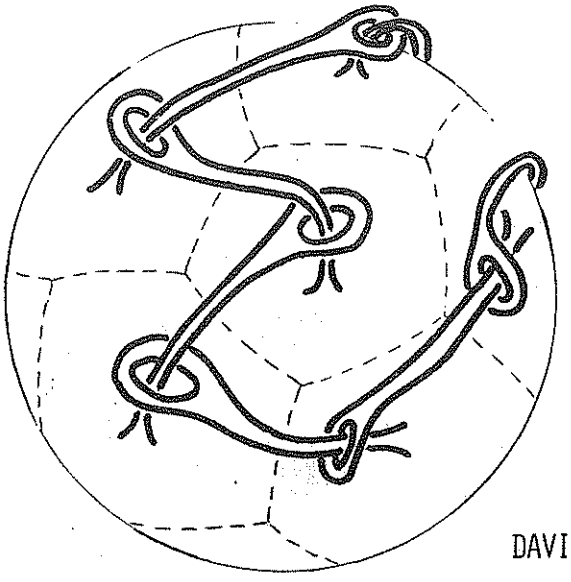
THE NEW ZEALAND MATHEMATICAL SOCIETY

NEWSLETTER

GEOMETRIC
TOPOLOGY



CENTREFOLD
DAVID VERE-JONES

CONTENTS

Number 24 August 1982 ISSN 0110-0025

Editorial

This issue features the New Zealand Mathematical Society Lecture delivered by Professor D.B. Gauld at the Dunedin Colloquium in May. Brief comments on the remaining invited addresses are given on page 13 with references to more detailed sources. Coverage of the Colloquium will be continued in a special issue of the Newsletter in late October. This is in line with the plan to run to four issues per year approved by Council about two years ago.

Contributions to future Newsletters are invited from anyone with items of interest to the New Zealand mathematics community, and may be sent to the editor or one of the Honorary Correspondents listed on page 2 of Newsletter 23.

Copy date for the next issue is 1 October.

Ian D. Coope

NZMS VISITING LECTURER - 1982

Dr. Graham Read, of the Open University and currently visiting Massey University has agreed to be this year's New Zealand Mathematical Society Visiting Lecturer. Dr. Read's principal interests lie in numerical analysis and in distance teaching technology. He will be visiting university mathematics departments and local mathematical associations throughout New Zealand in September.

ABSTRACTS OF TALKS

University Mathematics: How should we design undergraduate mathematics courses and how should we assess them? In this talk some attempt is made to classify the skills which we are trying to pass on to our students and to discuss the means we use to communicate them.

The Design and Production of Television: Programmes at the Open University: This talk is designed to explain the process by which rough initial ideas are translated into a finished television programme. The presentation includes a 25 minute television programme on the Taylor Series.

Television Programmes on Calculus: This is essentially a discussion of four (25 minute) television programmes produced jointly by the Open University and the BBC.

The Open University and how it works: The Open University has been in operation since 1969 and during that time it has evolved a complex method of producing its courses. This talk describes the production process from the view of the Mathematics faculty.

Innovations in Distance Education: This talk describes various recent developments in the use of traditional technology, and in micro-computer technology, which could have significant effects on distant education. The Open University has made its own contribution to this field with the development of its Cyclops system for transmitting and creating alpha-geometric displays.

ITINERARY

Monday	6 September	a.m.	Arrive Auckland	First talk	p.m.
Tuesday	7 September			Second talk	
Wednesday	8 September	a.m.	Arrive Hamilton	First talk	p.m.
Thursday	9 September			Second talk	
Friday	10 September		Arrive Palmerston North		
Monday	13 September	a.m.	Arrive Canterbury	First talk	p.m.
Tuesday	14 September			Second talk	
Wednesday	15 September	a.m.	Arrive Dunedin	First talk	p.m.
Thursday	16 September			Second talk	
Friday	17 September		Arrive Palmerston North		
	20-24 September		Visit Wellington (date to be arranged)		

PRESIDENT'S ANNUAL REPORT 1981/2

On behalf of the Council of the New Zealand Mathematical Society, I have the pleasure to present the eighth Annual Report of the Society.

The Society's membership stands at approximately 216 ordinary members and 4 institutional members. It is with regret that we record the deaths of Professor H.G. Forder, one of our honorary members, and Professor A.S.B. Holland, one of our reciprocity members.

The Newsletter continues to flourish under the guidance of the Canterbury team. Our thanks and congratulations go to the Editor, Dr. Brent Wilson, the acting Editor (since February), Dr. Ian Coope, and their assistants at the University of Canterbury. When one reads with interest the latest issue one does not always consider the effort required to produce it. Despite the comment in last year's Annual Report, the Newsletter continues to appear three times per year.

Council expresses its thanks to Dr. Graeme Wake who is stepping down after three years as Convener of the Publications Sub-Committee. This year this committee has been inundated by orders, and the associated activities such as reprinting, for the 7th form Syllabus Series. It is clear that this series filled a serious gap: in the period February 1981 to mid-April 1982, about 6000 copies were distributed. Once again the authors should be thanked for their contributions. So also, thanks go to Dr. Graeme Wake and his team at Victoria University, together with congratulations for not buckling under the strain of this major task. Sales of the book "Partitions, Yesterday and Today" by G.E. Andrews have now reached the break-even point, and sales of the "Status" manual by J.C. Turner continue.

After several years of discussions the A.C. Aitken Memorial Trust has been set up. This is a charitable trust whose purpose is the publication of Aitken's works, and the Society is a Trustee.

As Human Rights Officer, Dr. Bruce Calvert has continued the efforts to bring justice to politically oppressed mathematicians. Unfortunately progress on this is painstakingly slow but clearly it is an important activity which we should continue.

The pre-doctoral thesis competition was run again this year. Thanks are due to Dr. Michael Carter for organising the competition, to Professors Scott and Zulauf and Dr. Harper for agreeing to be judges and to Burroughs for financing the competition.

The 1981 Visiting Lecturer was Professor Ivar Stakgold, of the University of Delaware. The organisers of the Seventeenth Colloquium agreed to invite the President of the Society to present the New Zealand Mathematical Society Lecture.

In March this year the Society sponsored an Equinoxial Topology Workshop at the University of Auckland. Such sponsorship seems to be a valuable contribution which the Society can make to Mathematical research in New Zealand.

In July 1981, the immediate past President, Dr. Dean Halford, convened a meeting of interested parties to discuss the promotion of Mathematics in New Zealand. This meeting, held at the Royal Society's headquarters in Wellington, included representatives of the New Zealand Operations Research Society, the New Zealand Statistics Association and the Technical Institutes as well as the Society. Many issues of joint concern were discussed and Dean in particular is following these matters up.

Council is continuing to discuss with the Australian Mathematical Society a suitable time and place for the Third Australasian Mathematics Convention. We are in favour of May 1985, probably in Melbourne, and expect the Australians to have decided their preferences by now. One problem is the proximity of the International Congress on Mathematics Education to be held in Adelaide in August 1984.

Council had two full meetings, one right after the Annual General Meeting in Sydney and the other just before the Seventeenth New Zealand Mathematics Colloquium in Dunedin. In addition, there were two regional Council meetings; a northern one in Palmerston North and a southern one in Christchurch in December.

I wish to close by thanking all members of Council for their work on behalf of the Society and particularly the Secretary, Dr. David Smith, and the Treasurer, Dr. Joel Schiff, both of whom took on their onerous tasks at the beginning of their terms on Council. Best wishes go to those members who are retiring from Council at the end of this month.

D.B. Gauld
PRESIDENT

News and Notices

VACANCY IN DEPARTMENT OF MATHEMATICS AND STATISTICS

UNIVERSITY OF AUCKLAND

Applications are invited for a Senior Tutorship in Mathematics. Applicants should have a good honours degree, a Ph.D. in Mathematics, together with proven expertise as a University teacher, particularly of first year algebra and calculus. An ability to teach the application of electronic calculators and microcomputers would be an advantage. Commencing salary will be up to $22,421 per annum. Conditions of Appointment and Method of Application are available from all New Zealand Universities and the Assistant Registrar (Academic Appointments), University of Auckland. Applications should be forwarded as soon as possible but not later than 17 September 1982.

HECTOR MEMORIAL MEDAL

The Hector Memorial Medal and Prize (1982) of the Royal Society of New Zealand has been awarded to Professor R.P. Kerr, of the Department of Mathematics, University of Canterbury, for his work in mathematical physics. Professor Kerr found an exact solution of the Einstein equations of general relativity that describes the gravitational field produced by a spherical mass when it is rotating. His solution came into prominence after the discovery of pulsars, which are thought to be dense neutron stars in a state of very rapid rotation. If massive stars can collapse into black holes, their resulting gravitational fields would also be described by his solution.

P.C.W.

COORDINATING SERVICE FOR MATHEMATICAL VISITORS

The NZ Mathematical Society sponsors annually a Visiting Lecturer and has assisted in the past with the organisation of tours of this country by some overseas mathematicians. In wishing to extend its assistance the Council at its May meeting decided to offer a coordinating service for all mathematical visitors in New Zealand. Favourable reaction from mathematics departments and closely related departments in teaching and research institutions, some Government departments, and some professional associations, has been received, and the coordinating service is now under way.

Briefly, the service includes:

(a) The collation of information on visits and the regular publication of this information. The NZMS Visitors Coordinator liaises with the compiler of the overseas visitors section in the IMU Canberra Circular, so information intended for the IMUCC should be directed through the NZMS Coordinator.

(b) Being an information resource for potential visitors. The NZMS Visitors Coordinator could be an initial contact for people wanting general information about mathematical activities in New Zealand in order to plan a visit. It is intended to advertise this contact in some widely distributed periodicals.

(c) Assisting with the detailed planning of visits at a regional or national level upon request.

PROCEDURE

(1) As soon as a proposal visit by a mathematician or someone with substantial mathematical interests is known, information in the following format should be supplied:

Name of visitor, home institution, whether accompanied (if so, by whom?), principal field of interest, dates of visit, principal host institution, principal contact and address, status of the visit (definite, very likely, possible), other comments.

Send this information to the NZMS Visitors Coordinator:

Dr. W. D. Halford, Department of Mathematics and Statistics, Massey University, Palmerston North, New Zealand.

It is essential that information already supplied be updated as necessary.

(2) When a visit or proposed visit is known, institutions other than the principal host institution wishing to invite the visitor to spend time with them should do so through the listed principal contact.

(3) If further assistance in coordinating or planning a visit is required, the NZMS Visitors Coordinator will be pleased to help.

The Coordinator would be pleased to receive suggestions or comments on the service at any time.

VISITORS TO NEW ZEALAND

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

Professor Thomas Berger; University of Minnesota; ?; group theory; July 1982 - November 1982; University of Auckland; Professor P. J. Lorimer.

Dr. Michael Fawcett; University of Cambridge; ?; mathematical physics; August 1982 - December 1983; University of Otago; Professor W. Davidson.

Dr. M. Mrsević; University of Belgrade; Unaccompanied; general topology; 15 September 1981 - 31 August 1982; University of Auckland; Professor I. L. Reilly.

Dr. G. A. Read; Open University; wife and three children; numerical analysis, distance teaching technology; all 1982; Massey University; Professor B. I. Hayman.

Professor S. J. Taylor; University of Liverpool; wife; measure theory and probability; 17 July 1982 - 21 August 1982; University of Canterbury; Dr. N. A. Watson.

Professor R. C. Tomlinson; Warwick University; wife; operational research; 19 - 29 August 1982; NZ Department of Health; Dr. A. Smith; invited speaker ORSNZ conference.

One of the main aims for this listing is to enable institutions other than the principal host institution to invite visitors to spend time with them. Anyone wishing to issue such an invitation should do so through the listed principal contact.

"STATISTICS AT WORK"

Encouraged by a donation from Professor J. T. Campbell, the NZ Statistical Association has prepared a collection of New Zealand Case Studies in Statistics as background material for the statistics section of the 6th and 7th form mathematics syllabuses. The studies are directed at specific sections of the syllabus, and could be used for class studies or to suggest exercises and projects. Each study is accompanied by exercises and suggestions for class work, and there are numerous references for further reading. The principal aim of the booklet is to illustrate the practical importance and range of applications of statistical ideas in a local context.

The booklets are available directly from the Association at $8.50 (including postage) and will be released through retail bookshops later this year at approximately $10.00. Special rates for bulk purchase are as follows:

5-19 copies $7.00 each; 20 or more copies $6.50 each. (Postage is included in above prices).

