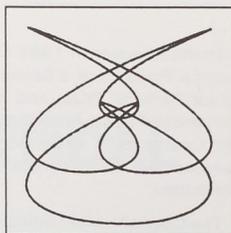


THE LONDON MATHEMATICAL SOCIETY NEWSLETTER



No. 136

January 1987

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Advertising: Susan Oakes, LMS Office, Burlington House, Piccadilly, London W1V 0NL. Tel: 01-437 5377.

The *Newsletter* is published monthly, except in August and September. Items for inclusion (with the exception of advertising material) should be sent to the Editor, to arrive before the tenth day of the month prior to publication. Advertisements, and general enquiries about the Society, should be addressed to Susan Oakes at the LMS Office.

Forthcoming Meetings

Friday 16 January, 1987 Burlington House
(J. T. Kent, S. L. Lauritzen)

Friday, 20 February 1987, University of Manchester
(R.O. Gandy, J.V. Tucker, G. Kreisel)

Friday 20 March 1987, Burlington House
(J.M. Ball, J. B. McLeod)

8-9 May 1987, Edinburgh

Joint meeting with Edinburgh Mathematical Society

Friday 19 June 1987, Burlington House

Friday 16 October 1987, Burlington House

Friday 20 November 1987, Burlington House

COUNCIL RETREAT 1987

Over the weekend of 6th to 8th March 1987, the Council of the Society will be holding an extended meeting at the Isle of Thorns, which will be given over to examining the long-term aims of the Society and the means of attaining them.

The views of the members of the Society are an important part of the information which ought to be available to them in undertaking this review of the Society's activities.

If you have thoughts on directions in which the Society ought to be moving, suggestions of activities in which it ought to be involved, or comments on the way in which the Society operates, please write to the President, Professor E.C. Zeeman, FRS, at the Mathematics Institute, University of Warwick, COVENTRY CV4 7AL, preferably to arrive before 31st January 1987.

1987 LMS PRIZES

In the summer of 1987 Council proposes to award a Polya Prize, a Senior Whitehead Prize, a Junior Berwick Prize, and one or more Junior Whitehead Prizes. Accordingly, it has appointed J.H. Coates, K.W. Gruenberg, B.E. Johnson, R. Penrose and E.C. Zeeman to the 1987 Prizes Committee.

The Council invites members of the Society to submit their views on possible candidates for the award of these Prizes confidentially in writing to any member of the Committee by 1st March 1987. Nominations for the award of a Junior Whitehead Prize are particularly solicited. Council reserves the right not to make an award if no candidate of sufficient merit is recommended by the Prizes Committee for any particular Prize.

The Polya Prize, which will be awarded for the first time in 1987, is awarded to an individual in recognition of outstanding creativity in, of imaginative exposition of, and of distinguished contribution to, mathematics within the United Kingdom.

The Senior Whitehead Prize is awarded to a mathematician who on 1st January 1987 is normally resident in the United Kingdom. Grounds for its award may include work in, influence on and service to mathematics, and

lecturing gifts. The Junior Berwick Prize is awarded to a mathematician who on 1st January 1987 is a member of the Society, who is under the age of forty years, and who is not already a Fellow of the Royal Society, in respect of a piece of work actually published by the Society in any of its publications during the period from 1st January 1983 to 31st December 1986.

The Junior Whitehead Prizes are awarded to mathematicians who on 1st January 1987 are normally resident in the United Kingdom or members of the Society mainly educated in the United Kingdom, who are under the age of forty years, and who are not already Fellows of the Royal Society. Grounds for the award may include work in and influence on mathematics. In each case nominations should contain explicit reference to the grounds on which the nomination is based.

No person may be awarded a given Prize more than once, and the President of the Society and the member of the Prizes Committee are ineligible for any of the awards. The detailed regulations and procedure for the award of each Prize may be obtained from Dr. C.J. Mulvey, Mathematics Division, University of Sussex, Falmer, Brighton, BN1 9QH.

SECOND SIEGEN TOPOLOGY SYMPOSIUM

A topology symposium will be held at the Mathematics Department of the University of Siegen from Monday 27 July until Saturday 1 August 1987. About 100 mathematicians working mainly on differential topology (and

especially linking phenomena) are expected to participate.

For more details write to Ulrich Koschorke, Mathematik V, Universität-GH-Siegen, Hölderlinstrasse 3, 59 Siegen (West Germany).

