee is

Miss Prue Purser	Senior Dean, Burnside High School	Mathematics teaching policies.
Mr Tony Davidson	HOD Mathematics, Shirley Boys High School	Curriculum policy.
Mr Paul McWilliam	Mathematics Adviser, Christchurch College of Education	Constitution and membership.
Mrs Linda Tame	HOD Mathematics, Mairehau High School	Women's affairs.
Mr Peter Guerin	HOD Mathematics, Hornby High School.	Liaison and publicity
Mr Alan Parris	Senior Teacher, Linwood High School	Mathematics Certificate courses and 1993 NZAMT conference
Mr Barry Brooker	Senior Lecturer, Christchurch College of Education	Primary affairs
Mrs Rachel Martin	Teacher, Kaiapoi North Primary School	Primary and Cultural Affairs
Mr Bill Ellwood	Presiden,t NZAMT	Liaison with NZMS and Mathematics Teacher Awards.
Mr Alan Bennett	Senior Teacher, Christchurch Boys' High School	Secretary and Treasurer.

Bill Ellwood.

EUROPEAN JOURNAL OF APPLIED MATHEMATICS

The *European Journal of Applied Mathematics* now has an Associate Editor in New Zealand: Dr J. F. Harper, Mathematics Dept., Victoria University, Wellington (e-mail harper@kauri.vuw.ac.nz, phone (04)471 5341, fax (04)471 2070).

Papers may be submitted to him or to any member of the Editorial Board. The Editor-in-Chief is Dr J. R. Ockendon, Mathematical Institute, 24-29 St Giles, Oxford, OX1 3LB, UK. Send three paper copies, or e-mail a LaTeX file including the figures to: ejam@vax.ox.ac.uk

The Journal publishes papers on all areas of applied mathematics, with special emphasis on:

(i) the exposition of new mathematical ideas relevant to the modelling and analysis of modern technological processes,
(ii) the development of interesting mathematical methods with broad areas of applicability.

SIXTEENTH INTERNATIONAL BIOMETRIC CONFERENCE (IBC92)
University of Waikato 7-11 December 1992

This is only the second time an IBC has been held in Australasia; the first was in Sydney in 1967. A number of satellite conferences and workshops have been planned around IBC92. Some of these will be of particular interest to mathematicians as well as to statisticians.

If you wish to present a contributed paper (oral or poster) please send an abstract, on the form published in the *Biometric Bulletin*, or in the March 1992 issue of the *NZ Statistical Association Newsletter* to the IBC92 Secretary by 1 July 1992. Professor J.A. (Nye) John (New Zealand) chairs the contributed papers programme committee. The invited papers and abstracts of the contributed papers are pre-published as the Conference Proceedings.

The March 1992 *NZ Statistical Association Newsletter* will contain registration material and programme information. If you can't wait till then, see the November 1991 or February 1992 *Biometric Bulletin* or contact the IBC92 Secretary for registration and abstract submission forms, and more information on the programme, pre- and post-conference tours around New Zealand, the mid-conference tour day and the accompanying persons programme. The address is: IBC92 Secretary, Ruakura Agricultural Centre, Private Bag 3080, Hamilton, New Zealand. Telephone: 64 (7) 856 2839; Fax: 64 (7) 838 5012; E-mail: ibc@ruakura.maf.govt.nz

Harold Henderson
Ruakura Agricultural Centre

SATELLITE CONFERENCES TO IBC92

A number of conferences and workshops have been planned around IBC92. They include

- Satellite meeting on Biostatistics (University of Newcastle, 30 November to 2 December.)
- Molecular Evolution Workshop (Forest Research Institute, Rotorua, 2-4 December)
- Workshop on Practical Applications of the Bootstrap (ANU, 2-4 December)
- Analysis of Repeated Measurements Data: An Overview (Hamilton, NZ, 3-4 December)
- International Workshop on Matrix Methods for Statistics (Auckland, 4-5 December)
- Dynamic Graphical Analysis of Statistical Models: Short Course (University of Waikato, 6 December)
- Methods for Correlated Data: Current Research (Queenstown, NZ, 14-16 December)
- 2nd Australasian Genstat Conference (Forest Research Institute, Rotorua, 14-16 December)

Further details appear in the Conferences section of this Newsletter, and fuller information will be published in the next *Biometric Bulletin* or may be obtained from Harold Henderson at the address given above.

BOOK REVIEWS

Galois Theory, by J. Rotman. Springer-Verlag, Berlin-Heidelberg-New York, 1990, xii + 108pp, DM 54. ISBN 3-540-97305-2.

I seem to recall reading a review of a recent book devoted to a first course in Galois Theory which began (roughly): What else can possibly be said about this gem of mathematics that was not already covered in those beautiful texts of Artin, Dieudonne? I also seem to recall that in that particular instance, the reviewer's conclusions were — very little and perhaps what was said should have remained unspoken. Having been a great admirer of Artin's and Stewart's texts I approached Rotman's slim volume with very low expectations. I am pleased to say that I was pleasantly surprised.

While this is not my favourite style of text, it is really well done. For characteristic zero all the basic material is here. This material is presented from the definition of a ring and a field to the Galois correspondence theorem and examples of insolvable groups in remarkably few pages (55, in fact). Also included are appendices including a self contained account of the elementary group theory needed, ruler and compass constructions, and

"old fashioned Galois theory". This last appendix attempts to present Galois theory along the lines of Galois via symmetric forms and permutation groups. In the hands of a halfway decent instructor, this would provide an excellent text. The exercises are good, numerous and form an integral part of the development. The presentation is lucid, economical and the choice of notation/terminology very fine. "Slick" is an adjective that springs to mind. Those of you familiar with Rotman's Group Theory text will be familiar with the style.

Nevertheless, if it is still in print I will probably stick to Stewart. Perhaps this is because it is the same I used as a student, but despite its flaws it still seems kinder to the reader. Furthermore, while many students really like the "linear" approach of texts such as Rotman's I feel we should endeavour to present mathematics in a global context. Are we teaching little blocks, or trying to give some idea of the coherence and unity of the subject? This is the same flaw I find in Serge Lang's texts.

I am a little troubled in sounding too negative. Much comes down to taste. There are many, I am sure, who will find this an ideal (and well priced!) text. I guess I would use it if Stewart is not available. And I am glad to have it in my library.

Rod Downey
Victoria University of Wellington

Modern Geometry—Methods and Applications: Part III Introduction to Homology Theory, by B. A. Dubrovin, A. T. Fomenko and S. P. Novikov. Translated from the Russian by Robert G. Burns. Graduate Texts in Mathematics Volume 124, Springer-Verlag, Berlin-Heidelberg-New York, 1990, ix + 416pp, DM 138. ISBN 3-540-97271-4.

This book is the third of a trilogy originally published in Russian by Nauka in 1979. The first two volumes are:

"Part I - The Geometry of Surfaces, Transformation Groups, and Fields", Graduate Texts in Mathematics v.93, 1984;

"Part II - The Geometry of Topology of Manifolds", Graduate Texts in Mathematics, v.104, 1985.

Before discussing Part III I will recall briefly the content of Parts I and II. The chapter headings for Part I are:

1. Geometry in Regions of a Space. Basic Concepts
2. The Theory of Surfaces
3. Tensors: The Algebraic Theory
4. The Differential Calculus of Tensors
5. The Elements of the Calculus of Variations
6. The Calculus of Variations in Several Dimensions, Fields and their Geometric Invariances

The chapter headings for Part II are:

1. Examples of Manifolds
2. Foundational Questions. Essential Facts Concerning Functions of a Manifold. Typical Smooth Mappings
3. The Degree of a Mapping. The Intersection Index of Submanifolds. Applications
4. Orientability of Manifolds. The Fundamental Group. Covering Spaces (Fibre Bundles with Discrete Fibre)
5. Homotopy Groups
6. Smooth Fibre Bundles
7. Some Examples of Dynamical Systems and Foliations on Manifolds
8. The Global Structure of Solutions of Higher-Dimensional Variational Problems

The Preface to Part I, reproduced in Part II, notes that, while the intention is to present a broad sweep of relevant material, the authors "strove to minimize the degree of abstraction of the exposition ... frequently an important result may be obtained in the context of crucial examples containing the whole essence of the matter." The result is two volumes of geometry which should be as accessible to physicists as to mathematicians.

The chapter headings for Part III are:

1. Homology and Cohomology. Computational Recipes
2. Critical Points of Smooth Functions and Homology Theory
3. Cobordisms and Smooth Structures

In addition there are two appendices covering an analogue of Morse Theory for Many-Valued Functions and Plateau's Problem.

There are, of course, many different ways of defining homology and cohomology theories, each with its own particular appeal. With the emphasis on geometry and the content of Parts I and II it is natural that de Rham cohomology, which is defined to be the quotient of the vector space of closed k-forms on a given manifold by the subspace of exact forms, should be defined on page 1 of Part III. Following standard facts about this cohomology theory the authors then introduce successively simplicial, cellular and singular (both simplicial and cubical) homology and cohomology theories, and develop standard facts pertaining to them, including the equivalence of the theories, the cohomology ring, the homology of fibre bundles, obstruction theory, characteristic classes, cohomology operations and sheaf cohomology. There are various applications/computations, such as Hopf algebras, the extension problem, homotopy groups of spheres, hyperelliptic Riemann surfaces and Kähler manifolds.

This short summary does not do justice to the content of Chapter 1, which occupies approximately half of the book. From the summary it would appear that there is a huge amount of material crammed into the chapter, yet the authors' philosophy as stated in the quote above from the preface together with their exploitation of the equivalence of the various theories in their context, results in a clear exposition of the theory, at least in the parts I read carefully. Although the authors make no attempt to present a self-contained exposition, I would recommend this chapter as a good way of becoming thoroughly acquainted with the basics of homology and cohomology theory independently of Parts I and II (though of course it will be necessary to look elsewhere than Chapter 1 for some preliminary notions and results, such as Stokes' theorem for a manifold).