Those wishing to purchase copies of the book should post their order (plus cheque) to:

Dr. P. J. Thomson, NZ Statistical Association, c/o Mathematics Department, Victoria University of Wellington, Private Bag, Wellington.

MATHEMATICAL ASSOCIATION TRUST BOARD

In 1977 the Auckland Mathematical Association (Inc) set up the Mathematical Association Trust Board for the purpose of assisting in providing for the financial and material needs of the Mathematical Associations in New Zealand.

In 1978 four trustees were appointed:

M.D. Jones	Principal, Diocesan School for Girls
C.M.M. Kirkpatrick	H.O.D. Mathematics, McAuley High School
D.B. Thomson	H.O.D. Mathematics, Green Bay High School
A.J.C. Begg	Director, Auckland Metropolitan College.

The Trustees invite applications for grants or assistance through the mathematical associations each year. This enables the Trustees to spread the benefits from the trust as widely as possible. The grants are intended to assist in a wide range of activities, such as helping with travel grants for international conferences, encouraging research, and aiding the development of new programmes. During 1980 and 1981 grants were made to Nelson, Christchurch and Hamilton, and six people going to the mathematics teachers' conference in Sydney were assisted.

Donations are required to build up the trust fund to enable its purposes to be achieved. The trustees seek support from individuals, associations, business houses, and others interested in mathematical education.

Please send your donation to the Mathematical Association Trust Board, P.O. Box 6855, Auckland 1, New Zealand. (Remember gifts over $5.00 are tax deductible).

Local News

AUCKLAND UNIVERSITY

DEPARTMENT OF MATHEMATICS & STATISTICS

The Academic Committee approved a proposal to rename the Mathematics Department, the Department of Mathematics & Statistics, thus giving the Statistics Unit greater identity.

Dr. Michael Erceg's appointment as Assistant Lecturer terminated on 30th June 1982. Michael has gone back into the family business.

Dr. Peter McInerney accepted a full-time temporary Senior Tutorship last April.

Dr. Simon Fitzpatrick arrived in June to take up his appointment as a Lecturer. Dr. Fitzpatrick is from the University of Illinois at Urbana-Champaign.

Professor Tom Berger is due to arrive in the Department this week from the University of Minnesota. Professor Berger will be with us until the end of November.

Seminars:

Dr. M. Schroder (University of Waikato) "Spaces making continuous convergence and locally uniform convergence coincide".

Professor D. Vere-Jones (Victoria University) "Inference problems for point processes defined through their conditional intensity functions".

Dr. A. O'Hagan (University of Warwick) "Theory vs Practice in preliminary test estimation".

Dr. J.A. John (University of Southampton) "Some conjectures for block designs" and "Detection of multiple outliers".

Professor S. Thomason (Dept. of Philosophy, Auckland University) "Euclidean infinitesimals".

Dr. C. Ansley (Graduate School of Business, University of Chicago) "Signal extraction and the use of polynomial splines in nonlinear regression problems".

Professor J. Cohen (Center for Advanced Study in the Behavioral Sciences, Stanford) "Demography and uncertainty".

Professor B. Joiner (University of Wisconsin) "The frontiers of statistical analysis".

Dr. C.M. Triggs (D.S.I.R., Auckland) "Comparison of missing value techniques".

Dr. K.J. Worsley (McGill University, Montreal) "Estimating change-points".

Dr. P. Hill (University of Waikato) "Kernel estimation of distributions for normal ranges in medical diagnosis".

Dr. G. Lord (Laval University, Quebec) "Stochastic modelling in insurance".

Dr. S. Fitzpatrick (Auckland University) "The skewness of Banach spaces".

DEPARTMENT OF COMPUTER SCIENCE

Two new papers will exist in 1983. A Stage I service course, 07.101, Elements of Computing, has been created. Topics will include programming, and the use of computer packages. The Computer Centre DEC-10 will be used to provide computing facilities. This will allow more students to do Stage I computing without placing more pressure on our equipment. A restriction of 200 students is imposed on all Stage I courses. A Stage II course, 07.235, Computer Applications, has been created. Topics include commercial applications and programming in Cobol. This will allow B.Sc. students to do some commercial computing, and avoid the problems related to the fact that they cannot easily do Management Studies courses in a B.Sc. A restriction of 100 students is imposed on all Stage II courses. Stage III courses have a restriction of 50 students each. We cannot see these restrictions being lifted in the near future, given the present education cuts.

Four second year masters students are doing theses this year.

P. McGlashan - Compiler for an Algol 68 like language.
B. Nicholson - Intelligent backtracking in theorem proving.
G. Sell - Virtual memory architecture.
C.M. Wong - Local computing networking.

Five first year masters students are doing projects this year.

G. Bell - USCD Schedular.
P. Carter - PROLOG Database.
B. Hogan - Logic Simulator in Software.
B. James - Data Flow Simulator.
J. Thornley - LALR Parser Generator.

John Butcher went overseas for July to take part in the Canadian Mathematical Society Conference at Toronto and SIAM Conference at Stanford.

Garry Tee is overseas on leave at the University College of London, at the Department of Civil and Municipal Engineering.

G.J.T.

WAIKATO UNIVERSITY

Mark Schroder returned from a year's leave mainly in Germany and Canada, rested but unprepared for the hard grind of teaching (his autofocus camera mentioned in December is really a much more plebeian Canon, but the photos came out well though).

Roger Hosking survived secondment near Bangkok, and gave some idea of his research among the sluice-gates at the recent Colloquium.

John Turner got back from Warwick in May all knotted up, just in time to marry off his daughter Louise to Bill Rogers, a mathematician who deserted to computers.

Ian Urch comes back in September after a term on leave in Physics at Adelaide.

Franklin Sneyd goes shortly to Cambridge (England) again, for a conference and short leave, and

Ernie Kalnins will be back soon from Minnesota.

For the rest, Kevin Broughan has devoted a lot of time and energy to getting macsyma onto our pair of VAXes, and our undergraduate student numbers are holding up well against the growth of computer science and management studies (but may soon be affected by the removal of the compulsory statistics requirement for all social science degrees). The University finally acceded to our perennial complaints about noise from the car-park by planting a two metre shelter belt, in vegetation which may reach knee-level if not killed first by cars.

Seminars:

Graham French on "Emmy Noether's ideals".
Tony O'Hagen (Auckland) on "Bayesian pretest estimators".
David Vere-Jones (Victoria University) on "Inference problems for point processes defined through their conditional intensity functions".
Kevin Broughan on "Procedures for using the computer algebra system macsyma".
Chris Wild (Auckland) on "Cox models".
Roger Hosking on "Solving partial differential equations using ordinary differential equations software", and
Peter Hill on "Kernels, ranges and medical misadventures - or Quigley's revenge?"

M.S.

MASSEY UNIVERSITY

Our newest member of staff, Dr. Charles Little, arrived in May with his wife and two young children. Welsh by birth, Charles moved with his family to Canada at the age of 6. There he acquired in due course a university education (bachelor's and master's degrees at the University of Toronto, doctorate at the University of Waterloo) and a wife. In 1973 Charles and his wife emigrated to Australia, where Charles taught at the Royal Melbourne Institute of Technology until his move to New Zealand. Charles's research interests are in graph theory and combinatorics, and he has already started to work with Mike Hendy on the construction and analysis of phyletic trees.

This year our second-year papers have a new look. The numerical analysis paper is on its way out, and instead the material on numerical methods is being incorporated at appropriate points in the analysis, calculus and linear algebra papers, as well as in a new paper on differential equations which gives equal weight to exact and approximate solution techniques. We believe that students will benefit by seeing numerical techniques in a variety of contexts, instead of seeing them taught as a separate subject.

Seminars:

Dr. Graham Read (The Open University) "The design and production of assessment and courses".
Peter Kreft (N.Z. Meteorological Service, Wellington) "Numerical weather prediction".
Gordon Knight "The Mathematics lecture".

M.R.C.

VICTORIA UNIVERSITY

David Vere-Jones's election as a Fellow of the Royal Society of New Zealand is commemorated in the Centrefold of this issue. We wish to congratulate him.

Terence Nonweiler will be at Sydney University for the third term as the Sulman Memorial Lecturer in Engineering. His subject will be aerodynamic heating during re-entry of spacecraft. He has also recently become a M.I.P.E.N.Z. (Member of the Institute of Professional Engineers of N.Z.). His place as Chairman of the Mathematics Department will be filled by Doug Harvie, from 1 September.

Mark Gosnell, a Junior Lecturer in Mathematics, is to go for 10 months to Finland under the AIESEC student work exchange scheme to do some commercial computing.

Jim Ansell is to replace John Harper on the National Committee for the Lithosphere.

J.F.H.

CANTERBURY UNIVERSITY

Bob Broughton is due to return soon from study leave. Most of the period of his leave has been spent in New Zealand, but during the last few weeks he has travelled to the U.S.A. and Canada to attend conferences on numerical mathematics.

Murray Smith will depart next month on a year's study leave, to be spent at Purdue University, where he will be engaged in teaching and research.

John Baker, who has been with us for nearly twelve months, left recently to return to the University of Waterloo.

Michael Steele has been awarded an 1851 Exhibition Scholarship, so that this has come to students of the department in two successive years (last year Paul Matthews gained the award). Michael has just completed his M.Sc. with Bill Barit, and will take up his Scholarship at King's College, Cambridge, where he will be studying under Frank Adams.

Professor S.J. Taylor, of the University of Liverpool, has arrived to take up his Erskine Fellowship. He is giving a series of lectures on topics in probability and stochastic processes, and on the history of analysis.

Seminars:

In addition to a number of seminars by staff and graduate students, we had a visit from Professor Craig Ansley (University of Chicago), who spoke on "Signal extraction, splines and non-linear regression".

R.S.L.

OTAGO UNIVERSITY

Professor Ivor Francis of Cornell University has been a Visiting Professor of Statistics from May until August.

Professor W. Davidson has completed a 4 year term of membership on the Mathematical, Physical, and Engineering Sciences Fellowship Selection Panel of the Royal Society of New Zealand.

Ken Dodds, one of Otago's 1981 "First Class" Honours Graduates, has been awarded 3 scholarships (i.e. U.G.C., Southland Frozen Meat Post-Graduate Scholarship, and the Cox Fellowship (from North Carolina State University)), for the pursuit of a Ph.D. degree in "Quantitative Genetics" at North Carolina State University -- where he expects to work with Dr. Bruce Weir (formerly of Massey University). He currently holds the position of half-time Assistant Lecturer -- and plans to leave for North Carolina in mid-August.

This year the Senior Demonstrators are Stephen McPhail, J. Lewis Weatherall, and Peter Zoontjens.

Dr. G.F. Liddell is on sabbatical leave from May, 1982 to May, 1983. He plans to visit both Oxford University and Queen's University (Canada). He also hoped to attend the I.C.M. in Poland -- but it has been postponed.

Dr. John Clark and Dr. Gloria Olive have returned from their sabbatical leaves. Dr. Clark visited the University of Aberdeen and Warwick University (where he attended a Ring Theory Symposium). Dr. Olive visited a variety of universities in the U.S., U.K., France, and Australia (e.g., M.I.T., California Institute of Technology, University of California at Berkeley, University of Glasgow, Reading University, University of Paris, Flinders University, University of New England, and University of Newcastle). In addition to giving talks etc., she investigated Graduate Programs in Mathematics Education.

The "weekly" seminars have included:

Dr. D.S. Bridges (of University College, Buckingham); "Recent advances in constructive mathematics".
Associate-Professor B.F.J. Manly; "Analysis of polymorphic animal variation".
Mr. N. James & Dr. G. Wyvill (from Computer Science Dept.); "Computer graphics".
Since June there has been a Special Seminar on "Bass-Serre theory of groups acting on trees", (based on J.P. Serre's book "Trees") organised by Dr. John Clark.

Dr. Gopi Jain (45), Senior Lecturer in Mathematics, (specialising in theoretical statistics) since 1971 died on 14 June 1982 after collapsing while jogging in the Botanical Gardens. He is survived by his wife Usha and 3 children Vidyut, Mukta, and Plyush. An obituary for Dr. Jain appears on page 21.

G.O.

Feature Article

GEOMETRIC TOPOLOGY : A small sample

David Gauld

The New Zealand Mathematical Society Lecture at the Mathematics Colloquium, Dunedin, 1982

In a fifty minute talk one cannot possibly do justice to the field of Geometric Topology but I hope my sample gives you some idea of the kinds of things Geometric Topologists do and the way some of their procedures may be used.