REAL ANALYSIS

An International Symposium in Real Analysis will be held at the University of Ulster, Coleraine, Northern Ireland, August 9 - 12, 1988, as a tribute to Professor Ralph Henstock.

Further details may be obtained from Pat Muldowney, Magee College, University of Ulster, Northland Road, Londonderry, BT48 7JL, Northern Ireland.

ASPECTS OF ANALYSIS

It is planned to hold a conference in University College, Cork, Ireland, for 2 days in mid-May 1987. It should appeal to workers in Operator Theory and Operator Algebras.

There will be no registration fee. Assistance in

arranging accommodation will be provided, if required.

Further information may be obtained from Dr. G.J. Murphy, Department of Mathematics, University College, Cork, Ireland.

COMBINATORIAL MATHEMATICS AND COMPUTING

The second international conference on *Combinatorial Mathematics and Computing* will be held at the Australian National University, Canberra, Australia from 24 - 28 August 1987.

Topics covered include combinatorial mathematics and related areas of computer science. Papers in application areas of combinatorics are welcome.

Speakers include T. Ito (Joetsu); R. Karp (Berkeley); C. Lindner (Auburn); K. Phelps (Georgia); C. Thomassen (Denmark).

Further details may be obtained from Dr. B.D. McKay, ICCMCZ, Department of Computer Science, Australian National University, GPO Box 4, Canberra, ACT 2601, Australia.

LONDON MATHEMATICAL SOCIETY

J. T. Kent (Leeds)

THE INFINITE DIVISIBILITY BOOM OF THE 1970s

S. L. Lauritzen (Aalborg)

DIFFERENTIAL GEOMETRY IN
STATISTICAL THEORY

FRIDAY, 16 JANUARY, 1987, at 3.30 p.m.

Geological Society's Meeting Room
Burlington House
Piccadilly, London W1

All interested are very welcome
Tea will be served at 4.30 p.m.

REPORT OF THE TREASURER

The year ending 31st August 1986 is the first to show the benefits of the revised arrangements for the printing and publication of the Society's periodicals. The *Publications Income and Expenditure Account* showed a surplus of £213,151 which includes some large non-recurrent items resulting from the change in arrangements. In round figures (£K) the total (213) was made up of net contributions from the Proceedings (118), Journal (59), Bulletin (28), Russian Mathematical Surveys (24) and Transactions of the Moscow Mathematical Society (6) less Editorial and Administrative Expenses (22). The figures reflect the recovery in periodicals subscriptions following the difficult period of the Hodgson's receivership and the value to the Society of all the hard work provided without any remuneration by its periodical editors and referees. We should not necessarily expect so large a surplus in future years. I would in particular like to acknowledge the huge contribution made by John Pym who retired as Publications Secretary in June 1986.

Other aspects of the Society followed the pattern of previous years. The *General Income and Expenditure Account* showed a surplus of £47,995. Expenditure was £15,000 higher than in 1984-85 (due chiefly to the International Congress of Mathematicians at Berkeley, our support to the Data Base Committee of the European Mathematical Council and the replacement of the office computer) but income from bank interest and dividends was £17,500 higher than in 1984-85. The accounts of the *Conference and Programme Reserve Fund* and the *Cunningham Fund* show grants of £9,122 (compared with £9,040 in 1984-85). However royalties from proceedings and refunds from previous conferences rose to £2,856 (compared with £1,733 in 1984-85) so that net expenditure in this area has not risen as fast as Council intended.

During the year the arrangement for the establishment of the Forder Lectureship, created

following the bequest received in 1983, were concluded with the New Zealand Mathematical Society. The first steps were taken to establish a Polya Prize following the generous gift of \$10,000 in memory of George Polya which was received in March 1986.

The Balance Sheet of the Society at 31st August 1986 shows assets of £1391,267 of which £125,000 is held as a Printing Reserve and £21,164 on behalf of special trusts. In addition of the Society held £70,956 in respect of unexpired subscriptions for issues of periodicals not yet printed. The total represents the sum managed by the Treasurer with the advice of Finance Committee and our professional advisers: E. J. Brooks & Son at Oxford for property matters, and Buckmaster & Moore (now a division of Credit Suisse Buckmaster & Moore Ltd) for investment matters. In round figures (£K) the distribution of the total (1462) at cost prices was agricultural land (140), index linked stock (84 - market value 92), other fixed interest stock (248 - market value 285), UK company and investment trust shares (257 - market value 546), overseas company and investment trust shares (214 - market value 323), NSB investment account (133), other sterling deposit accounts (290), foreign currency deposit accounts (50), current accounts (5) and sundry debtors (57) less sundry creditors (16). No sinister significance attaches to the last two items which simply refer to money due on 31st August but paid some time later.