Most of the second half of the book is devoted to a development of Morse theory beginning with a study of how a level set changes as a critical level is crossed. Connections with homology theory are developed via the Morse inequalities and the decomposition of a manifold into a handle sum. This leads to a discussion of a Poincaré duality. Inequalities relating the number of critical points to the Synsternite-Shnirelman category are discussed and there is a section devoted to the study of a collection of degenerate critical points forming a non-degenerate critical manifold. Some time is spent considering analogues of Morse theory on the space of all perceived-smooth paths between two fixed points in a manifold culminating in the result that when the manifold supports a complete Riemannian metric and the two points are not conjugate on any geodesic joining them then the space of paths between the two points is of the homotopy type of a countable cell complex with cells of prescribed dimensions. From this follows a study of the periodic problem of the calculus of variations. There is a brief application to Heegaard splittings of 3-manifolds. Another application is to Bott periodicity with two proofs being given for a unitary version, the first based on 1-dimensional calculus of variations and the second on 2-dimensional; this second proof leads to a sketch proof of Orthogonal Bott periodicity based on 8-dimensional calculus of variations. The final application is to certain solutions of the planar n-body problem.

As for Chapter 1, the chapter on Morse theory provides a good introduction to the subject and leads quickly to some profound applications, especially if one is willing to skim quickly through such homological preliminaries as are needed.

The final chapter applies the techniques built up previously to two classes of problems which have exercised topologies over the past 40 years or so: when is a manifold the boundary of another manifold and such related problems as under what conditions as a homology class represented by a submanifold; is a smooth structure on a manifold essentially unique? The response to the first question involves a study of the cobordism groups and the signature of a manifold and has as a by-product Novikov's topological invariance of the rational Pontrjagin classes. The response to the second question, of course, gives Milnor's answer that the 7-sphere does support essentially different differential structures.

I would recommend this book to anyone who wants a friendly approach to either homology and cohomology theory or Morse theory (or both) together with some significant applications. There is a large amount of deep and complicated mathematics encountered on the way. However, the authors' decision not to work in complex generality means that the reader is required only to familiarise him- or herself with smooth manifolds but not get too worried by general topological spaces. The neglect of general topological spaces carries no cost when it comes to the applications. The reader lacking some of the geometric and topological preliminaries, such as the theory of smooth manifolds and Stokes' theorem, need look no further than the previous volumes, especially Part II.

Ka uaua teenei take mahi whika, ka maarama te whakapuaretanga.

David Gauld
University of Auckland

Introduction to Applied Dynamical Systems and Chaos, by S. Wiggins. Texts in Applied Mathematics Volume 2, Springer-Verlag, Berlin-Heidelberg-New York, 1990, xiv + 672pp, DM 98. ISBN 3-540-97003-7.

This book gives a detailed textbook treatment of dynamical systems and chaos dividing this material into four chapters.

I. The geometrical point of view of dynamical systems, background material, Poincaré maps and examples.

Because of the diversity of systems of differential equations that describe dynamical systems it is not possible to describe universal rules for their study and the predictions of their orbit structure. Ideally given a specific dynamical system what is required is a complete characterisation of the geometry of the orbit structure. What is done in this chapter is background material for subsequent chapters while simultaneously focussing on a specific example, viz the Duffing oscillator given by the equations

$$\dot{x} = y$$
$$\dot{y} = x - x^3 - \delta y + \gamma \cos \omega t$$

where δ, γ and ω are real parameters. Physically δ can be regarded as dissipation, γ as the amplitude of the forcing and ω as the frequency. This chapter divides into two main parts, the first covers topics such as equilibrium solutions, index theory etc culminating in the Poincaré Bendixson theorem. The second section discusses the notion of Poincaré maps in some detail. These maps are the name given to virtually any discrete time system that is associated with a dynamical system. This method of study of a dynamical system offers several advantages in the study of ordinary differential equations, including, (i) dimensional reduction (ii) easier analysis of aspects of global dynamics and (iii) conceptual clarity. Construction of a specific type of Poincaré map requires a certain amount of ingenuity. It is most often used to study the orbit structure near a periodic orbit, or periodic portions of phase space, or the orbit structure near a homoclinic or heteroclinic orbit.

II. Methods for simplifying dynamical systems.

This involves two basic approaches, viz reduce the dimensional of the system which is the mechanism of centre manifold theory and eliminating the nonlinearity which arises from the use of the method of normal forms. These methods are the most important generally applicable methods available in the local theory of dynamical systems.

III. Local bifurcations.

This chapter addresses the questions of (i) the stability or instability of a fixed point (ii) the affect of varying a parameter on this stability or instability. Two types of systems are considered

(i) the parametrised vector field

$$\dot{y} = g\,(y,\lambda), \quad y \in \mathbf{R}^n, \quad \lambda \in \mathbf{R}^p$$

(ii) a p parameter family of maps

$$y \to g\,(y,\lambda), \quad y \in \mathbf{R}^n, \quad \lambda \in \mathbf{R}^p.$$

This chapter gives a good coverage of bifurcations in these solutions and also points out some of the pitfalls.

IV. Aspects of global bifurcations and chaos.

This chapter discusses techniques for describing what is meant by the term "chaos" as applied to deterministic dynamical systems. Mechanisms that give rise to chaotic dynamics as well as analytical techniques for predicting when these mechanics occur are developed. Topics covered in this chapter include the Smale horseshoe, Symbolic dynamics, Melnikov's method for homoclinic orbits in two dimensional time periodic vector fields and Chaos and Strange Attractors. By using a geometrical construction on a map, a description of the dynamics on its invariant set is given from which follows the precise idea of chaos. This is a fascinating chapter.

This book is written in a very readable manner. That is not to say that it is easy material. Numerous examples in the actual text as well as standard, carry through examples such as the Duffing oscillator equations as mentioned above, make the subject easier to follow. In addition there are numerous examples at the end of each section for the reader to try. Of all the books written by Wiggins on the subject this is the easiest to read.

E.G. Kalnins
University of Waikato

SPRINGER AND BIRKHÄUSER PUBLICATIONS

Information has been received about the following publications. Anyone interested in reviewing any of these books should contact

David Alcorn
Department of Mathematics and Statistics
University of Auckland
(email: alcorn@mat.aukuni.ac.nz)

Algorithms and Combinatorics

4.	Korte B	Greenoids. 211pp.

Applied Mathematical Sciences

89.	O'Malley RE	Singular perturbation methods for ordinary differential equations. 225pp.
90.	Meyer KR	Introduction to Hamiltonian dynamical systems and the n-body problem. 292pp.

Encyclopaedia of Mathematical Sciences

28.	Ostianu NM (ed)	Geometry I – Basic ideas and concepts of differential geometry. 264pp.
30.	Egorov YuV (ed)	Partial differential equations I – Foundations of the classical theory. 259pp.
32.	Egorov YuV (ed)	Partial differential equations III – The Cauchy problem. Qualitative theory of partial differential equations. 197pp.
42.	Khavin VP (ed)	Commutative harmonic analysis IV – Harmonic analysis in R^n. 228pp.

Graduate Texts in Mathematics

129.	Fulton W	Representation theory – a first course. 551pp.
131.	Lam TY	A first course in noncommutative ring theory. 397pp.
132.	Beardon A	The iteration of rational functions—Complex analytic dynamical systems. 280pp.

Grundlehren der mathematischen Wissenschaften

297.	Pastur L	Spectra of random and almost-periodic operators. 587pp.
298.	Berline N	Heat kernels and Dirac operators. 369pp.

ISNM (Birkhäuser)

100.	Desch W (ed)	Estimation and control of distributed parameter systems. 396pp.

MSRI Publications

22.	Ratiu T (ed)	The geometry of Hamiltonian systems. 527pp.
24.	Montgomery S (ed)	Noncommutative rings. 178pp.

Operator Theory; Advances and Applications (Birkhäuser)

52.	Prössdorf S	Numerical analysis and related operator equations. 560pp.

Progress in Systems and Control Theory (Birkhäuser)

9.	Byrnes CI (ed)	Nonlinear synthesis. 305pp.
	Bowers K (ed)	Computation and control II. 377pp.

Texts in Applied Mathematics

3.	Hale JK	Dynamics and bifurcations. 568pp.
9.	Pipkin AC	A course on integral equations. 268pp.

Universitext

	Jones A	Abstract algebra and famous impossibilities. 187pp.
	Meyer-Nieberg P	Banach lattices. 395pp.

Miscellaneous

	Jensen KK	Elements of KK-theory. 250pp.
	Lojasiewicz S	Introduction to complex analytic geometry. 537pp.
	Selberg A	Collected papers II. 253pp.

GRANTEE REPORTS

IVAN REILLY

1. International Mathematical Olympiad

I arrived in Stockholm on 12 July 1991 to lead the New Zealand team at the 32nd International Mathematical Olympiad (IMO). The New Zealand team was already in Stockholm with the Deputy Leader, overcoming the problems of exchanging winter for summer and night for day. Altogether there were teams of up to six high-school mathematicians from fifty-five countries who converged on the picturesque little town of Sigtuna, 50 km north of Stockholm. Each team was accompanied by a Leader and Deputy Leader.

The Team Leaders together formed a Jury which was responsible for setting the questions, evaluating the results and awarding the prizes.

The IMO is a contest for individuals, and the rules determine that up to 50% of the contestants may win Gold, Silver and Bronze medals, which are awarded in the ratio 1:2:3. In addition, students who do not win a medal but manage to score full marks on at least one question are awarded an Honourable Mention.