One of the first results which might be considered to be part of Geometric Topology is the Jordan Curve Theorem which will be familiar to most, but let me remind you of it.

JORDAN CURVE THEOREM: A simple closed curve in the plane divides the plane into exactly two pieces, each having the curve as its frontier.

Roughly speaking, a simple curve is one which does not cross itself and it is closed if its ends coincide. More precisely a *simple closed curve* is the image of an embedding of a circle (in the plane). Figure 1 illustrates a (typical?) example: obviously it does what the Jordan Curve Theorem prescribes. Figure 2 illustrates a more complicated example: one needs to think a bit more about this example before believing the Jordan Curve Theorem in this case.

First stated by Jordan in his book Cours d'Analyse [13], the Jordan Curve Theorem was first proved by Veblen in [18] and soon improved by Schoenflies in [17].

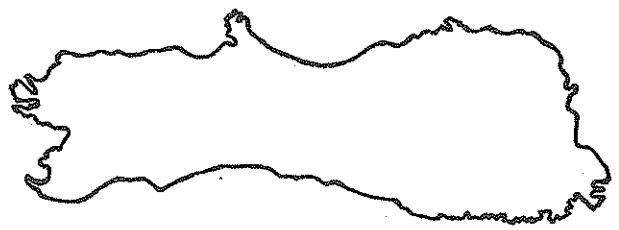


Figure 1

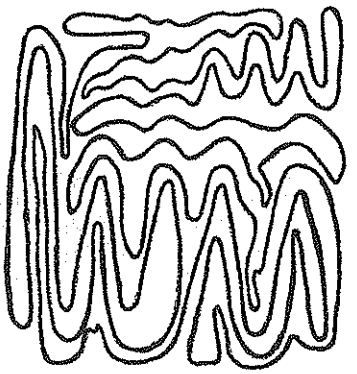


Figure 2

CLASSICAL SCHOENFLIES THEOREM: Any simple closed curve in the plane is the image of a circle under a suitably chosen homeomorphism of the plane.

Let $\mathbb{R}^n$ denote the Euclidean space of n-tuples of real numbers and S^{n-1} its subspace consisting of all points exactly one unit from the origin. In the case $n = 3$, S^2 becomes an ordinary sphere of unit radius: by analogy S^{n-1} is called the $(n-1)$-sphere. When $n = 2$, $\mathbb{R}^2$ is the plane and S^1 a circle. The Classical Schoenflies Theorem tells us that if C is a simple closed curve in $\mathbb{R}^2$ then there is a homeomorphism $h : \mathbb{R}^2 \to \mathbb{R}^2$ with $h(S^1) = C$. Now it is clear that S^1 divides $\mathbb{R}^2$ into two pieces, an inside and an outside, as in the Jordan Curve Theorem. The homeomorphism h takes the inside of S^1 to the inside of C and the outside of S^1 to the outside of C.

Topologists soon asked whether these theorems generalise to higher dimensions: replace $\mathbb{R}^2$ by $\mathbb{R}^n$ and S^1 by S^{n-1}. Brouwer, in [4], soon proved that the Jordan Curve Theorem generalises.

JORDAN-BROUWER SEPARATION THEOREM: Let $e : S^{n-1} \to \mathbb{R}^n$ be an embedding. Then $\mathbb{R}^n - e(S^{n-1})$ consists of two components, each having $e(S^{n-1})$ as its frontier.

Sometime later, Alexander, in [1], announced that Schoenflies Theorem, too, generalises, at least when $n = 3$. Even the best make mistakes, however, and soon after he provided his counterexample, [2], the Alexander Horned Sphere, illustrated in figure 3. It is a good exercise for beginning topology students to prove that the Alexander Horned Sphere really is an embedded sphere: one

needs the theorem about the limit of a uniformly convergent sequence of continuous functions and also the theorem about a continuous bijection from a compact space to a Hausdorff space. That it is a counterexample to the 3-dimensional version of Schoenflies Theorem follows by considering the loop, ℓ, running around the outside of the sphere in figure 3: if there were a homeomorphism $h : \mathbb{R}^3 \to \mathbb{R}^3$ for which $h(S^2)$ is the Alexander Horned Sphere then $h^{-1}(\ell)$ would be a loop outside S^2 and so it could be continuously shrunk outside S^2 to a point. Using h, we would then be able to continuously shrink ℓ outside the Alexander Horned Sphere to a point and this is not possible.

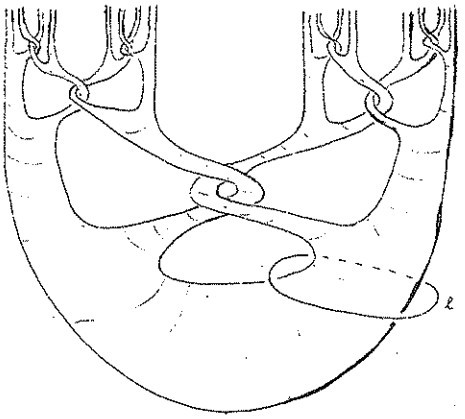


Figure 3

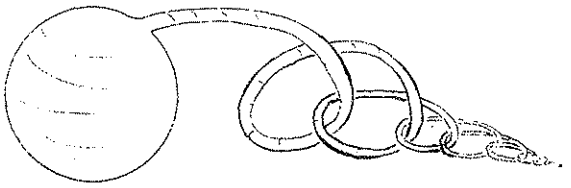


Figure 4

Two other counterexamples seem worth mentioning. The Fox-Artin sphere, [9], illustrated in figure 4, can be seen to be a counterexample essentially because if one tried to pass a loop over it, staying close to the sphere but always outside it then one would run into trouble at the limit point. The other counterexample is Bing's Hooked Rug, two steps in the construction of which are illustrated in figure 5. In his book [16] Rushing says of [3] "to read this paper is a nice way to satisfy one's geometrical appetite for the day". Once one convinces oneself that Bing's Hooked Rug is a counterexample, it is a short step to realising that repeated suspension gives a counterexample in all higher dimensions, i.e. an embedded image of S^{n-1} in $\mathbb{R}^n$ which is not realisable as the image of S^{n-1} under a homeomorphism of $\mathbb{R}^n$: see [16, p. 90], for example. If X is a compact subset of $\mathbb{R}^n$ then the suspension of X is a subset ΣX of $\mathbb{R}^{n+1}$ obtained as follows: let $a = (0,\ldots, 0,1)$, $b = (0, \ldots, 0, -1) \in \mathbb{R}^{n+1}$. Think of $\mathbb{R}^n$, and hence X, as being a subset of $\mathbb{R}^{n+1}$ by adding on an (n+1)st coordinate of 0. Then ΣX consists of the union of all closed line segments joining either a or b to a point of X. Figure 6 illustrates the idea as well as suggesting the fact that if S is any (embedded image of an) m-sphere then ΣS is an (embedded image of an) (m+1)-sphere.

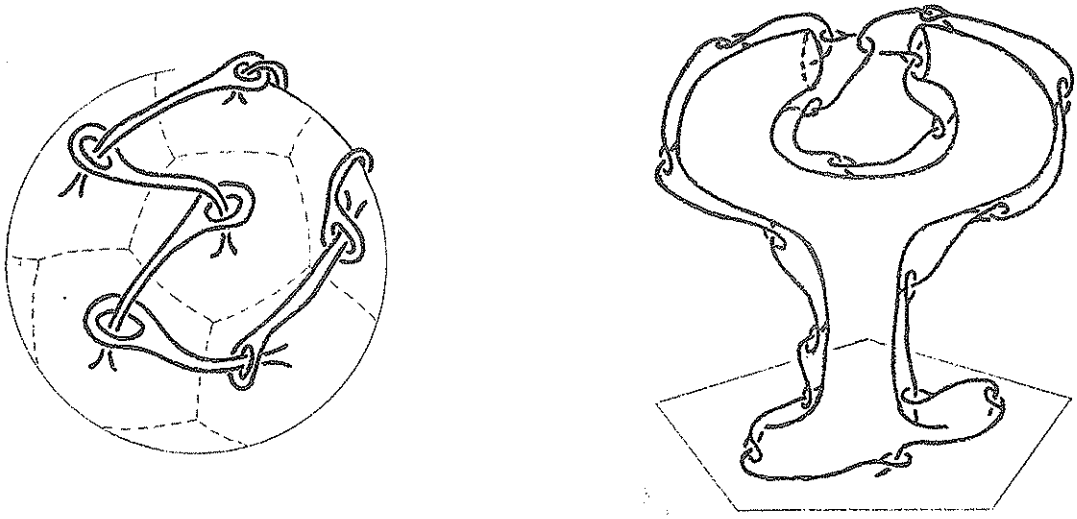


Figure 5

What can we say of our three counterexamples? One observation is that the Fox-Artin sphere is really quite ordinary except near the limit point, that the Alexander Horned Sphere is quite ordinary except near a Cantor set of bad points and that Bing's Hooked Rug is nasty everywhere. This can be made more precise by referring to local flatness: an embedding $e : S^{n-1} \to \mathbb{R}^n$ is *locally flat* at $p \in S^{n-1}$ (or by abuse at $e(p)$) provided p has a neighbourhood N in $\mathbb{R}^n$ over which $e \mid N \cap S^{n-1}$ extends to an embedding. The Fox-Artin sphere is locally flat at all but one point, the Alexander Horned Sphere is locally flat except at points of a Cantor set and Bing's Hooked Rug is locally flat nowhere. Incidentally, the Fox-Artin sphere illustrates a rather strange phenomenon. A theorem of Cantrell, [7], see also [16, p.100], says that only when $n = 3$ can we find an embedded $(n-1)$ sphere in $\mathbb{R}^n$ which is locally flat except at one point: for all other values of n, if the embedded $(n-1)$-sphere is locally flat except possibly at one point then it is locally flat there too. We can *see* the only place where things go wrong!! This is most unusual. More commonly things go wrong in the tantalisingly close dimension 4 or sometimes higher dimensions.

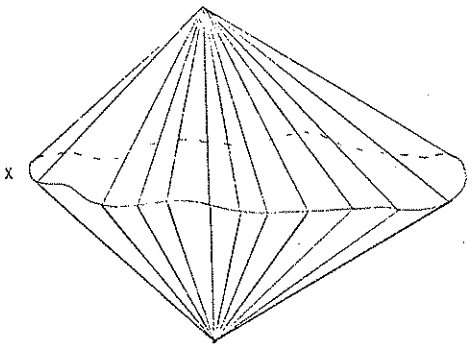


Figure 6

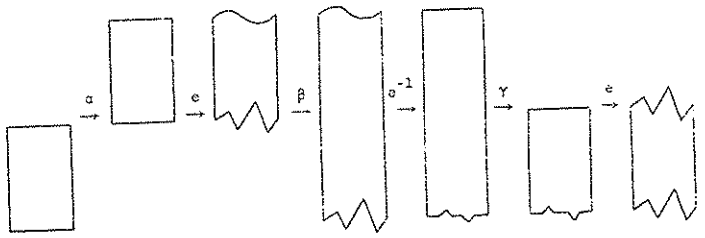


Figure 7

Having spoken negatively, but I hope not uninterestingly, for a while let me now give something positive. Almost simultaneously, Brown in [5] and Mazur in [14] (the first version of the latter is rather delightful reading, including reference to "an obsolescent New England penal apparatus"), generalised the Schoenflies theorem to arbitrary dimensions by requiring an extra hypothesis.

GENERALISED SCHOENFLIES THEOREM: Any embedding of S^{n-1} in $\mathbb{R}^n$ which is locally flat at each point of S^{n-1} extends to a homeomorphism of $\mathbb{R}^n$.

Actually, Mazur came first but he required an additional hypothesis which was soon eliminated by Morse in [15]. These two proofs of the Generalised Schoenflies Theorem, both quite elementary, are two of my favourite proofs. Time allows me to discuss part of Brown's proof.