Since I became Treasurer in April 1979 the scale of the Society's financial operations has increased both in magnitude and in complexity. The changes which have taken place would have been impossible without the support of the Burlington House office. I would like to acknowledge how much I have owed to Susan Oakes as Administrator and to the efficiency and enthusiasm with which she handles our finances on a day-to-day basis. I wish the new Treasurer, John Wright, every success in the period ahead.

R.L.E. Schwarzenberger Treasurer.

POLYA PRIZE

At its meeting on 21st November 1986, the Council of the Society agreed to institute a Polya Prize, in memory of Professor G. Polya, who until his death in 1985 had been a Member of the Society since 1925 and an Honorary Member since 1956. The establishment of the Prize has been made possible through a generous donation to the Society from Mrs. Polya, in memory of her husband.

The Polya Prize will be awarded for the first time in 1987. Thereafter, the award of the Prize will be considered once every three years. The Prize will be awarded by the Council of the

Society, on the recommendation of a Polya Prize Committee, in recognition of outstanding creativity, of imaginative exposition, and of distinguished contribution to mathematics within the United Kingdom.

In any year, the award of the Polya Prize will take precedence over that of any other of the Society's prizes. The Polya Prize may not be awarded to any individual who has previously received the De Morgan Medal. An announcement of the Committee who will consider the award of the Polya Prize in 1987 may be found elsewhere in this Newsletter.

LONDON MATHEMATICAL SOCIETY

Notice of General Meeting

There will be a General Meeting of the Society on Friday, 16th January 1987 at 3.30 p.m. in the Meeting Room of the Geological Society, Burlington House, Piccadilly, London W.1., to consider a proposal by the Council of the Society to delete the existing By-Laws 1,3, 1,4 and 1,6 and to substitute those printed below.

The new By-Laws, if accepted, will allow the Council of the Society to make known each year the name of the individual which it would wish its successor Council to nominate for election as President at the Annual General Meeting of the following year.

Text of the Proposed By-Law 1,3

The Council of the Society shall hold a meeting by October in each year to consider the subject of the election of the next Council and Officers, with a view to recommending to the Society a list of names which it considers suitable for election at the Annual General Meeting. In the list of names so recommended, there shall appear at least two names of Members of the Society who are not on the Council for the present year.

Text of the Proposed By-Law 1,4

At this meeting the Council shall also consider the subject of the election of a President in the following year, and may recommend a name to the Society from amongst those recommended in the present year for election to the next Council and Officers. The name so recommended shall be announced to the Society at an Ordinary Meeting, and published in the Newsletter, as the 'President-Designate of the Society.

Text of the Proposed By-Law 1,6

A list of names so recommended by the Council, and of all the names suggested by Members of the Society, shall be sent to each Member simultaneously with the summons to attend the Annual General Meeting. In this list the names of the Nominators shall be attached to each name proposed by Members of the Society, and note shall be made that all other nominations are made by the Council. The list shall also contain any recommendation made by Council concerning nomination for election as President in the following year.

C.J. Mulvey,
Council and General Secretary.

NASECODE V CONFERENCE

The Fifth International Conference on the *Numerical Analysis of Semiconductor Devices and Integrated Circuits* will be held on 17 - 19 June 1987. The related event Nasecode V Short Course on *The Interfaces and Integration of Process, Device and Circuit Models - An Introduction* will be held 15 - 16 June 1987.

Both events will be held in Trinity College, Dublin, under the auspices of the Institute for Numerical Computation and Analysis and in co-operation with the Commission of the European Communities, Electron Devices Society of the IEEE of the USA and the Committee of the Technical Group on Semiconductors and the Semiconductor Devices of the IECE of Japan.

The conference provides a forum for the discussion of the latest research on semiconductor process, device and integrated circuit modelling. Invited keynote speakers include: M.S. Adler, General Electric, Schenectady; J. Douglas Jr., University of Chicago; H. Elschner, TU, Dresden; G.V. Gadiyak, Academy of Sciences, Novosibirsk; M. Sever (Mock), Hebrew University, Jerusalem; T. Toyabe,

Hitachi, Tokyo. The Proceedings will be published in book form within two months of the conference.