The Soviet Union topped the unofficial rankings, with 241 points out of a maximum of 252. Second was China, last year's winner, with 231 points, and Romania came third with 225 points. The New Zealand team was placed 29th with a team score of 91, winning two bronze medals and an Honourable Mention.

The last day of the IMO ended with the Closing Ceremony, with the presentation of medals, followed by a banquet and entertainment.

2. Research Visits

I sailed on the ferry from Stockholm to Helsinki overnight on 23 July. My host in Helsinki was Professor Toivo Nieminen, Institute of Mathematics, University of Helsinki. He and one of his students are working on generalized open sets and related topics. They have answered a question raised in a recent paper by Ganster and Reilly. We had two days of concentrated discussion. I was not able to give a lecture because the University is closed in the second half of July.

On 26 July, I flew to Moscow. Here my host was Dr Arkadie Slin'ko, Institute of Systems Studies, USSR Academy of Sciences. While in Moscow I gave two invited lectures, both at Moscow State University. One, at the Chair of Topology, was on my recent work (with Ganster) on decompositions of continuity. The other, sponsored by the USSR Academy of Sciences, was to the Committee for the All-Soviet Mathematical Olympiad, and was titled "A small country at the IMO". Next year, 1992, there will probably be several teams from small countries that in 1990 were part of the Soviet Union. While in Moscow, I was able to have discussions with several leading Soviet topologists, especially A. V. Arhangel'ski, V. V. Fedorchuk and D. B. Shakmatov. On the Sunday I was in Russia, my hosts took me to Zagorsk, the headquarters of the Russian Orthodox Church, and I was able to participate in a packed church service. On entering another of the churches to see some special icons, my host and I were stopped by a stern-faced cleric. It seemed that my New Zealand summer costume, especially walk-shorts, offended the deity worshipped therein (or at least its earthly representative), and I was requested to leave. I did so, contemplating that while a year in a gulag is one thing, an eternity in the wrong place is quite another.

On 1 August, I flew to Thessaloniki via London at half the price of a direct flight, but four times as long. I spent a week in Thessaloniki visiting my co-author Dr Charikleia Konstadilaki-Savvopoulou. We were able to complete our paper "On c-closed functions", and it has now been submitted for publication. We began discussions on another paper. Until we establish electronic-mail contact, I fear that progress will be slow.

My next stop was Graz, Austria, where my host was Dr Max Ganster. I gave a lecture at Mathematisches Institut, Technische Universität, Graz, on "Properties of fine topologies". Since my visit, we have submitted two papers, "Another decomposition of continuity" and "Remarks on locally closed sets". We are in e-mail contact, and the difference it makes for joint research is phenomenal.

3. Conference Attendance:

Dr Ganster and I travelled by train from Graz to Bern overnight on 13 August, to attend the International Conference on Uniform Mathematics and Applications. Bern was celebrating its 800th birthday and was decked out for the occasion. Three very full days of conference passed quickly. My talk seemed to be well-received. Titled "Take a look in the mirror", it discussed properties of a quasi-uniform space which are determined by other properties of its conjugate (or reflection). There was a great deal of interest in my announcement of an up-coming bibliography on the literature of quasi-metric spaces. This project has occupied me for more than two years, and has been supported by two small research grants (each less than $1,000) from the University of Auckland Research Committee. At this conference there were a significant number of mathematicians from East European countries (financed by the organising committee). But Soviet delegates were conspicuous by their absence.

This was certainly not the case of the 7th Prague Topological Symposium, 18-24 August. There was a large number of Soviet topologists present. I had travelled overnight by train with a group of six colleagues from Bern to Prague. At 3 a.m. there was a "border incident". Two of our party, a Canadian and a Chinese, were removed from the train by the Czech border guards. The rest of us waited at the Prague railway station for them to arrive on the next train three hours later. Making rogue charges for 'proper' visas seems to be a way for officials to supplement their income.

This meeting which takes place every five years is widely regarded as the major regular topology conference in Europe. The large Soviet contingent and the rest of us woke on Monday to find that tanks were rumbling down the streets of Moscow that I had walked on just three weeks earlier. The first two days of the conference were a stressful time, especially for the Soviet delegates. But on the Wednesday there was a good deal more smiling. It seemed incongruous to be watching the failure of the Soviet coup on Czech television from CNN reports.

I had many requests for detailed copies of my talk which was a discussion of some ramifications of a modern topological interpretation of classical ideas of Denjoy and Cartan. This was a great opportunity for me to meet members of the East European and Soviet schools of Topology, as well as West European and American topologists. I hope I can attend the 8th Prague Topological Symposium in 1996.

This report will convey, I trust, some of the enjoyment and stimulation that was mine. I wish to express my gratitude to the Council of the NZ Mathematical Society for the award of a grant in partial support of my activities.

Ivan L. Reilly
University of Auckland

ROD DOWNEY

The NZMS have supported two of my recent trips overseas. In late 1989, I travelled principally to the 4th Biennial Asian logic meeting at the beautiful CSK centre in outer Tokyo. This conference was a satellite of the International Congress in Kyoto and attracted a number of major workers in logic. I gave an invited talk on my joint work with Mike Stob on automorphisms and splittings of recursively enumerable sets. Preliminary results appeared in the conference proceedings and a later version will appear in the Annals of Pure and Applied Logic. I also began some work with Steffen Lempp of the University of Wisconsin who was in attendance.

This year in a trip again partially supported by the NZMS I visited the University of Illinois at Urbana and the University of Wisconsin at Madison. At the first I worked with Carl Jockusch and we finished off some old work on "anr degrees" about which we have been corresponding for 2 years! We obtained some initial results on torsion free abelian groups concerning the complexity of their presentations (upon which we are still working) and began a project on a combinatorial topic called difference sets, and their relation to arithmetic and Borel sets. In my visit to Lempp at Wisconsin, I was able to interact with several students as well as realizing the project with Lempp we begun at Tokyo. A paper on this work has been submitted. In each of these universities I gave invited lectures. In Wisconsin, I gave lectures in both the Mathematics and Computer Science Departments.

While e-mail and fax have made an enormous difference to our ability to engage in collaborative research with people from the major centres, it is nevertheless true that there are certain times in a project where it is really important that the authors get together. Also there can be no doubt that contact with major research centres gives one a whole host of ideas. I would like to thank the NZMS for the grants that, in part, enabled me to benefit by the above experiences.

Rod G. Downey
Victoria University of Wellington

CENTREFOLD

Mr Garry Tee

GARRY JOHN TEE

by John Butcher and Ron Keam

Garry John Tee was born in Wanganui in 1932, in the depths of the Depression. In those difficult times his father made his livelihood by operating an informal mobile library. Later the family lived in Omihi, near Kaikoura, and then in Glen Massey and Ruawaro. Undoubtedly the hardship which Garry saw all around him in those early years of his life had a profound effect on him and helped shape his social conscience. It was unusual for anyone with the intellectual ability that Garry exhibited to attend Seddon Memorial Technical College but this was what he did, and he was remarkable, not only in winning a Junior Scholarship in the 1948 examination, but also in topping the list.

Because of his wide scientific interests, Garry pursued his BSc degree both in Pure and Applied Mathematics and also in Physics. He qualified in Mathematics for an MSc with first class honours. Garry did not take any foreign language at school. However, it became necessary for him to achieve reading ability in a foreign language as part of the MSc requirements. Garry taught himself Russian and became so proficient at this language that later he was able to use this skill to translate five books by Russian mathematicians. The late Robert Maxwell, founder of Pergamon Press, from the start took a personal interest in this important work. Garry correctly judged that computers had a great future and decided to move into this area of interest. This was many years before there were any computers in New Zealand. From 1958 to 1964 he worked in a congenial research environment for the English Electric Company but then accepted an invitation to join the mathematics staff of the new University of Lancaster. He spent a period of time in 1965 visiting the Computer Science Department of Stanford University and in 1968, returned to Auckland as a Senior Lecturer in Mathematics. He later became a foundation member of the Computer Science Department staff, but recently has returned to a position in the Mathematics and Statistics Department.

In 1971, Garry had the opportunity to study with Professor Richard Bellman at the University of Southern California. The topics on which he worked included an analysis of the Strassen method for numerically solving linear equation systems. Unfortunately, the illness of Professor Bellman, from which he never recovered, meant that Garry had to return to Auckland without completing his doctorate. However, Garry has been prodigious in research on this and other topics over the years. His early published work was in various aspects of numerical analysis, especially in iterative and other methods for the solution of linear equation systems, and especially those arising from discretised partial differential equations. More recently, a long-standing interest in scientific history has assumed an increasingly important place in his work. He reads an incredible range of material and is always on the lookout for subtle connections. He believes that perhaps his most important scholarly contribution was in connection with the similarity between Western Chou (Chinese) bronze tigers and a Chavín (Peruvian) jaguar. He pointed out that this similarity could quite realistically have been due to a direct—if unintended—link between the two cultures around the –3rd century. His scientific detective work has led to his finding New Zealand connections with a number of great scientific and mathematical people, such as Babbage, Hamilton and Darwin. He takes a particular interest in New Zealand mathematicians who have achieved fame elsewhere. Examples of this include Aitken and Comrie whom he has studied extensively. Garry is much in demand as a reviewer, and his wide-ranging reviews almost invariably add interesting elements to the subject of the work being considered. Informed comments from Garry are also to be found frequently in letters to the editors of such periodicals as *New Scientist* and the New Zealand *Listener*.