Let $e : N \to \mathbb{R}^n$ be an orientation-preserving embedding, where N is a neighbourhood of S^{n-1} in $\mathbb{R}^n$: the paper [6] by Brown allows me to extend the embedding of the Generalised Schoenflies Theorem to this e. I will further assume that e is close enough to the inclusion for the following to work. Half of Brown's proof in [5] gets us into this position. Assume that N contains all points whose distance from the origin lies between 1/3 and 3. In figure 7 we are looking at a part of a radial wedge of N, with the radial direction being up the page and the circumferential directions (straightened out for simplicity) across the page. Figure 7 illustrates a sequence of 6 embeddings. The first map, α, is multiplication by the scalar 2 and the second is e. Assume that e is close enough to the inclusion so that every point of $e(S^{n-1})$ is within 4/3 of the origin and that no point of $e(2S^{n-1})$ is within 5/3 of the origin. The third map, β, leaves points at least 5/3 from the origin alone, scalar multiplies points within 4/3 of the origin by 1/2 and radially stretches the annulus in between. The fourth map is e^{-1} which is defined on the set we are interested in provided e is close enough to the inclusion. Since β left $e(2S^{n-1})$ alone, $e^{-1}\beta e$ does nothing to $2S^{n-1}$. Assume that e is close enough to the inclusion

so that every point of $e^{-1}\beta e(S^{n-1})$ is within 3/4 of the origin. The fifth map, γ, leaves points within 3/4 of the origin alone, multiplies points at least 2 from the origin by 1/2 and radially shrinks the annulus in between. The sixth map is e once again. The composition of these six embeddings is defined on the whole of the closed annulus, A, consisting of all points whose distance from the origin lies between 1/2 and 1. An interesting feature of $e\gamma e^{-1}\beta e\alpha$ is that it does the same thing on S^{n-1} as on $\frac{1}{2}S^{n-1}$; more precisely, if $x \in S^{n-1}$, then

$$e\gamma e^{-1}\beta e\alpha(x) = 2e\gamma e^{-1}\beta e\alpha(\tfrac{1}{2}x) (= e(x)).$$

We can now construct $h : \mathbb{R}^n \to \mathbb{R}^n$, a homeomorphism extending $e|S^{n-1}$, by fitting pieces together like a jigsaw puzzle. Let $x \in \mathbb{R}^n$. If $x = 0$, let $h(x) = 0$. Otherwise for some integer k, $2^k x \in A$. Set

$$h(x) = 2^{-k} e\gamma e^{-1}\beta e\alpha(2^k x).$$

For most x, the k is unique, but if it is not then for a unique k, $2^k x \in A$ and $2^{k+1}x \in A$, $2^k x$ being 1/2 from the origin. In this case

$$2^{-k} e\gamma e^{-1}\beta e\alpha(2^k x) = 2^{-k-1} e\gamma e^{-1}\beta e\alpha(2^{k+1}x),$$

so h is well-defined.

I shall mention a few other places where this jigsaw puzzle procedure has been useful.

Firstly, in [8], Edwards and Kirby describe a procedure for constructing a bounded homeomorphism of $\mathbb{R}^n$ which agrees with a given homeomorphism on $B^n = \{(x_1, \ldots, x_n) \in \mathbb{R}^n / \Sigma x_i^2 \leqslant 1\}$ provided that the homeomorphism is close enough to the identity. They present two constructions, one of which goes like this. Given $h : \mathbb{R}^n \to \mathbb{R}^n$ near the identity, by working in each of the coordinate directions in succession as in figure 7, we can construct an embedding of a hypercube in $\mathbb{R}^n$ which agrees with h on B^n and does the same thing on each of any pair of opposite walls. Similar embeddings can then be fitted together to give the desired bounded homeomorphism g, as in figure 8. One nice feature of the construction is that if h´ is near h then g´ is near $g : h \to g$ is continuous. From this Edwards and Kirby could deduce local contractibility of the group of homeomorphisms of $\mathbb{R}^n$. An extension of their ideas led to resolution of the annulus conjecture in dimensions greater than 4: one can identify opposite faces of the hypercube to obtain a homeomorphism of the n-torus. By a surgery argument this homeomorphism (or rather a finite cover of it) is stable, from which one can deduce the stability of h where now we need only demand that h is orientation-preserving.

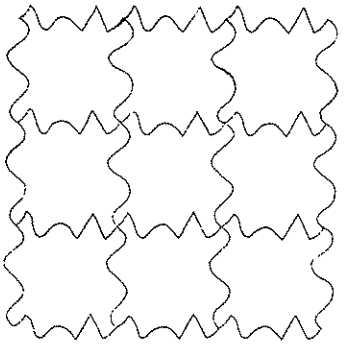


Figure 8

Secondly in [10], by beginning with a homeomorphism of any finite simplicial complex, close to the identity, and carrying out the procedure only finitely many times I was able to provide an elementary proof of local contractibility of the group of homeomorphisms of a finite simplicial complex. The niceness of the construction means that the contraction preserves the subgroup of piece-wise-linear homeomorphisms.

Finally, in [12], Vamanamurthy and I used the niceness to allow us to adapt the procedure to the context of quasiconformal mappings. This led eventually to the resolution of a conjecture of Gehring, of [11]. Surely this is Applied Geometric Topology.

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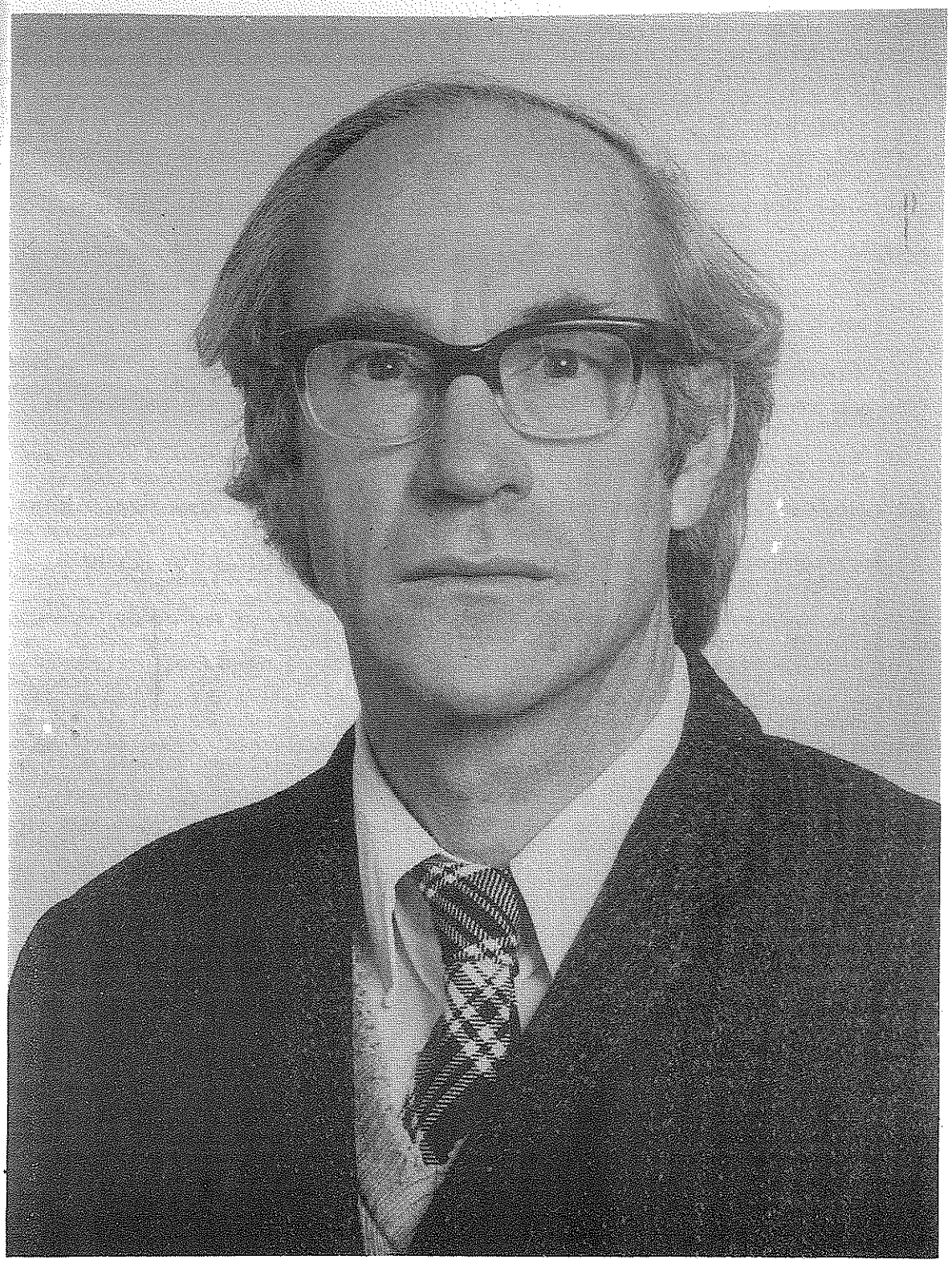
DUNEDIN COLLOQUIUM - INVITED ADDRESSES

Professor Paul Erdös of the Hungarian Academy of Sciences gave a most entertaining address entitled *Combinatorial Problems in Geometry.* Prizes ranging from $25 to $3000 were offered for solutions to problems posed; one of these appears on page 20. Erdös' talk was recorded and a transcript is to be published in the Mathematical Chronicle.

Professor Ivor Francis (Cornell University) presented a survey of statistical software entitled *An Analysis of Developers' and Users' Ratings of Statistical Software.* A written version is to be published under the joint authorship of I. Francis and N. Lauro in COMPSTAT 82, Physica Verlag, Vienna.

Professor Tom Hawkins spoke on *Non-Euclidean Geometry and Weierstrassian Mathematics.* This talk was based on earlier work published in Annals of New York Academy of Science and in Historia Mathematica (1980). A sequel is to appear soon in Archive for History of Exact Science.



Centrefold

PROFESSOR DAVID VERE-JONES

Elected Fellow of the Royal Society of New Zealand

In May of this year David Vere-Jones, Professor of Mathematics at Victoria University of Wellington since 1970, was elected as a Fellow of the Royal Society of New Zealand.

David Vere-Jones is New Zealand's leading resident mathematical statistician. He has made major contributions to the theory of statistics, its applications, and to the teaching of statistics in New Zealand. He is highly regarded internationally and is involved in numerous international activities.

One of his major research areas has been concerned with Point Processes (the statistical theory of sequences of events that occur at discrete points in time or space, such as earthquakes, neuron firings, volcanic eruptions, etc.) A substantial body of the existing theory owes its origins to him, either directly or via his students. Of particular importance and relevance to New Zealand is his pioneering work on the applications of point process theory to seismology. This began with the two papers on the times of occurrence of New Zealand earthquakes in the N.Z. Journal of Geology and Geophysics and is now expanded to include spatial patterns, earthquakes mechanism and the statistical problems associated with earthquake risk estimation and earthquake prediction.

Another area in which he has made substantial contributions is the theory of Markov Processes. This includes both the general theory, and particular examples such as branching processes and queueing theory. His two papers on non-negative matrices, although developed as part of Markov chain theory are relevant to areas of mathematics quite unrelated to statistics.

He has also made substantial contributions to mathematical and statistical education in New Zealand. He is the Subject Convener for Mathematics for the University Entrance Board of the University Grants Committee and a member of the National Consultative Committee on Mathematics. He was instrumental in setting up Victoria University's Institute of Statistics and Operations Research which promotes and coordinates research, teaching and consulting in Statistics and Operations Research at Victoria University. He continues to be active in the affairs of the Institute and has been its principal chairman since its inception.

Currently he is president of the N.Z. Statistical Association. He is a former president of the N.Z. Mathematical Society which he helped found. He has also been the secretary of the Royal Society's National Committee for Mathematics. He is Chairman of the East Asian and Pacific Regional Committee of the Bernoulli Society (a branch of the International Statistical Institute) and is particularly concerned with improving contact and communications between statisticians in this East Asian/Pacific region.

His international standing is such that he is frequently invited to overseas institutions and conferences. He speaks Russian and other languages thus enabling him to maintain frequent contact with statisticians and seismologists in many countries. He has been an ordinary member of the International Statistical Institute since 1978 (membership is limited and currently stands at about 1000 world-wide) and a Fellow of the Royal Statistical Society since 1969.