The short course consists of tutorial and survey lectures on recent advances in the interfaces and integration of semiconductor process, device and circuit models. Invited lecturers include: J. Akagi, Toshiba, Kawasaki; B. Baylac, Thomson, CSF, Grenoble; K. De Meyer, KU, Leuven; C. Greenough, RAL, Didcot; W. Haensch, Siemens, Munich; B. Hunt, Analog Devices; Limerick; P. Lloyd, Bell Laboratories, Allentown; C. Lombardi, SGS-ATES, Agrate Brianza; B.J. McCartin, United Technologies, East Hartford; R. O'Brien, IBM, East Fishkill; F. Odeh, IBM, Yorktown Heights; H. Oka, Fujitsu, Atsugi; J.F. Palmier, CNET, Bagneux; A. Poncet, CNET, Grenoble; S. Selberherr, TU, Vienna; A. Yoshii, NTT, Atsugi;

Further information may be obtained from Conference Management Services, P.O. Box 5, 51 Sandycove Road, Dun Laoghaire, Co. Dublin, Ireland.

COMBINATORIAL CONFERENCE

The Eleventh British Combinatorial Conference organized jointly by the British Combinatorial Committee and the Department of Mathematical Sciences, University of London, Goldsmiths' College, will be held in London from Monday 13th July to Friday 17th July 1987. Accommodation and meals will be available in the College from Sunday evening to Saturday morning.

The principal lecturers, each of whom has been invited to give a survey talk are: P. Erdős (Budapest, Richard Rado Lecturer); A. Barlotti (Florence); P.J. Cameron (London); V. Chvátal (New Brunswick); P. Frankl (Paris); E. Milner (Calgary); V. Rödl (Prague); A. Thomason (Exeter); P. Winkler (Emory).

In addition, there will be special sessions for contributed talks of 20 minutes each. These sessions will cover a wide range of combinatorial topics, such as Coding Theory, Combinatorial Group Theory, Combinatorial Matrix Theory,

Combinatorial Set Theory, Designs, Enumeration, Finite Geometries, Graphs and Networks, History of Combinatorics, Hypergraphs, Matroids, Ramsey Theory, as well as applications.

Papers of the invited lecturers will in all probability be published by Cambridge University Press in the London Mathematical Society Lecture Notes Series in advance of the conference. It is expected that the conference will receive financial support from the British Council.

All requests for further information should be made to the local organiser: Mrs. C. Whitehead, Department of Mathematical Sciences, University of London, GOLDSMITHS' COLLEGE, London SE14 6NW, from whom application forms will be available by January 1987. Applications should be in the hands of the local organiser by Friday 29th May 1987; an increased registration fee will apply thereafter.

DIFFERENTIAL EQUATIONS

A meeting on *Differential Equations* will take place between 27th - 29th May at the National Institute for Higher Education, Dublin. There will be special session on nonlinear equation and on asymptotics for linear equations. Invited speakers include K. Brown (Heriot-Watt), M.S.P. Eastham (King's College, London), H. Ockendon

(Oxford), J.R. Ockenden (Oxford) and R.B. Paris (CEA - Euratom). Presentations on any aspect of differential equations (pure or applied) are welcome. Further information can be obtained from Prof. A. Wood, School of Mathematical Sciences, National Institute for Higher Education, Dublin, Dublin 9, Republic of Ireland.

UNIVERSITY OF HONG KONG

Lecturer in Mathematics

Applications are invited for a Lectureship in Mathematics, tenable from September 1987. Applicants specializing in any main branch of mathematics will be considered.

Annual salary (superannuable) is on an 11-point scale: HK\$176,880 - 295,680 (approx. £16,080 - 26,880; sterling equivalent as at 14.11.86). Starting salary will depend on qualifications and experience. At current rates, salaries tax will not exceed 17% of gross income. Housing benefits at a rental of 7½% of salary, children's education allowances, leave, and medical benefits are provided.