Garry's interests in mathematical biography led him to a study of the lives and works of some of the great woman mathematicians. An important example of this is Sof'ya Vasil'yevna Kovalevskaya, the famous analyst whose name is attached to the Cauchy-Kovalevsky theorem. A second example is Augusta Ada, Countess of Lovelace, who is recognised today as the first computer programmer and the scientific partner of Babbage. Later Garry was to write a major article dealing with several of the great woman mathematicians of history.

Garry has been an active supporter and a popular speaker at the New Zealand mathematical colloquia. Most recently, he was invited to mark the 25th anniversary of the start of these annual events by presenting a historical survey of them. This was illustrated by photographs from Garry's own collection of mementos. In fact Garry is a keen photographer, especially of significant conference events. As a keen swimmer and underwater diver, he was also an enthusiastic photographer of marine life, until he had to retire from these activities for medical reasons.

Garry is unique in the New Zealand mathematical and scientific scene. He has a detailed knowledge of an enormous range of subjects from the literary to the scientific, and this knowledge is a valuable resource which he readily shares. He adds his own distinctive flavour to discussions with his colleagues and maintains an active correspondence with many people throughout the world. His influence, one way or another, is enormous. I am sure that fellow mathematicians and all who know Garry will wish to express with us their appreciation for his contributions and to congratulate him on reaching the age of sixty.

MATHEMATICAL VISITORS TO NEW ZEALAND

List 31 : 1 March 1992

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.

Dr Peter Cholak; University of Michigan; wife; recursion theory, theoretical computer science; 22 June 1991 to June 1992; Victoria University, Wellington; Dr Rod Downey; postdoctoral fellowship.

Dr Peter Collins; Oxford University; wife; topology; 9 February to 1 May 1992; University of Auckland; Ivan Reilly; University of Auckland Foundation visitor.

Professor Dinh Van Huynh; Institute of Mathematics, Hanoi, Vietnam; ring theory; January - April 1992; University of Otago; John Clark; possible.

Dr William Gasarch; University of Maryland; wife; theoretical computer science; February and March 1992; Victoria University, Wellington; Dr Rod Downey; very likely.

Dr Chris. Gibson; Liverpool University, U.K.; unaccompanied; singularity theory and applications; May 1992; Victoria University; Peter Donelan; very likely.

Professor Mel Henriksen; Harvey Mudd College, Claremont, California; wife; analysis, topology; 4 March to 1 April 1992; University of Auckland; Ivan Reilly.

Professor John Howie; U of St Andrews; late March 1992; University of Canterbury; Dr G.R. Wood.

Ken Milton; Centre for Educational Studies, University of Tasmania; mathematics education; early March to mid-April, also later 1992; Centre for Science and Mathematics Education, University of Waikato; Andy Begg.

Dr Ghanshyam Mehta; Dept of Economics, U of Queensland; April-May 1992?; mathematical economics; University of Waikato; Prof. Douglas Bridges; possible.

Professor J. W. Moon; University of Alberta; graph theory; August 1991 to August 1992; University of Otago; Prof. Derek Holton.

Professor Melvin A. Nyman; Alma College, Michigan, USA; applications of mathematics to problems in resource management, biological and social sciences; June - August 1992; University of Otago; Prof. Brian Manly.

Dr Zbigniew Piotrowski; Youngstown State University, Ohio; unaccompanied; real analysis; March to May 1992; University of Auckland; Ivan Reilly; very likely.

Professor M.J.D. Powell; U of Cambridge; approximation theory, optimization, numerical Analysis; January to March 1992; University of Canterbury; Dr R. K. Beatson;

Professor Stephen M. Samuels; Purdue University; wife (Dr Myra Samuels, biostatistician); probability theory and applications, dynamic optimization; 7 Jan - 8 May 1992; University of Canterbury; Dr Murray Smith; Visiting Erskine Fellow.

Professor Sanforth Thayer; Dept. of Mechanical Engineering, U of Colorado, Fort Collins; Wife (Nona); industrial engineering, operations research, quality assurance; 1 March to 31 May 1992; Massey University; Prof. G. C. Wake; As a Fulbright Visitor he

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
University of Canterbury

SECRETARIAL

MINUTES OF THE THIRTIETH COUNCIL MEETING
Friday 29 November 1991

The meeting was held at the meeting rooms of the Royal Society, Turnbull Street, Wellington and began shortly after 10:00 a.m..

PRESENT: Robert Aldred (eventually), Bill Ellwood (NZAMT), John Giffin, Rob Goldblatt, Derek Holton (Chair), Margaret Morton, David Robinson, Kee Teo, Gillian Thornley, Graeme Wake (FOSTS) and Graham Weir. Brian Balshaw, Executive Officer of FOSTS, joined the meeting for the FOSTS report and discussion.

1. **APOLOGY**: Ingrid Rinsma.

2. **MINUTES OF THE TWENTY-NINTH COUNCIL MEETING**:

It was moved by David Robinson and seconded by Gillian Thornley that the minutes of the previous meeting be received and signed as a true and accurate record. The motion was carried.

3. **MATTERS ARISING FROM THE MINUTES**:

There were no matters arising from the minutes.

4. **CORRESPONDENCE**:

All relevant correspondence is dealt with elsewhere in the agenda.

5. REPORTS:

(a) TREASURER. Kee Teo reported on the state of the Society's funds. He noted that the fall in interest rates would affect the income earned by the term investment, currently $100,000 on 90 day deposit. This was acknowledged and generally agreed that the current investment policy should be maintained.

The distribution of the approximately $10,000 income was detailed.

(b) MEMBERSHIP: It was reported that the Society's membership currently stands at 151 ordinary members, 16 reciprocal members, 2 free members, 23 student members, 4 free student members, 1 life member and 10 honorary members. It was also suggested that members be reminded of the policy of offering one year's free membership to post graduate and final year honours students.

(c) PUBLICATIONS: Nil Report.

(d) NEWSLETTER: Nil report.

6. FOSTS:

Graeme Wake presented details of the FOSTS Chairperson's Report and indicated that a new electoral system had been implemented and a new FOSTS Council had been elected. Under the new system, mathematics is included in the same sector as Physics, Population, Computers etc. Our relevant sector representative is John Clare although it was noted that Graeme Wake could still act as Mathematics/Statistics liaison with FOSTS. The New Council will meet on 18 December to distribute portfolios.

Brian Balshaw reported on the review of the Royal Society Act which is currently being undertaken. He stressed the need for a non-corporate political body for the sciences.

7. THE JOURNAL:

The formation of The New Zealand Journal of Mathematics from The Chronicle and the commitment of the NZMS in doing so was discussed. In particular, the financial implications to the Society were mentioned in the light of a letter from David Alcorn in which it was indicated that the Society may be required to provide a $2000 grant in the first year.

Due to the uncertain nature of the undertaking, Derek Holton suggested that we should limit the Society's ongoing commitment. The ensuing discussion recognized the desirability of such a journal and the excellent goodwill extended by Auckland in the venture.

It was moved from the Chair that the Society give the Journal $3000 in February 1992, $2000 in February 1993 and $2000 in February 1994 with a review of future commitment in 1993.

The motion was carried unanimously.

The question of personal liability of members of the committee was raised and a document and postal ballot was to be circulated to the Council to determine the Society's position on this point.

A second ballot to determine the membership's feelings about subscriptions to the Journal will be circulated.

The Chair moved the following resolutions:

Resolution 1. The purpose of the NZJM Journal Committee is to encourage the dissemination of mathematical knowledge by publishing the New Zealand Journal of Mathematics on a non-profit basis on behalf of the Department of Mathematics and Statistics of the University of Auckland and the New Zealand Mathematical Society, with the aim of providing a publication outlet for local authors and a medium for exchange.

Resolution 2. In the event of the Committee being wound up the assets of the committee shall be apportioned on an equitable basis between the Department of Mathematics and Statistics of the University of Auckland and the New Zealand Mathematical Society.

Both were carried without dissent.

8. AUSTRALIA/NZ INSTITUTE OF MATHEMATICS:

In Australia the need has arisen for a body to accredit the competence of mathematicians to various bureaucratic bodies. The formation of a National Mathematical Science Research Institute may very well result across the Tasman, and the Society will keep in touch against the eventuality that such a body may some day be required here.

9. MATHEMATICS EDUCATION POLICY:

At the NZAMT (New Zealand Association of Mathematics Teachers) conference in September, concern was expressed at the current government's attitude towards education. It was decided to set up a group to develop policy about the mathematics curriculum and related matters, and ways of implementing this policy. It was suggested that Derek Holton and Gordon Knight keep in contact with NZAMT on this matter to give them any assistance they required. It was also felt that the NZMS should consider developing a policy which complements that of NZAMT.

10. ACHIEVEMENT INITIATIVE-MATHEMATICS:

Derek Holton gave a brief description of a suggested system of achievement based mathematics instruction. The Policy Advisory Group is currently revising the system and will have a fuller version ready for trial in 1992. The system may be implemented in 1993. A Maori document is being produced to parallel the above.

11. NZMOC:

The New Zealand Mathematics Olympiad Committee reported (through Derek Holton) that the team had won two bronze medals and an honourable mention in the last competition, and that the team placing had improved by one position over the 1990 performance.

It was suggested that some support for 1992 could be sought from the Society, and that that matter would be raised again in May.

12. ICMI REPRESENTATION:

It is the policy of the ICMI to change representatives reasonably frequently, and as Gordon Knight has been the Society's representative there for some time it has been suggested that Megan Clark, Director of the Mathematics Education Centre at Victoria University, be considered for the position. The matter is being looked into further.

13. IMU:

The IMU has requested that Mathematicians be encouraged to contribute to their Special Development Fund (SDF) to help bring qualified young mathematicians from developing countries to the ICM in 1994. It was recommended that the attention of members be brought to this by compiling a short piece for the Newsletter.