David was born in London but came to New Zealand at the age of twelve, completed his secondary education at Hutt Valley High School (was dux in 1953) and was a student at Victoria University of Wellington in the middle fifties. He won a Rhodes scholarship to undertake postgraduate studies in probability theory at Oxford under the supervision of Professor D.G. Kendall. After completing his doctorate he went to Moscow as an exchange Scholar at Moscow University where he made contact with the strong Russian school on probability; contacts which have continued over the years. David returned, as so many ex-Victoria students in mathematics have done, to Wellington in 1962 and took up the post (which he held previously before going to Oxford in 1958) at the Applied Mathematics Division of D.S.I.R. which he held until the mid sixties. During this time he married his wife Mary who was then also working in the Applied Mathematics Division. After short appointments (gained no doubt because of his rapidly developing expertise in mathematical statistics) in distinguished statistical centres such as the Australian National University

in Canberra, Michigan State University and Manchester University, the call to Wellington was again answered by his appointment to the chair of mathematics at Victoria University recently vacated by the retirement of his former teacher (Professor J.T. Campbell).

At Victoria he has quickly gained wide-respect for his activities here and is well-known for his work in all areas of the university's activities: research, teaching and administration. The hall-mark of his activity here has been his refusal to allow administrative procedures to dominate his thinking and his ability to never lose sight of the university's main function: research and teaching. His long term and unceasing commitment to research gives witness to that.

David is known for his many areas outside of mathematics. He is a talented actor - some say as good as his brother Peter who is well-known as a professional actor in the New Zealand scene. He is a formidable opponent on the tennis court and was the 1982 singles champion at the local Northland tennis club. He plays interclub tennis right through the year.

The election of David Vere-Jones as a Fellow of the Royal Society of New Zealand will bring expertise to the Fellowship of the Royal Society in an area that it is currently lacking. He will serve the Society with distinction and his colleagues warmly congratulate him on this honour.

G.C. Wake

1982 BURROUGHS-NZMS THESIS COMPETITION

Following a successful first round in 1980, the NZMS competition for pre-doctoral theses was run again in 1982, this time with generous assistance from Burroughs Limited. The competition attracted seven entries from three universities (Canterbury, Massey and Victoria), which kept the judging panel busy for several months. Professor Ted Zulauf (Waikato) agreed to convene the judging panel again, his fellow judges this time being Dr John Harper (Victoria) and Professor Alastair Scott (Auckland).

The judges were unanimous in awarding first prize to David Johnstone for his thesis *Predator-Prey Dynamics : A Review*, submitted to Massey University (supervisor: Dr Michael Carter). This thesis stood out, in the judges' opinion, as a very mature piece of writing, which succeeding in reviewing an enormous amount of literature in a pleasing and informative way which held the reader's interest throughout. It contained both critical comment and some original contributions.

Second prize was awarded jointly to James Graham-Eagle (*An Existence Theorem for Non-Linear Elliptic Partial Differential Equations*, submitted to Victoria University, Supervisor: Dr Graeme Wake) and Paul Matthews (*L_p Solution of Overdetermined Systems of Linear Equations*, submitted to Canterbury University, Supervisor: Dr Ian Coope). Both theses were fine pieces of writing, and the judges felt that they did not want to discriminate between them.

The judging panel complimented all the entrants on the quality of their work; the task of reading through all the theses was a time-consuming but rewarding one.

Unfortunately none of the prizewinners could attend the prizegiving in Dunedin on 17 May (during the New Zealand Mathematics Colloquium); David Johnstone could not get leave from his job in Wellington, while James Graham-Eagle and Paul Matthews are at present studying in the United Kingdom. It therefore fell to the supervisors to collect the prizes and certificates on behalf of the winners; the presentation was made by Professor David Gauld, president of the NZMS, at a short ceremony following the NZMS Lecture at the Colloquium.

Burroughs Limited contributed prize money of $250; the NZMS increased this to $300 to allow a first prize of $150 and two second prizes of $75 each.

Thanks are due to the judges for performing their difficult task so well, and to Burroughs Limited for their support. It is intended that the next round of the competition should be held in 1984, for theses submitted during 1982 and 1983; pre-doctoral thesis supervisors please note!

M.R. Carter

Letters to the Editor

UE MATHEMATICS

Peter Lorimer's response to Professor Vere-Jones' article on the UE syllabus has provoked some musings on my part on the differing styles of university socio-political organisation prevailing in New Zealand, Europe and North America.

In Europe, including the UK, the baronial traditions of old established society have found their mirror in the hierarchical structures of the university world which have in many cases outlasted the social order which gave them birth. But there is an intellectual justification for this hierarchy which has been expounded by such leading mathematicians as Dieudonné (appropriately enough!) namely the "great man" theory of mathematical productivity. (A sort of Lorenz curve with cumulative mathematical output along the y-axis and the population of mathematicians ranked along the x-axis.)

In fact, after looking at a CV of a certain visiting applied mathematician which lists 108 publications over a 20-year span in several quite different subject areas I am almost willing to go along with the theory. Almost, but not quite - in the ecology of the mathematical community the big Totaras and Kauris create the conditions in which the smaller species can thrive, and do not themselves grow well in monoculture.

In the New World the Departmental head has evolved into a chairman at the majority of institutions. Despite the egalitarianism the peck-order concept is alive and well in North American academia but it functions more on a between-university than a within-university basis. The peers that a North American mathematician competes with are his fellow Lie algebraists or recursive function theorists or whatever. Relative success or failure is measured by the status of one's institution somewhat more than one's rank within the institution.

It seems that language and national barriers to mobility are the real reason behind the persistance of hierarchical organisation in European universities. In any event these factors can only reinforce the effect of social conservatism in this regard.

The small number of universities of roughly uniform status possessed by New Zealand, coupled with the small numbers of fellow workers in any particular sub-discipline of mathematics make it unlikely that New Zealand will follow the North American path in these matters. It will be obvious that, like Peter, I reflect the bias of my own education in preferring the North American way. I am gloomy, though, about any prospect of change. Perhaps the only hope could be if a CER with Australia would bring about a Closer Intellectual Relationship.

I would be interested to hear what thoughts others may have on these matters and on the broad general question of how we can, in a small and isolated society like ours, stimulate healthy professional relationships between mathematicians in this present competitive but no-growth situation.

Murray A. Jorgensen

LOMONOSOV

The following letter was communicated to the Newsletter by the NZMS Human Rights Officer, Bruce Calvert.

We wish to draw the attention of the international mathematical community to the plight of Dr. Michael Lomonosov. In November 1978 Dr. Lomonosov applied for a permit to emigrate to Israel. He was subsequently dismissed from his position at the Institute for Problems of Information Transmission, U.S.S.R. Academy of Sciences, Moscow, and now makes a menial living as janitor. Only a few months ago, after a nerve-racking period of some three years of harassment and uncertainty, was Dr. Lomonosov's request rejected on the grounds that if he emigrates he might slander the U.S.S.R. abroad.

Though Lomonosov has no access to a library, almost no contacts with colleagues and is unable to publish, he appears to be in a rather active phase of his work.

Mathematicians everywhere may help Lomonosov professionally, by sending to him reprints, journals, books and letters, and by writing on his behalf to President Brezhnev and other Soviet officials. It is advisable to send correspondence by registered mail with return request. His address: Chertanovskaya Ulitsa 34-1-286, Moscow 113525, U.S.S.R.

Dr. Lomonosov is interested mainly in combinatorics, graph theory and flow problems in networks.

Professor Kannoi,
CHAIRMAN, ISRAEL MATHEMATICAL UNION.

Conferences

*** 1982 ***

August (Beijing, China)
International Conference on Finite Element Methods
Details from Conference Secretary, International Conference on Finite Element Methods, Department of Civil Engineering, University of Hong Kong, Hong Kong.

August 2-6 (Sao Paulo, Brazil)
International Seminar on Functional Analysis, Holomorphy and Approximation Theory
Details from Jorge Mujica, Institute of Mathematics, Statistics and Computer Science, State University of Campinas, Caixa Postale 1170, 13100 Campinas, Sao Paulo, Brazil.

August 2-6 (Rio de Janeiro, Brazil)
Third Conference on Topology of Manifolds and Homotopy Theory
Details from Antonio Conde, IMECC-UNICAMP, 13100 Campinas, Sao Paulo, Brazil.

August 3-10 (Czechoslovakia)
Meeting on Binary Systems and Ring Theoretic Methods in Universal Algebra
Details from J. Ježek, Department of Algebra, Charles University, Sokolovská 83, 18600 Praha 8, Czechoslovakia.

August 8-13 (Montreal)
Tenth IMACS World Congress on Systems Simulation and Scientific Computation
Details from S. Sankar, Tenth IMACS Congress Chairman, Department of Mechanical Engineering, H 929-12, Concordia University, 1455 Maisonneuve Boulevard West, Montreal, Canada H3G 1M8.

August 8-13 (Sheffield)
First International Conference on Teaching of Statistics
Details from ICOTS Secretary, Department of Probability and Statistics, The University, Sheffield 853 7RH, England.

August 9-10 (Warsaw)
International Conference on Philosophy and Foundations of Mathematics
Details from Cecylia Rauszer, Institute of Mathematics, Warsaw University, PKin 1X f1, 00-901 Warsaw, Poland.

[August 11-19]
International Congress of Mathematicians
Postponed.

August 19-21 (Cincinnati)
3rd American Time Series Meeting (8th ITSM)
Details from Oliver Anderson, 9 Ingham Grove, Lenton Gardens, Nottingham NG7 2LQ, England.

August 19-27 (Blazejewko, Poland)
Eighth Conference on Analytic Functions
Details from Julian Lawrynowicz, Instytut Matematyczny PAN, Oddzial W Lodzi, ul. Kilinskiego 86, PL-90-012 Lodz, Poland.

August 23-27 (Bonn)
XI International Symposium on Mathematical Programming
Details from Math. Progr. Secretariat, c/- Institute for Operations Research, Nassestrasse 2, D-5300 Bonn 1, West Germany.

August 23-27 (Melbourne)
Sixth Australian Statistical Conference
Details from Ian R. Gordan, Conference Secretary, Department of Statistics, University of Melbourne, Parkville, Victoria 3052, Australia.

August 23-27 (Adelaide)
Tenth Australian Conference on Combinatorial Mathematics
Details from Dr. L.R.A. Casse, Department of Mathematics, University of Adelaide, North Terrace, Adelaide, South Australia 5001, Australia.

August 23-27 (Prague)
Third Czechoslovak Symposium on Graph Theory
Details from Mathematical Institute CSAV (Graphs), Zitna 25, 115 67 Praha 1, Czechoslovakia.

August 23-28 (Florence, Italy)
Logic Colloquium 82
Details from A Marcja, Logic Colloquium 82, Instituto Matematico "U. Dini", V. le Morgagni, 67/A, 50134 Firenze, Italy.

August 23-28 (Würzburg, West Germany)
Equadiff 82
Details from H.W. Knobloch, Equadiff 82, Mathematisches Institut, Universität Würzburg, D8700 Würzburg, Federal Republic of Germany.

August 30 - September 2 (Mons, Belgium)
International Colloquium on Geometry Teaching
Details from G. Noel, Université de l'Etat à Mons, 15 Avenue Maistriau, B 7000 Mons, Belgium.