Further particulars and application forms may be obtained from the Secretary General, Association of Commonwealth Universities (Appts), 36 Gordon Square, London WC1H 0PF, or from the Appointments Unit, Registry, University of Hong Kong, Hong Kong. Closes: **14 February 1987.**

UNIVERSITY OF OXFORD

in association with St. John's College

Numerical Analysis/Engineering Science

UNIVERSITY LECTURERSHIP IN NUMERICAL ANALYSIS

Applications are invited for the above post tenable from October 1987, which has been created as a consequence of the Government initiative in Engineering and Technology to support the introduction of a new Honour School of Engineering and Computing Science from 1986, mounted jointly by the Department of Engineering Science and the Computing Laboratory.

The successful candidate may be offered a tutorial fellowship in Engineering Science at St. John's College for which separate application need not be made.

Applicants should have research interests in numerical analysis and its engineering applications, the preferred field being computational fluid dynamics.

Further particulars of the university lectureship and associated college fellowship may be obtained from Professor K.W. Morton, Computing Laboratory, 8 - 11 Keble Road, Oxford, OX1 3QD (telephone Oxford (0865) 54141), to whom applications (ten typed copies, one from overseas) together with CV and the names of three referees, should be sent by 24 January 1987.

CAMBRIDGE

LMS Lecture Note Series

Elliptic Structures on 3-Manifolds

C. B. THOMAS

The aim of this book is to present all the known material on the classification of free actions by finite groups on the standard three-sphere. The book is an expanded version of notes for a course given at the University of Chicago, and it will be useful as a seminar text for researchers interested in algebraic topology and group theory.

LMS Lecture Note Series 104
122pp. 1986 0 521 31576 X
Paperback £8.50 net

An Introduction to the Theory of Surreal Numbers

H. GONSHOR

These notes provide a formal introduction to the theory of surreal numbers. The subject is still new and the author is able to lead the reader through to some of the outstanding problems in the field. Topics covered in the book include exponentiation and generalised ϵ -numbers.

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192 pp. 1986 0 521 31205 1
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Based on undergraduate lectures at Cambridge, this text book provides an elementary and self-contained introduction to local fields. After a general introduction, attention centres on the p -adic numbers and their use in number theory. There follow chapters on algebraic number theory, diophantine equations and on the analysis of a p adic variable.

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Hard covers £27.50 net
0 521 31525 5
Paperback £9.95 net

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PETER JOHNSTONE

It is the aim of this book to present M. H. Stone's representation theorem for Boolean algebras as a whole. Material from the frontiers of algebra, geometry, general topology, category theory and functional analysis is drawn together to provide a thorough picture of the theorem and its applications in modern mathematics.

*Cambridge Studies in Advanced
Mathematics*
370 pp 1986 0 521 33779 8
Paperback £12.95 net

Littlewood's Miscellany

Edited by **B. BOLLOBAS**

'This admirable book is impossible to summarise. It overflows with what G. B. Shaw calls the gaiety of genius.'

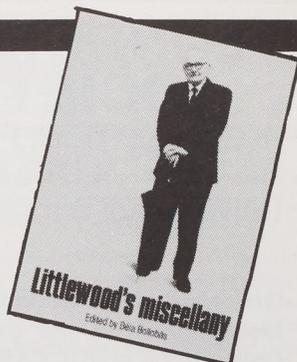
'For many of us this is the book of the year.'

'What a delightful book!'

These are some of the accolades which greeted the publication of *A Mathematician's Miscellany*.

Littlewood's Miscellany, which includes most of the earlier work as well as material collected by Professor Littlewood later in his life, allows us to see academic life in Cambridge, especially in Trinity College, through the eyes of one of its greatest figures. For this publication, the new material has been prepared by Bela Bollobas; his foreword is based on a lecture given to the British Society for the History of Mathematics on the occasion of Littlewood's centenary.

200 pp. 1986 0 521 33058 0 **Hard covers £17.50 net**
0 521 33702 X **Paperback £5.95 net**



Euclidean and Non-Euclidean Geometry

An Analytic Approach

PATRICK J. RYAN

This textbook for students of geometry gives a rigorous treatment of the fundamentals of plane geometry: Euclidean, spherical, elliptical and hyperbolic. The book not only discusses the structure of classical geometries, but also provides the computational techniques for further geometrical investigations.

215 pp. 1986 0 521 25654 2

Hard covers £27.50 net

0 521 27635 7

Paperback £9.95 net

Theory of Holors

A Generalization of Tensors and Non-tensors

PARRY MOON and DOMINA E. SPENCER

The word holor describes a mathematical entity made up of one or more independent quantities, such as complex numbers, scalars, vectors, matrices, tensors and quaternions. This book demonstrates the use of a single notation that applies to all holors, and the authors develop holor algebra and calculus in the most general sense.