It was also requested that donations be sought to help support the Rolf Nevanlinna Prize. As very little was known about the prize, it was decided to find out more information before a call for donations is made.

14. JIM CAMPBELL TEACHER'S AWARD:

The 1991 awards were presented to:

> Wayne Abrahams, Christine Anderson, Kathy Beatson, Anthony Davidson, Russell Dear, Gwenda Hill and Kevin Kent.

On the whole it was felt that the awards were a good concept, although there were some problems with the first round. Indications were that there was some uncertainty about the exact nature of the award and the selection process by which the awards were made. It was decided to address some publicity to clearing up these problems and to form a selection body from NZMS and NZAMT.

The name of the award was brought into question as the name Jim Campbell is relatively unknown outside of Wellington.

The Chair also asked that we set aside $500 towards funding the attendance at the Colloquium for award winners next year. It was also asked that we discuss making such a commitment ongoing with an annual review.

15. NZMS POLICY DOCUMENT:

Derek Holton reported that the Policy Document would be reconsidered and redrafted for presentation at the next AGM. In particular, Margaret Morton questioned the membership targeting and whether or not we should look to encourage membership from the Polytechs and Colleges of Education.

16. COUNCIL NOMINATIONS:

There are three members of Council, John Giffin, Kee Teo and Gillian Thornley, whose terms are due to end in May. Therefore it is important that there be sufficient nominations made to fill the vacancies. A discussion on filling the important positions of President and Treasurer took place.

17. NZMS VISITING LECTURER:

The matter of funding the Visiting Lecturer was raised, after Douglas Bridges' experiences as Visiting Lecturer involved inconsistent and sometimes confusing handling of funding at each of the institutions involved. Derek Holton volunteered to communicate with Heads of Departments to settle some system of funding this year's Visiting Lecturer, John Loxton.

It was also decided to circulate material and a postal vote to determine the 1993 Visiting Lecturer.

18. FORDER LECTURERS:

At the time of the meeting there had been no word from Britain about the Forder Lecturer situation and it was decided that a letter should be sent to ask for information.

19. AITKEN CELEBRATIONS:

Derek Holton reported that there would be some sort of celebration of the Aitken Centenary in 1995 in Dunedin. There is also the possibility of a joint meeting with Australia. We will be kept informed of any developments.

Gillian Thornley has written to the Edinburgh Mathematical Society for information on their planned celebrations but has heard nothing from them as yet.

It was reported that John Butcher had talked to the president of the Edinburgh Mathematical Society and discussed the possibility of an Edinburgh person being made Forder Lecturer for the occasion.

20. APPLICATIONS FOR FINANCIAL ASSISTANCE:

Research, conference and travel support applications were received and discussed. Following these discussions it was decided that

Dr. Peter Donelan of Victoria University be granted $500 towards the cost of travelling to England to continue his work with Chris Gibson on Robotics.

Dr. Marston Conder be granted $500 towards the costs of attending a conference on Groups and Combinatorics at the Research Institute for Mathematical Sciences at the University of Kyoto in Japan.

All other applicants were unsuccessful in obtaining funds from the Society.

21. NZMS RESEARCH AWARDS:

Gillian Thornley reported that nominations for the awards were currently being assessed.

22. ANY OTHER BUSINESS:

(a) It was reported that the AMS/NZMS profile of mathematicians was moving along nicely and was nearing completion.

(b) Margaret Morton passed on a reminder from David Smith that the recipients of travel grants were supposed to provide a short report on how their money was spent for publication in the Newsletter.

(c) Gillian Thornley brought to the attention of the meeting the fact that there have been some problems concerning the Aitken Trust Fund and taxation matters. The matter is currently being worked out.

(d) A proposal to establish a New Zealand Academy of Humanities was received by several members of the council. The feeling of the meeting was that the Society would continue to work with FOSTS rather than seeking to be included in such an academy.

CONFERENCES

** 1992 **

May (L'Aquila, Italy) **Conference on Classification of Algebraic Varieties**
Contact E.L. Livorni, Dipartimento di Matematica, Universita, Via Vetoio, loc. Coppito, 67100 L'Aquila, Italy.

May 3-4 (Katsively, Ukraine) **Evolutionary Stochastic Systems: Theory and Applications to Physics and Biology**
Contact A. Swishchuk, Inst. Math. Ukrain. Acad. Sci., Repin Str. 3, Kiev 4, 252601, Ukraine.

May 4-6 (Victoria, British Columbia) **1992 ACM Symposium on the Theory of Computing**
Contact A. Wigderson (STOC 92 Chair), Computer Science Dept., Princeton University, Princeton, NJ 08544, U.S.A.

May 6-9 (University Park, Pennsylvania) **Seventh International Conference on Multivariate Analysis in memory of Parachuri R. Krishnaiah**
Contact C.R. Rao, 123 Pond Laboratory, Pennsylvania State University, University Park, Pennsylvania 16802, U.S.A.

May 10-16 (Oberwolfach, Germany) **Geschichte der Mathematik**
Contact MFOG: see (1) below.

May 11-13 (Chicago, Illinois) **Fourth SIAM Conference on Optimization**
Contact SIAM: see (6) below.

May 11-15 (Tokyo) **IUTAM Symposium on Inverse Problems in Engineering Mechanics**
Contact K. Sato, JASCOME Office, c/o Kozo Keikaku Engineering Inc., Dai-ichi Seimei Building 24F, 2-7-1 Nishi-shinjuku, Shinjuku-ku, Tokyo 163, Japan.

May 11-15 (Marseille, France) **Rencontre Franco-Russe de Géometrie**
Contact CIRM: see (8) below.

May 17-23 (Oberwolfach, Germany) **Quadratische Formen**
Contact MFOG: see (1) below.

May 18-22 (Milano, Italy) **International Workshop on Bayesian Robustness**
Contact International Workshop on Bayesian Robustness, CNR IAMI, via Ampère 56, I-20131 Milano, Italy.

May 18-22 (Vienna) **NASECODE VIII, The Eighth International Conference on the Numerical Analysis of Semiconductor Devices and Integrated Circuits**
Contact NASECODE Secretariat, 26 Temple Lane, Dublin 2, Ireland

May 18-22 (Marseille, France) Algebren en Théorie des Nombres
Contact CIRM: see (8) below.

May 18-23 (Knoxville, Tennessee) **Low-Dimensional Topology**
Contact K. Johannson, Dept. of Math., Univ. of Tennessee, Knoxville, TN 37966, U.S.A.

May 24-29 (Knoxville, Tennessee) **First US/Japan Conference on the Frontiers of Statistical Modelling: An Informational Approach**
Contact Judy Snow, Conference Coordinator, US/Japan Modeling Conference - 1992, Department of Statistics, 331 Stokely Management Center, The University of Tennessee - Knoxville, Knoxville, TN 37996-0532, U.S.A.

May 24-30 (Oberwolfach, Germany) **Kommutative Algebra und Algebraische Geometrie**
Contact MFOG: see (1) below.

May 25-28 (Beaune, France) **NATO Advanced Research Workshop: Asymptotic-Induced Numerical Methods for PDE's, Critical Parameters, and Domain Decomposition**
Contact H.G. Kaper, Math. and Comp. Sci. Div., Argonne National Lab., 9700 South Cass Ave., Argonne, IL 60439-4844, U.S.A.

May 25-29 (Marseille, France) **Endoscopie Automorphe**
Contact CIRM: see (8) below.

May 31 - June 6 (Oberwolfach, Germany) **Singularitaten**
Contact MFOG: see (1) below.

May 31 - June 6 (Oberwolfach, Germany) **Free Resolutions in Algebraic Geometry and Representation Theory**
Contact MFOG: see (1) below.

June 1-5 (Pau, France) **Third International Conference on Mathematical Population Dynamics**
Contact D. Arino, Univ. de Pau et des Pays de L'Adour, Lab. de Math. Appliquees, Av. de l'Univ., 64000 Pau, France

June 1–5 (Minneapolis, Minnesota) **IMA Workshop on Linear Algebra for Control Theory**
Contact IMA: see (3) below

June 1-5 (Kalamazoo, Michigan) **7th International Conference on Graph Theory, Combinatorics, Algorithms and Applications**
Contact Y. Alari, Department of Mathematics and Statistics, Western Michigan University, Kalamazoo, Michigan 49008-5152, U.S.A.

June 1-30 (University of Newcastle, New South Wales) **Workshop on differentiability of convex and locally lipschitz functions on Banach spaces**
Contact Professor J. R. Giles, Department of Mathematics, University of Newcastle, NSW 2308, Australia

June 7-13 (Oberwolfach, Germany) **Computational Group Therapy**
Contact MFOG: see (1) below.

June 8-11 (Vancouver, Canada) **Sixth SIAM Conference on Discrete Mathematics**
Contact SIAM: see (6) below.

June 8-13 (Ravello, Italy) **Zero-dimensional schemes**
Contact F. Orecchia, Dip. di Matem., Univ. di Napoli, via Mezzocanone 8, 80134 Napoli, Italy

June 8-19 (Varenna, Italy) **Dirichlet Forms**
Contact P. Zecca, Secretary CIME, Dipartimento di Matematica, U. Dini, Viale Morgagni 67/A, 50134 Firenze, Italy.

June 12-20 (Venezia, Italy) **D-moduli and Representation Theory**
Contact P. Zecca, Secretary CIME, Dipartimento di Matematica, U. Dini, Viale Morgagni 67/A, 50134 Firenze, Italy.

June 14-20 (Oberwolfach, Germany) **Freiformkurven and Freiformflachen**
Contact MFOC: see (1) below.

June 14–20 (West Lafayette, Indiana) **5th International Symposium on Statistical Decision Theory and Related Topics**
Contact Shanti S. Gupta, Department of Statistics, Purdue University, West Lafayette, IN 47905, U.S.A.