[August 30 - September 3]	*Eleventh International Symposium on Mathematical Foundations of Computer Science* Cancelled.
September 1-3 (Tunis)	*Symposium on Informatics and Control for Development* Details from Secretary, IASTED Tunis Symposia, Department of Electrical Engineering, École Nationale d'Ingenieurs de Tunis, B.P. 37, 1012 Tunis-Belvedere, Tunisia.
September 1-3 (Tunis)	*Symposium on Measurement and Control* Details from Secretary, IASTED Tunis Symposia, Department of Electrical Engineering, École Nationale d'Ingenieurs de Tunis, B.P. 37 1012 Tunis-Belvedere, Tunisia.
September 1-10 (Gargnano, Italy)	*International Institute on Stochastics and Optimisation* Details from M. Speranza, International Institute on Stochastics and Optimisation, c/o IAMI, Via Cicognara 7, 20129 Milan, Italy.
September 5-9 (Dublin)	*European Econometric Congress* Details from Mme. Aussert, I.S.U.P., 4 place Jussieu, 75230 Paris, Cedex 05, France.
September 13-17 (Palermo, Italy)	*Fifteenth European Meeting of Statisticians* Details from A. Mineo, 1st Stat., Fac. Econ., Palermo, Italy.
October - November (Chiangmai, Thailand)	*Workshop on Teaching of Graduate and Undergraduate Mathematics* Details from Mark Tamthai, Department of Mathematics, Chulalongkorn University, Bangkok 5, Thailand.
October 18-20 (Madison, Wisconsin)	*Symposium on Waves on Fluid Interfaces* Details from Gladys Moran, Mathematics Research Centre, University of Wisconsin, 610 Walnut St., Madison, Wisconsin 53706, U.S.A.
October 25-27 (Fairfield Glade, Tennessee)	*Sparse Matrix Symposium* Details from Robert C. Ward, Union Carbide Corporation - Nuclear Division, Computer Sciences Division, Box Y, Bldg. 9704-1, Oak Ridge, Tennessee 37830, U.S.A.
November 2-4 (Boston, Massachusetts)	*SIAM Conference on Numerical Simulation of VLSI Devices* Details from Hugh B. Hair, SIAM Services Manager, 1405 Architects Building, 117 South 17th St., Philadelphia, Pennsylvania 19103, U.S.A.
November 3-5 (Chicago, Illinois)	*Twenty-third Annual IEEE Symposium on Foundations of Computer Science* Details from David W. Bray, Department of Electrical and Computer Engineering, Clarkson College, Potsdam, New York 13676, U.S.A.
November 16 - December 10 (Trieste, Italy)	*Autumn Course on Mathematical Ecology* Details from ICTP, P.O. Box 586, I-34100 Trieste, Italy

OFFICERS OF THE SOCIETY, JUNE 1982 - MAY 1983

President:	Dr. J.H. Ansell,	Victoria University of Wellington
Incoming Vice-President:	Prof. W. Davidson,	University of Otago
Immediate Past President:	Prof. D.B. Gauld,	University of Auckland
Secretary:	Dr. K.G. Russell,	Victoria University of Wellington
Treasurer:	Dr. J.L. Schiff,	University of Auckland
Councillors:	Dr. M.R. Carter,	Massey University (to 1983)
	Dr. I.D. Coope,	University of Canterbury (to 1985)
	Dr. P.D. Hill,	University of Waikato (to 1985)
	Dr. A. McNabb,	DSIR, Wellington (to 1984)
	Dr. D.J. Smith,	University of Auckland (to 1984)
Editor:	Dr. I.D. Coope,	University of Canterbury
NZAMT Alternates:	Mr. N.J. Gale,	Papanui High School
	Mr. B.R. Stokes,	Hamilton Teachers' College

Problems

Readers are invited to send problems for this section. Some indication should be given of how a problem has arisen and whether a complete solution is known and attribution of sources should be provided for problems that are not original. Attempts at solutions should be sent to the setter or to the Editor.

Problem 8. $25 Question.

Is it true that for every n there are n distinct points in the plane, so that they determine n-1 distinct distances so that the ith distance (in some order) occurs i times?

Comments:

Such a set trivially exists for $n \leq 4$, Pomerance gave such a set for n = 5 and a Hungarian High School student for n = 6.

This problem was submitted by Professor Erdos and a prize of $25 is offered for a proof or disproof.

Comments on Problem 7. (April 1982)

The required result is most easily established by equating coefficients of x^r in the identity

$$(1-x)^n \ (1-x)^{-(n-m-r+1)} = (1-x)^{m+r-1} \ .$$

Direct proofs using this result were provided by D. R. Breach, J. Rayner and P. F. Renaud. An inductive proof is more difficult and the most elegant inductive argument received was that submitted by A. Zulauf.

Rational Approximations to Pi.

On page 22 of the April Newsletter I am alleged to have drawn your attention attention to a result concerning π and 22/7.

If I had in fact done so, I would not have been so discourteous to the discoverer as to omit the reference. Would you please insert it in your next issue:

D.P. Dalzell, 1971, "On 22/7 and 355/113"
Eureka (=J. Archimedeans(= Cambridge Univ. Math. Soc.)), 34, 10-13

(Dalzell also proved that $24 \times 10^{-8} < 355/113 - \pi < 33 \times 10^{-8}$, by as elementary a method as one could reasonably expect.)

J. F. Harper.

Clearly there has been an unfortunate misunderstanding. The editor apologises for any annoyance or embarrassment that may have been caused. The following note is also relevant.

$$\int_0^1 \frac{x^8(1-x)^8}{1+x^2}\,dz = 4\left(\pi - \frac{47171}{15015}\right) \text{ and hence } \frac{1}{1750320} < \pi - \frac{47171}{15015} < \frac{1}{875160}$$

In fact, $\frac{47171}{15015} + \frac{1}{2}\left(\frac{1}{1750320} + \frac{1}{875160}\right)$ differs from π by about 6×10^{-8}.

Reference: D.A. Nield, Rational Approximations to Pi, N.Z. Math. Mag., Vol. 18 (1982), 99.

D.A. Nield.

Professor Zulauf poses the following related problem (with no claim to originality)

Let n and m be non-negative integers of the same parity. Show that a rational approximation to π can be obtained by considering the integral

$$D_{n,m} = \int_2^1 \frac{x^n(1-x)^{2m}dx}{1+x^2}$$

and estimate the error.

Solution available on request. Note that Nield, in his article, considers the case n = 2m, m even.

OBITUARY: G.C. JAIN

Dr. Gopi Chand Jain of the Mathematics Department, University of Otago, died suddenly on 14 June 1982. He collapsed while jogging in the Botanical Gardens near the University. His tragic death was a great shock to us all, and readers will join us in extending deepest sympathy to his wife Usha and family in their sad bereavement.

Gopi had been with us in the Mathematics Department since September 1971 when he arrived from Canada to take up the appointment of Senior Lecturer in Mathematical Statistics. He soon got over some initial accent difficulties and within a short time proved himself to be a most valuable member of the Department - in respect of advanced teaching, supervision of research students, and prodigious output of personal research.

Early practical training in statistics came for Gopi in provincial Indian Government service, following a B.Sc. Mathematics major at Agra University (where he held a Merit Scholarship), and an M.Sc. in Statistics at the University of Patna. During the years 1958-64 as a Government statistician he carried out socio-economic, dietary and industrial surveys and their statistical analysis. He was involved in the preparation of developmental schemes for various districts, based on factors such as natural resources, urbanisation, transport, labour and power forces, and literacy. This early training undoubtedly helped Gopi to place his later deeper theoretical studies in a sound practical perspective.

In 1964 he won a Research Training Scholarship from the Ministry of Education which took him to the University of Delhi where he completed a Ph.D. thesis on Stochastic Processes in 1967. Appointed lecturer at Delhi University in that year he taught courses in Statistics to post-graduate students and took part in joint supervision of research. Two years later he was awarded a Postdoctoral Fellowship by the University of Calgary, and this was followed a year later by another Postdoctoral Fellowship held at Dalhousie University, Halifax, Nova Scotia. Gopi's ability and dedicated industry were already clearly shown by the fact that between the years 1966 and 1970 he had written 21 papers, in either sole or joint authorship, at a rate which took reputable international journals several more years to catch up with in terms of publication. He read a paper at nearly all the New Zealand Mathematical Colloquia and also attended and presented papers at the 3rd and 5th Australian Statistical Conferences in 1976 and 1980, respectively.

Gopi published his first two papers in 1966 in the Journal of the Indian Statistical Association. These were on random walks and gave a good indication of his future research directions. By the time he reached the University of Otago in 1971 his publications included several more papers on distribution theory and stochastic processes. From 1971 on he maintained a steady output of about four papers a year and firmly established himself as the principal theoretical statistician in Otago.

Gopi's interests were wide within the general area of probability and distribution theory. His most important contribution to statistics is probably the study of new distributions. For example in 1973 he published with P.C. Consul a generalisation of the Poisson distribution in the journal *Technometrics*. Altogether he produced more than 20 papers on distribution theory. However, he also published work in operational research, econometrics, reliability theory and approximation theory.

Recently, Gopi contributed a major article on Hermite distributions to Wiley's forthcoming *Encyclopedia of Statistical Sciences*. At the time of his death he had just finished revising a manuscript on moment relations for characterising a distribution by zero regression.

Apart from his published contributions to the theory of statistics, Gopi will be long remembered for his contribution to the training of statisticians at the University of Otago. One of his strengths was in the area of supervision of research students working for higher degrees. In his time at the university he usually had one or two students working with him. In total there were five M.Sc. theses and one Ph.D. thesis that were successfully completed under his direction.

Refresher leave from late 1977 to early 1979 proved a mixed blessing for Gopi. He spent 11½ months happily and profitably at Dalhousie University and also at McMaster University in Canada. However on the homeward journey with his family via India he unfortunately suffered a very severe attack of malaria, and became seriously ill. He slowly improved in health again on his return to New Zealand and his steady efforts to continue his research and also to regain fitness were entirely characteristic of him.

Gopi Jain was a gentle and kindly person, possessing a courteous and cooperative nature and quiet charm. He and his wife Usha were generous hosts in Dunedin and played an active part in the local Indian social community. His benign presence will be greatly missed, but well remembered, by us all.

W.D.
B.F.J.M.

Secretarial

MINUTES OF THE EIGHTH ANNUAL GENERAL MEETING

held at University of Otago
on Tuesday, 18 May 1982

The Chairman began the meeting at 5.05 p.m. by first announcing that Council had appointed Mr. H.S. Roberts and Prof. C.M. Segedin as Honorary Members of the Society.
ENDORSED WITH ACCLAMATION.

PRESENT: D.B. Gauld (Chair), Alcorn, Ansell, Boyd, Broughan, Bryant, Carter, Coope, Davidson, Davies, Dawkins, Dixit, Gardiner, Goulter, Halford, Hosking, Knight, Long, McManus, McInnes, McNabb, Olive, K. Pledger, Reilly, Russell, Sawyer, Schroder, Sharp, Smith, Vamanamurthy, Wake, Werry, Woods.

1. APOLOGIES: Calvert, Stokes, Vere-Jones. SUSTAINED.

2. MINUTES OF PREVIOUS AGM: These were taken as read and confirmed.

3. MATTERS ARISING:

(a) Status of By-Laws: The Chairman reported that the Justice Department had written confirming that the By-Laws are not considered part of the Constitution.

(b) A.C. Aitken Memorial Trust: The Chairman reported that Council had resolved to approve the formation of this Trust, and that the Deed had been executed.

(c) Third Australasian Convention: The Chairman reported that a decision of the Australian Mathematical Society was awaited on the NZMS recommendation that the Convention be held in Melbourne in May, 1985.

(d) Assistance to South Pacific.

It was moved (Ansell/Halford) that the meeting endorse the Council resolution:

1. That Council approve the principle of providing further post-graduate mathematics education opportunities in the South Pacific, and that it budget up to $500 in the coming year for the implementation of a proposal to be formulated after specific information on needs is received from Dr. Joyce.

2. That the Secretary write to the Vice-Chancellors of New Zealand Universities seeking an expression of attitude and policy on the granting of leave to staff to enable them to take up appointments with limited tenure at USP.

4. ANNUAL REPORT: This was read by the Chairman, and it was moved (Schroder/Dixit) that it be received. CARRIED.

5. TREASURER'S REPORT: The Treasurer spoke to the Report, noting that there had been approximately $6000 profit from publications, with total receipts of about $25,000. There was discussion of methods of dealing with the problem of overdue subscriptions, the total amount overdue being approximately $1000.

It was noted that a separate Publication account was to be opened in Wellington, and suggested that the surplus should be invested regularly in Term Deposits.

It was moved (Schiff/Reilly) that the report be accepted. CARRIED.

It was moved (Ansell/Halford) that some of the publication profits may be used for special projects, with an amendment (Long/Wake) that the amount so used be up to $2000. CARRIED.

After further discussion it was moved (Pledger/Long) that Publication funds be taken account of separately and that transfer of those funds to the general account normally be approved only by a resolution of a general meeting. CARRIED.

6. PUBLICATIONS REPORT: This was tabled and spoken to by Dr. Wake who reported on a proposal of the publication of a first year Calculus book in the style of the Syllabus Series. He emphasized the usefulness of the Careers Booklet and advocated its use. He stated that he felt it time to reconsider the relationship of the NZMS to the Mathematical Chronicle and referred the matter to the incoming Publications Committee.

It was moved (Wake/Halford) that this report be adopted. CARRIED.

7. HUMAN RIGHTS: The following report from the Human Rights officer, Dr. Calvert, was read:

During the year I carried on the Subcommittee's work, dealing with the following three cases. I request the Society to consider the motion presented below. Some supporting and explanatory documents are attached.

1. Following representations from Dr. Bunder, Maths Dept., Wollongong, a letter was sent to Dr. Minc, a refusenik from Leningrad, as in 1980. Dr. Bunder was asked for an update on the case.