June 15-18 (Edmonton, Canada) **Wave Phenomena II: Modern Theory and Applications**
Contact Canadian Applied Mathematics Society Conference, Applied Mathematics Institute, University of Alberta, Edmonton, Alberta, Canada T6G 2G1.

June 15–19 (Toronto, Canada) **Twenty First International Conference on Stochastic Processes and their Applications**
Contact G.L. O'Brien, Department of Mathematics, York University, 4700 Keele Street, North York, Ontario M3J 1P3, Canada.

June 15-19 (Montréal) **Fourth Conference on Formal Power Series and Algebraic Combinatorics**
Contact Laboritoire de Combinatoire et d'Informatique Mathematique, Univ. du Quebec a Montréal, Case Postale 8888, Succ. A, Montréal (Quebec), Canada H3C 3P8.

June 15-27 (Montecatini Terme, Italy) **Nonequilibrium Problems in Many-Particle Systems**
Contact P. Zecca, Secretary CIME, Dipartimento di Matematica, U. Dini, Viale Morgagni 67/A, 50134 Firenze, Italy.

June 17-20 (Nova Scotia, Canada) **4th International Conference on Computers and Learning**
Contact I. Tomek, Jodrey School of Computer Science, Acadia University, Wolfville, Nova Scotia BOP 2X0, Canada.

June 21-27 (Oberwolfach, Germany) **Porous Media**
Contact MFOG: see (1) below.

June 22-24 (New Brunswick, New Jersey) **Seventh IMACS International Conference on Computer Methods for Partial Differential Equations**
Contact K. Hahn, IMACS PDE-7 Conference Secretary, Rutgers Univ., Dept. of Comp. Sci., New Brunswick, NJ 08903, U.S.A.

June 22-25 (Santa Cruz, California) **Seventh Annual IEEE Symposium on Logic in Computer Science**
Contact D. Leivant, School of Comp. Sci., Carnegie Mellon Univ., Pittsburgh, PA 15213, U.S.A.

June 22-26 (Rennes, France) **Distancia '92, International Meeting on Distance Analysis**
Contact Distancia '92, Université de Rennes II, 6 Avenue Gaston Berger, 35043 Rennes cedex, France.

June 22-26 (Toronto, Canada) **5th International Meeting on Statistical Climatology (5IMSC)**
Contact Francis W. Zwiers, Numerical Modeling Division, Canadian Climate Centre, 4905 Dufferin Street, Downsview, Ontario, Canada M3H 5T4.

June 22-26 (Toronto, Canada) **12th Conference on Probability and Satistics in the Atmospheric Sciences**
Contact Paul Mielke Jr., Department of Statistics, Colorado State University, Fort Collins, Colorado 80523, U.S.A.

June 23-26 (Sorrento, Italy) **Homotopy Theory**
Contact R.A. Piccinini, Univ. di Milano, Dipt. di Matematica, Via C. Saldini 50, I-20133 Milano, Italy.

June 23-27 (Turin, Italy) **Workshop on Computational Geometry**
Contact V. Demichelis, Dipt. di Matematica, Univ. di Torino, Via Carlo Alberto IV, 10123 Torino, Italy.

June 27-July 3 (Mount Holyoake College, Massachusetts) **The Penrose Transform and Analytic Cohomology in Representation Theory**
Contact Dr R. J. Baston, Mathematical Institute, 24-29 St Giles, Oxford OX1 3LB, U.K.

June 28 - July 4 (Oberwolfach, Germany) **Hyperbolic Systems of Conservation Laws**
Contact MFOG: see (1) below.

June 29-30 (Luxembourg) **International Conference on the Development of Mathematics from 1900 to 1950**
Contact Société Math. du Luxembourg, Centre Univ. de Luxembourg, 162A Avenue de la Faiencerie, L-1511 Luxembourg.

June 29 - July 1 (Port Moresby, Papua-New Guinea) **South Pacific Conference on Mathematics and Mathematics Education**
Contact Associate Professor O.P. Ahuja, Department of Mathematics, University of Papua-New Guinea, Box 320, University P.O., Papua-New Guinea.

June 29 - July 3 (Strasbourg, France) **International Conference on K-Theory**
Contact Inst. de Recherche Math. Avancee, Univ. Louis Pasteur et CNRS, 7 rue Rene-Descartes, 67084 Strasbourg, France.

June 29 - July 5 (Salamance, Spain) **19th International Colloquium on "Group Theoretical Methods in Physics"**
Contact L.J. Boya, Chairman, Depto. Fisica Teorica, University of Zaragoza, 50.009 Zaragoza, Spain.

July 1-3 (Oxford) **Sixth IMA Conference on the Mathematical Theory of the Dynamics of Biological Systems**
Contact IMA: see (7) below.

July 1-10 (Point-à-Pitre, France) **Stochastic Analysis Workshop of Guadaloupe-Silivri**
Contact C. Martias, Univ. des Antilles et de la Guyanne, Faculté des Sciences, B.P. 592, 97167 Point-à-Pitre Cedex, France.

July 2-4 (Perth) **Miniconference on Banach Space Theory**
Contact Dr S.P. Fitzpatrick, Department of Mathematics, University of Western Australia, WA 6009, Australia.

July 5-11 (Oberwolfach, Germany) **Mathematische Modellierung und Simulation Elektrischer Schaltungen**
Contact MFOG: see (1) below.

July 6-10 (Paris) **European Congress of Mathematics**
Contact ECM, College de France, 3 rue d'Ulm, F-75005, Paris, France.

July 6-10 (Perth) **11th Conference of the Australian Statistical Society**
Contact Dr Russel John, School of Agriculture, University of Western Australia, Nedlands, WA 6009, Australia.

July 6-10 (Perth) **18th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing**
Contact Dr K. Vijayan, Department of Mathematics, University of Western Australia, Nedlands, WA 6009, Australia.

July 6-10 (Perth) **36th Annual Meeting of the Australian Mathematical Society**
Contact Dr P.F. Siew, School of Mathematics and Statistics, Curtin University of Technology, Bentley, WA 6102, Australia.

July 6-31 (Minneapolis, Minnesota) **Environmental Studies: Mathematical, Computational and Statistical Analysis**
Contact IMA: see (3) below.

July 11-18 (St Andrews, Scotland) **St Andrews Colloquium**
Contact J.M. Howie, St Andrews Colloquium 1992, Mathematical Institute, North Haugh, St Andrews, KY16 9SS, Scotland.

July 12-17 (Vienna) **International Colloquium on Automata, Languages and Programming**
Contact W. Kuich, Technische Univ. Wien, Wiedner Hauptstrasse 8-10, A-1040 Wien, Austria.

July 12-18 (Oberwolfach, Germany) **Arithmetic Algebraic Geometry**
Contact MFOG: see (1) below.

July 13-15 (Gold Coast, Queensland) **Mathematics and Computers in Sport**
Contact Associate Professor Neville de Mestre, School of Information and Computing Sciences, Bond University, Gold Coast, Queensland 4229, Australia.

July 2-13 (Montréal) SMS-NATO ASI: **Bifurcations and Periodic Orbits of Vector Fields**
Contact G. David, Dept. de Math. et de Stats., Univ. de Montréal, C.P. 6128-A, Montréal H3C 3J7, Canada.

July 19-24 (Los Angeles) **SIAM Annual Meeting (SIAM's 40th Anniversary)**
Contact SIAM: see (6) below.

July 19-25 (Oberwolfach, Germany) **Lower-Dimensional Theories and Domain Decomposition Methods in Mechanics**
Contact MFOG: see (1) below.

July 19-25 (Blaubeuren, Germany) **Applications of Nonstandard Analysis to Analysis, Functional Analysis and Probability Theory**
Contact M. Wolff, Mathematisches Institüt der Universität Tübingen, Auf der Morgenstelle 10, D-74 Tübingen, Germany.

July 19-31 (Lancaster, England) **SERC Numerical Analysis Summer School**
Contact J. Gilbert, Dept. of Math., Lancaster Univ., Fylde College, Lancaster LA1 4YF, England.

July 20-24 (Oxford) **Algorithms for Approximation**
Contact E. Smith, Applied and Computational Mathematics Group, RMCS (Cranfield), Shrivenham, Swindon, Wiltshire SN6 8LA, England.

July 20-24 (Tver, U.S.S.R.) **Second Symposium on Logical Foundations of Computer Science**
Contact V.W. Marek, Dept. of Comp. Sci., Univ. of Kentucky, Lexington, KY 40506, U.S.A.

July 20-24 (St Andrews, Scotland) **The Fifth Internatonal Conference on Fibonacci Numbers and their Application**
Contact Professor A.F. Horadam, Department of Mathematics, Statistics and Computer Science, University of New England, Armidale, New South Wales 2351, Australia.

July 20-26 (Paris) **International Conference on Algebraic Geometry**
Contact Y. Laszlo, Univ. Paris-Sud, Mathématiques Bat. 425, 91405 Orsay Cedex, France.

July 26-31 (Vancouver) **18th International Symposium on Rarefied Gas Dynamics (RGD 18)**
Contact B. Shizgal, RGD 18, Dept. of Chemistry, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Y6.

July 26 - August 1 (Oberwolfach, Germany) **Variationsrechnung**
Contact MFOG: see (1) below.

July 26 - August 1 (Fort Collins, Colorado) **AMS-SIAM Summer Seminar on Exploiting Symmetry in Applied and Numerical Analysis**
Contact D. L. Salter, AMS, P.O. Box 6887, Providence, RI 02940, U.S.A.

July 30 - August 1 (Copenhagen) **The State of Matter: Conference on Mathematical Physics, Celebrating the Sixtieth Birthday of E.H. Lieb**
Contact M. Aizenman, Princeton University, Jadwin Hall, P.O. Box 708, Princeton, NJ 08544, U.S.A.

August (Kazan, Russia) **The International Conference Lobachevsky and Modern Geometry denoted to the 200th Anniversary of Lobachevsky 's birthday**
Contact V.V. Vishnevsky, Department of Geometry, Kazan University, 18 Lenin Street, Kazan, 420008 Russia

August (Edinburgh) **Kinetics of Phase Transitions**
Contact International Centre for Mathematical Sciences, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, Scotland.

August 2-8 (Oberwolfach, Germany) **Algebraische Zahlentheorie**
Contact MFOG: see (1) below.

August 3-7 (Lisbon) **Second Meeting of the International Linear Algebra Society**
Contact Professor J.A. Dias Da Silva, Universidade de Lisboa, Portugal.

August 3–7 (San Sebastian, Spain) **IMSIBAC 5(5th International Meeting of Statistics in the Basque Country**
Contact Professor J.P. Vilaplana, Faculty of Mathematical Sciences, University of Bilbao, E–48070 Bilbao, Spain.

August 3-7 (Clearwater, Florida) **6th Workshop on Lie-Admissible Formulations**
Contact G.F. Weiss, Chairman of the Organizing Committee, 6th Workshop on Lie Admissible Formulations, The Institute for Basic Research, 495 A-19, no. 1577, Palm Harbour, Florida 34682-1577, U.S.A.

August 9-15 (Oberwolfach, Germany) **Jordan-Algebren**
Contact MFOG: see (1) below.

August 9-16 (Budapest) **Logic Colloquium '92**
Contact Janos Bolyai Mathematical Society, ASL '92 Logic Conference, H-1027 Fö utca 68, Budapest, Hungary.

August 10-18 (Ottawa) **Canadian Mathematical Society Annual Seminar on Representations of Algebras and Related Topics**
Contact V. Dlab, Dept. of Math. & Stat., Carleton Univ., Ottawa, Ontario K1S 5B6, Canada.

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

August 16-22 (Oberwolfach, Germany) **Reelle Analysis**
Contact MFOG: see (1) below.

August 17-21 (Hamilton, Ontario) **The Alan Day Conference - a Conference on Lattices and Algebras to Honour Alan Day (1941-1990)**
Contact William Lampe, Mathematics Department, University of Hawaii, Honolulu, Hawaii 96822, U.S.A.

August 17-21 (Summit County, Colorado) **The Sixth International Conference on Boundary and Interior Layers - Computational and Asymptotic Methods (BAIL VI)**
Contact BAIL Secretariat, 26 Temple Lane, Dublin 2, Ireland.

August 17–23 (Quebec City, Canada) **ICME7 : Seventh International Congress on Mathematics Education**
Contact D. Wheeler, Department of Mathematics, Concordia University, 7141 ouest, rue Sherbrooke, Montréal, Québec H4B 1R6, Canada.

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

August 19-22 (Ottawa) **Sixth International Conference on Representations of Algebras (ICRA VI)**
Contact Secretary ICRA VI, Dept. of Math. and Stat., Carleton Univ., Ottawa K1S 5B6, Canada.

August 19–26 (Melbourne, Florida) **World Congress of Nonlinear Analysts**
Contact Professor V. Lakshmikantham, Department of Applied Mathematics, Florida Institute of Technology, 150 West University Boulevard, Melbourne, FL 32901-6988, U.S.A.

August 22–28 (Haifa, Israel) **18th International Congress of Theoretical and Applied Mechanics**
Contact A. Solan, Secretary, IC-TAM 1992, Faculty of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa 32000, Israel.

August 23-29 (Oberwolfach, Germany) **Mathematical Finance**
Contact MFOG: see (1) below.

August 24-28 (Neuchâtel, Switzerland) **10th Symposium on Computational Statistics (COMPSTAT)**
Contact COMPSTAT Secretariat, Groupe de Statistique, Université de Neuchâtel, Pierre-à-Mazel 7, CH-2000 Neuchâtel, Switzerland.

August 25-29 (Rabat, Morocco) **3rd Islamic Countries Conference on Statistical Sciences**
Contact Secretary, Executive Board, Islamic Society of Statistical Sciences, 122-F Liberty Plaza, Gulberg-III, Lahore, Pakistan.

August 30 - Sept. 5 (Oberwolfach, Germany) **Komplexe Analysis**
Contact MFOG: see (1) below.

August 31 - Sept.2 (Pécs, Hungary) **4th International Workshop on Generalized Convexity**
Contact Professor S. Komlosi, Faculty of Economics, Janus Pannonius University, Rakoczi ut 80, H-7621 Pecs, Hungary

September (Beijing) **IMACS 2nd International Conference on System Simulation and Scientific Computing - BICSC '92**
Contact W. Chuan-Yuan, Chinese Association for System Simulation, 37 Xue Yuan Rd., Beijing 100083, China.

September 2-4 (Manchester) **International Conference on Control: Modelling, Computation, Information**
Contact IMA: see (7) below.

September 6-12 (Oberwolfach, Germany) **Topologie**
Contact MFOG: see (1) below.

September 9-11 (Sheffield, U.K.) **Royal Statistical Society Full Conference**
Contact Professor P.J. Diggle, Mathematics Department, Lancaster University, Lancaster LA1 4YF, U.K.

September 13-19 (Oberwolfach, Germany) **4-Dimensional Manifolds**
Contact MFOG: see (1) below.

September 14-16 (Edinburgh) **Fifth IMA Conference on the Mathematics of Surfaces**
Contact IMA: see (7) below.

September 14-18 (Bath, U.K.) **20th European Meeting of Statisticians**
Contact Professor R. Gibson, School of Mathematics, University of Bath, Claverton Down, Bath BA2 7AY, U.K.

September 16-18 (Minneapolis, Minnesota) **2nd SIAM Conference on Control in the 90s**
Contact SIAM: see (6) below.

September 17-19 (Timisoara, Romania) **International Conference on Group Theory**
Contact "The Group Theory Conference", Division of Algebra, Dept. of Mathematics, Univ. of Timisoara, Bd. V. Parvan 4, 1900 Timisoara, Romania.

September 20-26 (Oberwolfach, Germany) **Funktionalgleichungen**
Contact MFOG: see (1) below.

September 21-23 (Guildford, England) **Fourth IMA Conference on Stably Stratified Flows: Flow and Dispersion over Topography**
Contact IMA: see (7) below.

September 21-23 (Barcelona) **7th International Conference on Multivariate Analysis in memory of Ronald A. Fisher**
Contact C.M. Cuadras, Universitdad de Barcelona, Barcelona, Spain.

September 21-25 (Minneapolis, Minnesota) **IMA Workshop on Robust Control Theory**
Contact IMA: see (3) below.

September 27 - October 3 (Oberwolfach, Germany) **Darstellungstheorie Endlicher Gruppen**
Contact MFOG: see (1) below.

October 4-10 (Oberwolfach, Germany) **Funktionalanalysis**
Contact MFOG: see (1) below.

October 12-16 (Minneapolis, Minnesota) **IMA Workshop on Control Systems Design for Advanced Engineering Systems: Complexity, Uncertainty, Information and Organization**
Contact IMA: see (3) below.

October 16-19 (Salt Lake City, Utah) **Second SIAM Conference on Dynamical Systems**
Contact SIAM: see (6) below.

October 18-24 (Oberwolfach, Germany) **Geometrie**
Contact MFOG: see (1) below.

October 25-31 (Oberwolfach, Germany) **Stochastische Analysis**
Contact MFOG: see (1) below.

November (Gold Coast, Queensland) **AUSCRYPT '92**
Contact Professor W. Caelli, Faculty of Information Technology, Queensland University of Technology, P.O. Box 243, Brisbane, Queensland 4001, Australia.

November 1-7 (Oberwolfach, Germany) **Kombinatorik**
Contact MFOG: see (1) below.

November 8-14 (Oberwolfach, Germany) **Numerische Integration**
Contact MFOG: see (1) below.

November 9-13 (Minneapolis, Minnesota) **IMA Workshop on Control and Optimal Design of Distributed Parameter Systems**
Contact IMA: see (3) below.

November 14-16 (Allahabad, India) **The Third Biennial Conference of the Allahabad Mathematical Society**
Contact K.K. Azad, Secretary, Allahabad Mathematical Society, 10, C.S.P. Singh Marg, Allahabad - 211001, India.

November 15-21 (Oberwolfach, Germany) **Komplexitätstheorie**
Contact MFOG: see (1) below.

November 16-20 (Concepcion, Chile) **International Congress on Numerical Methods in Engineering and Applied Sciences**
Contact Sergio Lavanchy, Facultad de Ingenieria, Casilla 53-C, Concepcion, Chile.

November 16-20 (Minneapolis, Minnesota) **IMA Period of Concentration: Flow Control**
Contact IMA: see (3) below.

November 29 - December 5 (Oberwolfach, Germany) **Theory of Large Deviations**
Contact MFOG: see (1) below.

November 30 - December 2 (Newcastle, Australia) **Satellite meeting on Biostatistics**
Contact Professor Annette Dobson, Department of Statistics, University of Newcastle, Newcastle, NSW 2308, Australia.

December 2-4 (Rotorua) **Molecular Evolution Workshop**
Contact Dr Bruce Weir, North Carolina State University, Raleigh, NC 27695-8203, U.S.A.

December 2-4 (Canberra) **Workshop on Practical Applications of the Bootstrap**
Contact Dr Kim-Anh Do, Statistical Sciences Division, CMA, Australian National University, Canberra, ACT 2601, Australia.