2. In response to a letter from Prof. Kannai, Chairman, Israel Mathematical Union, a letter was sent to the First Secretary of the USSR Embassy in Wellington. It concerned Scharansky, Brailovsky, Lerner, Maimon, Alber, Koghan, Dikki, Loffe, Freidlin, Schanowski, Esses, Freiman, Resenstein, Kinelpheld, Kamburd, Rodin, Leonov, Elizasheberg and Herlovitz.

A letter was sent, replying to Prof. Kannai, asking for more detailed and complete information.

3. In response to new material from Israel Halperin, Vice President Canadian Math. Soc., director of International Campaign - Massera, letters were sent to the Uruguayan authorities. A packet of articles on the case were sent to the Student Newspapers of our universities.

I would like to propose the following motion: That the New Zealand Mathematical Society authorize Professor Israel Halperin to list it as supporting the "International Campaign - Massera."

It was moved (Smith/Olive) that the report be received. CARRIED.

The motion contained in this report was moved (Gauld/Woods). CARRIED.

It was suggested that such items should be circulated to members before the meeting in future.

8. RETIRED AND STUDENT MEMBERSHIP: The following two recommendations of Council were moved from the Chair.

1. That the subscription rate for members in retirement should be either a single payment of thrice the annual ordinary member's fee at the time of retirement or an annual fee of one fifth of the ordinary member's annual fee. CARRIED.

2. That the annual subscription fee for student members be one tenth the full annual rate for ordinary members. CARRIED.

9. ELECTION OF OFFICERS: Incoming Vice President: Prof. W. Davidson, Council Members: Dr. I.D. Coope, Dr. P.D. Hill: Auditor: Prof. D.M. Emanuel.

10. GENERAL:

(a) RSNZ Award Scheme: The following recommendation of Council was moved from the Chair: That the Incoming Council be empowered to join this scheme after consideration when the scheme is implemented. CARRIED.

(b) Subscription: The Chairman moved the Council recommendation that the full subscription rate for ordinary members for 1983 be $23.00 reducible to $21.00 if paid by 31 March 1983. CARRIED.

(c) Votes of thanks to the President, Secretary and Treasurer and to retiring council members, Dr. G. Olive, Dr. W.D. Halford and Mr. R.S. Long were proposed. CARRIED WITH ACCLAMATION.

The meeting concluded at 6.45 p.m.

D.J. Smith
SECRETARY

MINUTES OF BRIEF COUNCIL MEETING

Held at University of Otago
on Wednesday, 19 May, 1982 at 8.30 a.m.

PRESENT: J.H. Ansell (Chair), M.R. Carter, I.D. Coope, W. Davidson, D.B. Gauld, W.D. Halford, R.S. Long, G. Olive, K.G. Russell, J.L. Schiff, D.J. Smith.

APOLOGIES: A. McNabb, P. Hill.

PAYMENTS FOR APPROVAL: DJS/JLS moved that the payments as on the tabled list be approved. CARRIED.

APPOINTMENTS:

Secretary: JHA moved that Council co-opt. Dr. K.G. Russell for one year for the specific purpose of being Secretary. CARRIED.

Treasurer: JHA/DBG moved that Dr. J.L. Schiff continue as Treasurer. CARRIED.

Newsletter Editor: JHA moved that the Newsletter Editor for the coming year be Dr. I.D. Coope. CARRIED.

Publications Committee: JHA moved that the Committee consist of Mr. D.P. Alcorn, Dr. I.D. Coope, Assoc. Prof. I.L. Reilly, Dr. G.C. Wake, and Mr. G.J. Tee with Assoc. Prof. Reilly as Convener. CARRIED.

Visiting Lecturer Selector: This was deferred until the next Council meeting, but Prof. D.B. Gauld was asked to continue in the meantime.

RSNZ Member Bodies Representative: DGB/MRC moved that Dr. J.H. Ansell continue in this capacity.

Thesis Competition: JHA/MRC moved that the competition not be run in 1983. CARRIED.

Human Rights: DGB/JHA moved that Dr. B. Calvert continue in this position subject to his approval. CARRIED.

Coordinator of Visitors: DJS/DBG moved that Dr. W.D. Halford be appointed for a year. CARRIED.

Graduate Information Coordinator: No appointment was made but members are to seek names to forward to JHA from each University. MRC volunteered as officer for Massey.

BANK ACCOUNTS: It was noted that according to the Constitution the only persons authorized to be signatories on Society accounts are President, Secretary, Treasurer, so that these should be the signatories for the general account and publications account.

The outgoing Council was asked to place funds in the Australian account on fixed deposit before retiring.

The meeting closed at 9.15 a.m.

D.J. Smith
SECRETARY

PUBLICATIONS COMMITTEE REPORT 1981/2

Regrettably this year saw no new ventures started and it is timely to remind New Zealand mathematicians of the possible avenues of publication through the Society (see the item in the Newsletter, April 1982). All this year's efforts were absorbed in the printing, reprinting (again and again!) and distribution of the seventh form booklets for the applied mathematics series - the demand for which exceeded, by several magnitudes, our expectations. (Details are given below).

Clearly there are needs in other teaching areas (secondary and tertiary) and it is to be hoped that we could undertake these in a similar way. With the rapidly escalating prices of overseas printed books, our style of presentation (inexpensive, locally produced material) is more likely to be within the budgets of students and our inadequately funded school textbook system.

Details of continuing projects are outlined below.

1. ANDREWS: A further 21 copies were distributed this year, making a total of 468 copies distributed. This means that this venture has now broken-even financially. It has now been reviewed in most reviewing journals (see, for instance Math. Reviews Issue 81(b), 01015. I believe this venture to have been extremely worth-while and consider we should look for other comparable manuscripts for consideration towards publication at regular intervals.

2. SYLLABUS SERIES: Since February 1981 to April 1982 the following numbers of booklets on the seventh form applied mathematics syllabus have been distributed

Probability and Statistics by J.C. Turner & R.M. Cornwell	Printed	3400
	Less current stocks	413
	Nett distribution	2987
Probability and Statistics Teachers' Booklet	Printed	450
	Less current stocks	259
	Nett distribution	191
Computing and Numerical Mathematics by R.L. Broughton & A. Ramsey	Printed	2100
	less current stocks	100 (approx.)
		2000
Mechanics by J.F. Harper	Printed	1100
	Less current stocks	288
	Nett distribution	812

This represents a considerable income to the Society which, of course, will be reflected in the Society's accounts. (A nett figure of $6492.91 for the 1981 financial year). Clearly successive reprintings will continue to bring a return to the Society. Thanks should be accorded to Mrs Esme Greig of the VUW Mathematics Department for assistance with the distribution, keeping records etc. for this series.

During the year we increased the cost of each volume to $5 per copy ($1.25 for the Teachers Booklet). Annual circulation of all schools informing them of its availability is maintained.

3. STATUS MANUALS: A further reprinting of just 200 copies was ordered for the 1982 year. Only Waikato University is using it in 1982 and it could be that they will need only 100 copies. This might cause a small loss this year but this will be more than offset by the income to the Society achieved by STATUS in previous years.

4. AITKEN PROJECT: Council has now approved the terms of the charitable trust proposed by Garry Tee for the purpose of financing the publication of Aitken's collected works. Little other progress has been made, but we understand Garry is still collecting material and still hoping to find an established publishing house which will undertake the substantial part of this project.

5. CAREERS BOOKLET: Over 1000 copies of the 1980 edition (2000 printed) remain and there is no immediate need for a reprinting this year. Members should be reminded of its existence and the usefulness of its contents to students and graduates of mathematics. It has been extensively used in Employment Forums in Wellington and consumer reaction has been good. I believe all third year students in mathematics should receive a copy and if Departments need copies these can be obtained from Dr. Ray Littler at Waikato University.

CONCLUDING REMARKS: The pressures and scale of the organisation of the Syllabus Series has prevented the Committee acting in a true cooperative manner this year and inevitably the activity has been confined to Wellington in the last 12 months. Sincere apologies should be extended to the Auckland members (David Alcorn and Garry Tee) in this regard.

It seems appropriate that after three years I should relinquish the position as Convener of the Committee but I am more than willing to continue oversight of the Syllabus Series if that is the wish of the Council. I hope that a new Convener will inject some new ideas into our publication ventures and build on what has been achieved. I would like to thank the other members of the Committee (David Alcorn, Garry Tee, David Vere-Jones and Brent Wilson) for their support over a very busy year.

Graeme Wake (CONVENER)

MINUTES OF THE ELEVENTH COUNCIL MEETING

held at University of Otago
on Sunday, 16 May 1982

The meeting opened at 10.00 a.m. in the Library of St. Margaret's College.

PRESENT: D.B. Gauld (Chair), J.H. Ansell, M.R. Carter, I.D. Coope, W.D. Halford, R.S. Long, A. McNabb, G. Olive, J.L. Schiff, D.J. Smith.

1. APOLOGY: Mr. B. Stokes. SUSTAINED(IDC/MRC).

2. MINUTES OF PREVIOUS MEETINGS:
JHA/WDH moved that they be taken as read. CARRIED.
(a) WDH/MRC moved that the 10th Council Meeting Minutes be confirmed. CARRIED.
(b) WDH/GO moved that the Brief Council Meeting Minutes be confirmed. CARRIED.
(c) JHA/DS moved that the Northern Regional Council Meeting Minutes be confirmed. CARRIED.
(d) JHA/RSL moved that the Southern Regional Council Meeting Minutes be confirmed. CARRIED.

3. MATTERS ARISING:
(a) WDH/DJS moved to appoint the rubber stamp as presented to be the Common Seal, but that the Secretary be asked to alter the seal to incorporate the same motif that appears on NZMS stationery at present. CARRIED.
(b) Publications structure: JHA reported that the administrative situation in Wellington has improved following the use of paid secretarial assistance.
Appointment of a Convener to replace G. Wake was to be referred to next Council Meeting.

It was moved (JHA/WDH) that
1. Council expresses its appreciation to G. Wake for his services as Convener of the Publications Committee and request him to continue his work with the Syllabus series.
2. Council thanks Mrs. E. Greig for her secretarial assistance.
3. The Wellington-based members of Council and the Treasurer establish a publication account in Wellington, the signatories to be designated at the next Council Meeting, and which is under the overall responsibility of the Treasurer who will receive periodic reports on the operation of the account. CARRIED.

JHA/MRC moved that I.D. Coope replace G. Wood as signatory on the Newsletter account. CARRIED.

(c) NZMS representation on NCCM: The Secretary is instructed to supply a copy of Outward 51 to D. Vere-Jones.
(d) Council personnel files: The Secretary reported that efforts are in hand to fill gaps in the file.
(e) Honorary membership nominations: It was noted that present honorary members consist of Prof. B.H. Neumann and Prof. J. Campbell and that the principal criterion for honorary membership is the nominee's contribution to N.Z. Mathematics.
It was moved (WDH/AM) that Prof. C. Segedin be appointed as honorary member. CARRIED.
It was moved (JLS/RSL) that Dr. H.S. Roberts be appointed as honorary member. CARRIED.
These appointments were to be announced at the Annual General Meeting. A Newsletter item was also to be prepared.
(f) Retired and student membership rates:
WDH/GO moved to endorse the recommendation of the Northern Regional Meeting that the subscription rate for members in retirement should be either a single payment of twice the annual ordinary members fee at the time of retirement or an annual fee at the student rate.
JHA/RSL moved the amendment that "twice" be replaced by "thrice". CARRIED.
MRD/DJS moved the amendment that "at the student rate" be replaced by "of one fifth of the ordinary members annual fee". CARRIED.
The motion as amended was carried.
(g) 1982 Visiting Lecturer: DBG reported on his efforts to select a Visitor for 1982 which have as yet been unsuccessful. There were no suitable replies to a Newsletter invitation for suggestions. All universities except Auckland replied affirmatively that they expect to be able to offer support to a visitor at previous levels.
GO suggested that the Selector give consideration to past and present presidents of the Society as possible Visiting Lecturers.
WDH/RSL moved that the incoming Council consider establishing a Visiting Lecturer Reserve fund for the purpose of enabling prospective visitors to take up the offer of a visiting lectureship. CARRIED.
Meeting adjourned for lunch 12:05 to 1:10.
(h) Thesis competition:
1. MRC made the following report:
The 1982 Thesis Competition was sponsored by Burroughs Ltd., who generously agreed to contribute $250 towards the prize money. The judges were Professors A. Scott and A. Zulauf, and Dr. J. Harper. The competition attracted 7 entries (3 from University of Canterbury, 1 from Massey University, 3 from Victoria University) and the results were:
Winner: Dr. G. Johnstone (Massey University)
Equal runners-up: J.G. Graham-Eagle (Victoria University)
S.P.J. Matthews (University of Canterbury

The prizes are to be presented after the NZMS lecture, on Monday 17 May 1982. The Dunedin morning newspaper has been provided with a brief press release which it is hoped will appear on the Tuesday morning after the ceremony.