December 3-4 (Hamilton, New Zealand) **Analysis of repeated measurements data: an overview**
Contact Dr David Fletcher, Department of Mathematics and Statistics, University of Otago, Box 56, Dunedin, New Zealand.

December 4-5 (Auckland) **International Workshop on Matrix Methods for Statistics**
Contact George Styan, Dept. of Mathematics and Statistics, McGill University, Burnside Hall 1240, 805 ouest, rue Sherbrooke, Montreal, Quebec H3A 2K6, Canada.

December 6 (Hamilton, New Zealand) **Dynamic graphical analysis of statistical models: short course**
Contact IBC92 Secretary, Ruakura Agricultural Centre, Private Bag 3080, Hamilton, New Zealand.

December 6-12 (Oberwolfach, Germany) **Theory and Numerical Methods for Initial-Boundary Value Problems**
Contact MFOG: see (1) below.

December 7-11 (Bangalore, India) **IMACS Symposium on Scientific Computing and Mathematical Modelling**
Contact K.S. Yajnik, C-MMACS, National Aeronautical Lab, Belur Campus, Bangalore 560037, India.

December 7-11 (Hamilton, New Zealand) **Sixteenth International Biometric Conference (IBC 92)**
Contact IBC 92 Secretary, Ruakura Agricultural Centre, Private Bag 3080, Hamilton, New Zealand.

December 13-19 (Oberwolfach, Germany) **Asymptotische Statistik**
Contact MFOG: see (1) below.

December 14-15 (Queenstown, New Zealand) **Statistical Methods in Epidemiology**
Contact K. Sharples, Department of Preventive and Social Medicine, University of Otago Medical School, Box 913, Dunedin, New Zealand.

December 14-16 (Queenstown, New Zealand) **Methods for correlated data: current research**
Contact K. Sharples, Department of Preventive and Social Medicine, University of Otago Medical School, Box 913, Dunedin, New Zealand.

December 14-16 (Rotorua) **2nd Australasian Genstat Conference**
Contact David Baird, MAF, P.O. Box 24, Lincoln, New Zealand.

December 16-22 (New Delhi) **7th International Conference on Multivariate Analysis in memory of Prasanta Chandra Mahalanobis**
Contact S.K. Mitra, Delhi University, New Delhi, India.

December 27-31 (Las Cruces, New Mexico) **Holiday Symposium on Lie Group Representation and Combinatorics**
Contact R. J. Wisner, Lie Group Symposium, Dept. of Math. Sciences, New Mexico State University, Box 30001, Las Cruces, New Mexico 88003-0001, U.S.A.

** 1993 **

January 3-7 (Auckland) **International Conference on Scientific Computation and Differential Equations (in honour of Professor John Butcher's 60th birthday)**
Contact Dr Horst Gerlach, Department of Mathematics and Statistics, University of Auckland, Auckland, New Zealand.

January 25-29 (Minneapolis, Minnesota) **IMA Workshop on Robotics**
Contact IMA: see (3) below.

February 1-3 (Minneapolis, Minnesota) **IMA Minisymposium on Biological Control of Movement**
Contact IMA: see (3) below.

February 7-11 (South Australia) **29th Australian Applied Mathematics Conference**
Contact Dr A. J. Roberts, Department of Applied Mathematics, University of Adelaide, GPO Box 498, Adelaide, SA 5001, Australia.

February 16-25 (Minneapolis, Minnesota) **IMA Workshop on Nonsmooth Analysis and Geometric Methods in Control**
Contact IMA: see (3) below.

March 15-19 (Minneapolis, Minnesota) **IMA Workshop on Systems and Control Theory for Power Systems**
Contact IMA: see (3) below.

April 5-9 (Minneapolis, Minnesota) **IMA Tutorial: Design and Analysis of Adaptive Systems**
Contact IMA: see (3) below.

April 12-16 (Minneapolis, Minnesota) **IMA Workshop on Adaptive Control, Filtering and Signal Processing**
Contact IMA: see (3) below.

April 19-20 (Minneapolis, Minnesota) **IMA Minisymposium on Fuzzy Control**
Contact IMA: see (3) below.

May 3-7 (Minneapolis, Minnesota) **IMA Tutorial: Verification Issues in Discrete Event Systems**
Contact IMA: see (3) below.

May 10-14 (Minneapolis, Minnesota) **IMA Workshop on Discrete Event Systems, Manufacturing Systems and Communication Networks**
Contact IMA: see (3) below.

May 20-23 (Santa Barbara, California) **International Conference on Approximation Probability and Related Fields**
Contact S.T. Rachev, Dept. of Statistics and Applied Probability, University of California, Santa Barbara, California 93106, U.S.A.

June 14-18 (Minneapolis, Minnesota) **IMA Workshop on Mathematical Finance**
Contact IMA: see (3) below.

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.

August 1-14 (Galway, Ireland) **Groups 93 Galway/St Andrews**
Contact: email groups 93 @ st. andrews.ac,uk (telefax +353 91 25700).

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 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 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.

** 1994 **

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.

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

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**: A. Zeller-Meier, CIRM, Luminy, Case 916, F-13288 Marseille, Cedex 9, France.

M.R. Carter

Solution to Crossword No 35

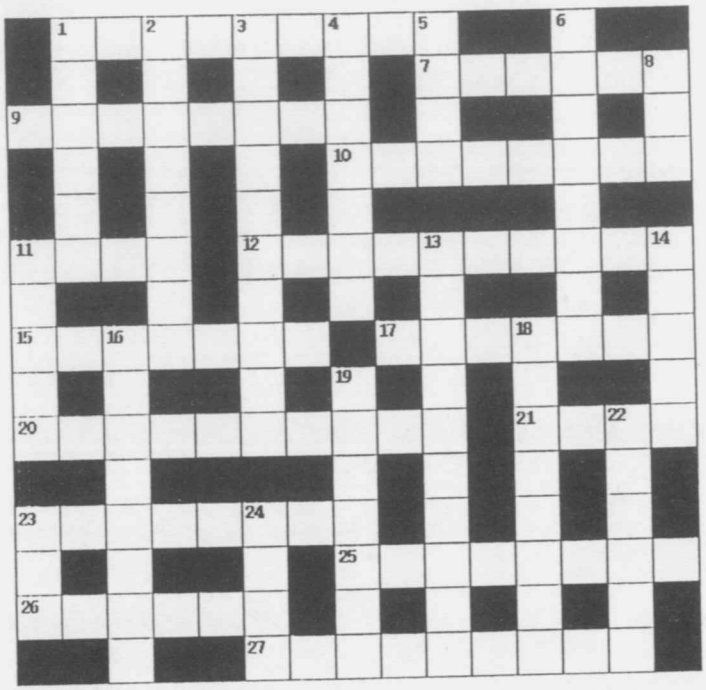
C	O	M	P	L	E	X	V	A	R	I	A	B	L	E
I	■	A	■	O	■	Y	■	S	■	N	■	I	■	L
R	I	G	H	T	■	S	■	I	N	C	E	N	S	E
C	■	N	■	S	A	T	E	D	■	H	■	G	■	M
U	D	A	L	■	■	E	■	E	■	■	W	O	V	E
M	■	T	■	■	T	R	U	S	T	■	A	■	■	N
N	E	E	D	L	E	■	T	■	O	U	T	F	I	T
A	■	■	I	■	A	C	T	O	R	■	E	■	■	O
V	E	R	G	E	R	■	E	■	S	C	R	U	F	F
I	■	■	O	■	S	C	R	E	E	■	■	N	■	V
G	O	W	N	■	■	L	■	U	■	■	A	U	T	O
A	■	O	■	B	■	O	R	R	I	S	■	S	■	L
T	A	R	G	E	T	S	■	O	■	U	L	U	R	U
O	■	L	■	T	■	E	■	P	■	R	■	A	■	M
R	E	D	W	H	I	T	E	A	N	D	B	L	U	E

CROSSWORD

No 36

Dated

by K N Tode



All the across answers and some of the down answers are names of mathematicians. Where known, the year of birth and the year of death are given. Also the nationality is indicated. 17 across was a polymath who included genetics, biomathematics and relativity in his repertoire. 21 across was associated with a factorisation. 11 across is known for sub-planes. A prize of $20(NZ) is offered for the first correct solution opened on July 1st, 1992. Entries should be in sealed envelopes addressed to *Crossword, c/o Mathematics Department, University of Canterbury, Private Bag, Christchurch, New Zealand.*

Across

1. 1907—1969 (Eng) (9)
7. 1768—1822 (Fr) (6)

9. 1736—1813 (Fr) (8)
10. 1854—1979 (Fr) (8)
11. 1902—1979 (Ger) (4)
12. 1891—1983 (Russ) (10)
15. 1826—1866 (Ger) (7)
17. 1892—1964 (Eng) (7)
20. 1885—1977 (Eng) (10)
21. 1861—1927 (USA) (4)
23. 1667—1754 (Fr) (8)
25. 1854—1929 (Eng) (8)
26. pre 1512—post 1567 (Sp) (6)
27. 1852—1939 (Ger) (9)

Down

1. Indian virtue had ram run around (6)
2. Short state, short city, odd spirit, all in the annotated edition (8)
3. No go ahead, no loan? (3-6)
4. Nine-pot makes half quart (3,4)
5. Thankyou, team. Cab! (4)
6. A latin lark upsets a land-car (8)
8. 1527—1608 (Eng) (3)
11. 1871—1950 (Fr) (5)
13. Big pawnbroker is a relative (10)
14. 1540—1603 (Fr) (5)
16. East time from judgement of amount (8)
18. After month headless human takes a gate of the tenth cohort (8)
19. Sound quartet of leading hands? (8)
22. Coates' is sleepy; Stacpoole's is blue (6)
23. Do about turn for playing two-some (3)
24. Have all including meat (4)