2. A vote of thanks was proposed to M. Carter for his good efforts in organizing the Thesis Competition. CARRIED WITH ACCLAMATION.

(i) Reciprocity agreements: The incoming Secretary is to renew efforts to negotiate reciprocal membership agreements with MAA and IMA.

Council members were encouraged to initiate personal contacts with Secretaries of reciprocal societies while on leave.

(j) Third Australasian Convention: It was reported that we are now waiting for the AMS decision on our recommendation of Melbourne in 1985.

(k) Support for South Pacific:

WDH/JHA moved that Council approve the principle of providing further post-graduate mathematics education opportunities in the South Pacific, and that it budget up to $500 in the coming year for the implementation of a proposal to be formulated after specific information on needs is received from Dr. Joyce. CARRIED.

JHA/GO moved that the Secretary write to the Vice-Chancellors of New Zealand universities seeking an expression of attitude and policy on the granting of leave to staff to enable them to take up appointments with limited tenure at U.S.P. CARRIED.

(l) FRSNZ nominations: It was reported that our nomination for this year had been completed and that a decision was expected soon. A further name was mentioned for a possible subsequent nomination, to be followed up by the Incoming President.

(m) Aitken Trust: DJS/JHA moved that the Society execute the Trust deed by affixing its seal. CARRIED.

JHA/WDH moved that the Secretary notify G. Tee of its execution of the deed and to remind him that the Society, as Trustee, expected that the President and Treasurer would be consulted before any expenditure of money on behalf of the Trust. CARRIED.

(n) Employment brochure: The comments in the Publication Committee report §5 were noted.

(o) Teaching Fellowships in N.Z. Universities: It was noted that mathematics teachers may be able to be released to take up these Fellowships because of falling class rolls, and that opportunities for retraining for mathematics teachers apart from these Fellowships are practically nil, so that there should be a very substantial increase in the number of Fellowships made available, and representations to this effect should be made to the Education Department, the Director General and to the Minister. The matter is to be followed up by the President in the coming year.

(p) Reappraisal of 7th Form Program: JHA/RSL proposed to move and second the following motion at the A.G.M.: That this meeting believes that the University Entrance examination should normally be sat at the end of the Seventh Form year.

(q) Promotion of Mathematics in New Zealand: WDH reported that due to a nil response from concerned associations, no further action had been taken. WDH, although retiring from Council, was asked to continue his efforts and to consider convening a meeting with representatives of the Computer Society (who were unrepresented at the July meeting) and NZMS and others.

RSL and IDC are to confer on preparing a Newsletter article inviting members and instructing them in methods of notifying the Press of newsworthy mathematical events with the purpose of increasing public awareness of our activities and achievements.

(r) Supplementary mathematics questionnaire: DJS/RSL moved that Council receive the previously circulated report of WDH and MRC and thank them for preparing it. CARRIED.

Council members were asked to give consideration during the Colloquium to naming a coordinator for the information gathering scheme and that participants at each university be sought at the A.G.M.

4. CORRESPONDENCE: DJS/JHA moved that the Inward Correspondence be received and that the Outward Correspondence be approved as tabled. CARRIED.

IDC asked for a copy of Inward 83.

5. NEW MEMBERS: GO/JLS moved that the applicants for membership on the tabled list be accepted. CARRIED.

JLS advocated the recruitment of new members by Council members and suggested that the list of members be published in the Newsletter occasionally.

6. FINANCIAL REPORT: JHA/RSL moved that the Treasurer's Report be received. CARRIED.

JLS asked that all claims for reimbursements be accompanied by receipts giving details and proof of expenditure.

MRC/RSL moved to recommend to the A.G.M. that annual subscription fee for student members be one tenth the full annual rate for ordinary members. CARRIED.

JHA/WDH moved that efforts be made to increase the number of Institutional members, and that the subscription fee should be a minimum of $25.00 or a donation in excess of that amount. CARRIED.

JHA agreed to correspond with present and prospective Institutional members in this regard.

7. PUBLICATIONS: JHA/DJS moved that the Publication Committee report be received. CARRIED.
Matters arising had already been discussed under items 3(b), (m) and (n).
DBG apologised and left the Chair at 4.50: JHA took the Chair.

8. COORDINATION, ORGANISATION AND SPONSORSHIP OF VISITING MATHEMATICIANS IN NEW ZEALAND
WDH spoke of the need for an individual to assume responsibility for collecting and communicating information on visitors and prospective visitors to New Zealand, and efforts were to be made at the Colloquium to appoint a coordinator.

9. RSNZ NOMINATION: DJS reported that nominations had been forwarded to RSNZ as follows:
For NCM Prof.J. Deely, Christchurch; Prof. J. Butcher, Auckland
For NCTAM Prof. I. Collins, Auckland
JHA/DJS moved that these nominations be endorsed. CARRIED.
JHA suggested that these nominations should be a matter for consideration at a Nov./Dec. Council meeting.

10. RSNZ AWARDS SCHEME: JHA reported on his attendance at RSNZ Member Bodies Annual Meeting at which this item was discussed. Following discussion it was moved (WDH/RSL) that Council supports the RSNZ Award Scheme and to recommend to the A.G.M. that the Incoming Council be empowered to join the scheme after consideration when the scheme is implemented.

11. COUNCIL MEMBERSHIP: The Secretary reported the difficulty of meeting the By-law provisions for geographical distribution of Council members when members did not take seriously enough the need for making nominations to positions on Council at the appropriate time.

Council reaffirmed the importance of the principle of providing for appropriate geographical distribution of Council members.
IDC offered to invite honorary Newsletter correspondents to solicit nominations from members at their own institutions for vacancies on Council.

12. SUBSIDIES FOR REGIONAL SYMPOSIA: It was observed that the original intention of these subsidies was to cover such items as teas and room hire charges.
RSL/MRC moved that Officers of the Society be empowered to make small subsidizing sums available for regional symposia of up to $2.00 per head with a maximum of $30.00. CARRIED.

DBG returned to the meeting but not to the Chair at 5.30.

13. AMS SUMMER RESEARCH INSTITUTE IN N.Z.: DBG reported on his correspondence with AMS President broaching the subject of holding an SRI in N.Z., perhaps in Jan./Feb. 1985.
Council expressed its approval in principle and the matter is referred to the Incoming Council to discuss dates, topics, venue, etc.

14. UNEMPLOYED AND UNTENURED Ph.D. GRADUATES IN N.Z.: Following a precedent observed by DBG at a meeting in Australia last year, the possibility of compiling a list of untenured and unemployed graduates was discussed, but the practical difficulties of collecting and updating such information accurately seemed to outweigh the likely benefits. Some assistance to such people could result from a collection of information on available jobs, and JHA offered to arrange such job listings.

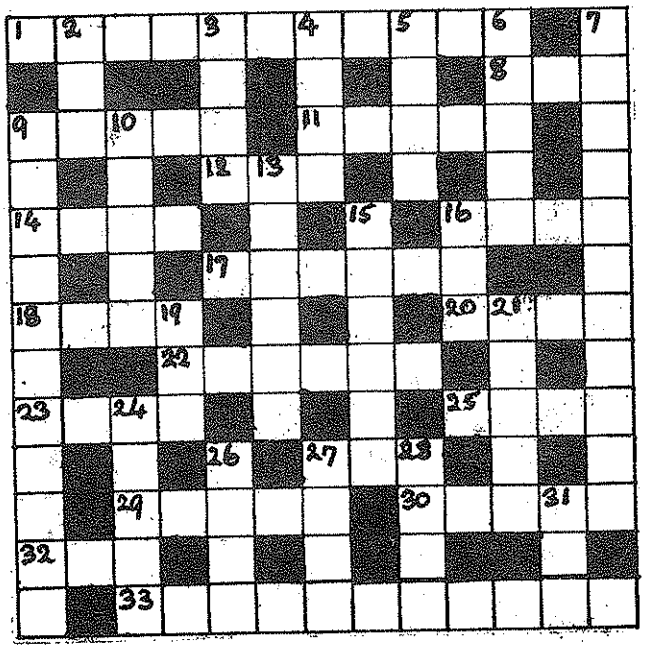
15. GENERAL:
(a) By-Law: The approval of an amendment of By-Law 3 incorporating specifications of subscription rates for ordinary, student, retired and institutional members, and surcharge for airmail postage was deferred to the next Council meeting.
(b) Regional Meetings: JHA moved that the mid-term Council meeting (in Nov./Dec.) be a full meeting of Council rather than regional. CARRIED.
(c) Publications profits: JHA moved to recommend to the A.G.M. that some of the profits from publications be used for special projects. CARRIED.
It was noted that the approval of up to $500 for aid to South Pacific and the establishment of a Visitors' reserve fund foreshadowed such approval.
(d) It was resolved to recommend to the A.G.M. that the ordinary full subscription rate for 1983 be $23.00, reducible to $21.00 if paid by 31 March 1983.
(e) Colloquium payment: DJS/JHA moved that payment of $150.00 to the Seventeenth Colloquium be approved. CARRIED.
(f) Books for Developing Countries: Incoming Council is to continue efforts to dispose of an accumulation of books in MRC's office.
(g) WDH proposed a vote of thanks to President, Secretary and Treasurer. CARRIED WITH ACCLAMATION.
(h) DBG proposed a vote of thanks to retiring Council members G. Olive, W.D.Halford and R.S. Long. CARRIED WITH ACCLAMATION.

The meeting concluded at 6.10 p.m.

D.J. Smith
SECRETARY

Crossword

N^{o} 7 FOR YOUR EYES ONLY by Matt Varnish



Across:

1. Fly whisk? (with which, flicking, night is bright). (5,6)
8. Insist tiringly. (3)
9. Lizzy kind with tiny limbs. (5)
11. Fibbing (in crib?). (5)
12. Slippingly frigid. (3)
14. Is shy with R (Might sing with his crwth). (4)
16. Mix nick. (4)
17. City in grim (in It.). (6)
18. Gyp by skipping bill. (4)
20. Silly billy. (4)
22. Bit sickly?. (6)
23. Ship's tilt. (4)
25. Link with firing. (4)
27. Timid fling. (3)
29. BQ?. (5)
30. Tri-city flying vicinity. (5)
32. Spirit in slinging. (3)
33. Light fighting. (11)

Down:

2. In nib if writing. (3)
3. I kit thing. (4)
4. Sly, bright, trying tricks. (4)
5. Finishing tidy. (4)
6. Sir Will is my titling ≡ Sir Will I ——. (5)
7. High flying signs. (3,8)
9. Writings crib B in slings. (11)
10. Rhythmic bit in dilly. (5)
13. This isn't chilly if y is i. (6)
14. Icky-ticky things. (6)
16. Tis in hindsight MPs will. (3)
19. Chris's things. (3)
21. Swiftly spin with mild din. (5)
24. Distinct hints still by inns. (5)
26. Singing mini icy mitt girl. (4)
27. Trim in girth. (4)
28. Birds' chirps. (4)
31. In which is nightly biding. (3)

CROSSWORD N^{o} 6 SOLUTION

Across:

1. Query, 4. Full stop, 9. Inlay, 10 Vertices, 11. Owing, 12. Cape, 13. Eat, 15. Code, 16. Morse, 18. Nailed, 20. Rout, 24. Send, 25. Speech, 26. Edges, 29. Rocs, 31. Rio, 32. Trig., 34. Vest, 36. Dieresis, 37. Ankle, 38. Isolated, 39. Inset.

Down:

1. Quincunx, 2. Ellipsis, 3. Yoyo, 5. Used as, 6. Lute, 7. Tycho, 8. Paste, 10. Veer, 14. Terse, 15. Clue, 16. Men, 17. Odder, 19. Less, 21. Ops., 22. Tetrakys, 23. The Great, 27. Divide, 28. Goes, 29. Radii, 30. Credo, 33. Leda, 35. Taxi.

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