392 pp. 1986 0 521 24585 0

£50.00 net

Please note that all LMS series titles are available to members at 25% discount. For full details of all Cambridge Mathematics publications, please write to Sally Seed at the Cambridge address.

Cambridge University Press

The Edinburgh Building, Shaftesbury Road,
Cambridge CB2 2RU

LONDON MATHEMATICAL SOCIETY CONFERENCE

INEQUALITIES: FIFTY YEARS ON FROM HARDY,
LITTLEWOOD AND POLYA

University of Birmingham, England: 13 to 17 July 1987

On behalf of the London Mathematical Society the Department of Mathematics of the University of Birmingham will organise this Conference in JULY 1987.

Invitations have been accepted by the following named mathematicians to give plenary lectures in the areas specified; many of these areas are associated with individual chapters in the book *Inequalities* by Hardy, Littlewood and Polya which was first published by Cambridge University Press in 1934.

C.D. Ahlbrandt (Columbia, United States - Variational inequalities of America)

J.M. Anderson (London, Great Britain) - Inequalities in complex function theory

W.D. Evans (Cardiff, Great Britain) - Hardy-Littlewood integral inequalities

E. H. Lieb (Princeton, United States of America) - Inequalities in mathematical physics

H.W. McLaughlin (Troy, United States of America) - General finite inequalities

B. Saffari (Paris, France) - Trigonometric inequalities

L.E. Payne (Ithaca, United States of America) - Isoperimetric inequalities

J. Schröder (Köln, West Germany) - Operator inequalities and applications

H. Triebel, (Jena, East Germany) - Sobolev inequalities

R.C. Vaughan (London, Great Britain) - Hilbert's inequality

W. Walter (Karlsruhe, West Germany) - Differential inequalities

A. Zettl (DeKalb, United States of America) - Landau - Kolmogorov inequalities

Accommodation for participants, and companions, will be available in a Hall of Residence.

Contributed lectures (30 minutes) are welcomed.

An excursion for all participants and companions is planned for the Wednesday afternoon.

For further information please write to:-

The Organising Secretary,
Inequalities Conference,
Department of Mathematics,
University of Birmingham,
PO BOX 363,
BIRMINGHAM B15 2TT,
England, UK.

ELECTION OF THE PRESIDENT

At a General Meeting on 17th January 1986, the Society considered a proposal from the Council that its By-Laws be amended to allow a President to be elected to a third year of office. At that meeting, the view was expressed that the Council should consider other ways of extending the period in which a President might be seen to influence the affairs of the Society. The General Meeting was therefore adjourned to the date of the Annual General Meeting in 1986 to allow Council to reconsider the situation.

Considering the possibilities available to it within the constraints of the Charter and Statutes of the Society, Council agreed that an acceptable way forward would be to consider the nomination of the President of the Society one year in advance of the time at which this is presently done. The name of the President-Designate could then be announced to the Society at this point.

At the General Meeting reconvened on 21st

November 1986, Council therefore proposed an amendment withdrawing its previous proposal that the President could be elected to a third year of office. It was announced that Council intended instead to bring forward a proposal to amend the By-Laws to require the nomination of the President to be considered one year in advance of the Annual General Meeting at which the election would take place. This amendment was carried, and the proposal first considered on 17th January 1986 was therefore withdrawn.

The Council of the Society now wishes to bring forward its alternative proposal concerning the consideration of its nomination of the President a year in advance. Accordingly it has agreed changes to the By-Laws which it wishes to have approved by the Society in General Meeting. The details of the proposed changes are contained in a Notice of General Meeting to be found elsewhere in this Newsletter.

1987 NAYLOR PRIZE

The 1987 Naylor Prize is awarded to Douglas Samuel Jones, of the University of Dundee, for his many contributions to diffraction theory, with

especial applications to electromagnetic radiation, to wave guides and to acoustics

ANDREW DU PLESSIS

Professor A. du Plessis will be visiting England, financed partly by the LMS, from 8 - 22 January 1987. He will give the following talks:

12 January 1987, *Sufficient conditions for stability*, University of Warwick.

14 January 1987, *Competitive Map Colouring*,

Frank Budden Memorial lecture to the Mathematics Association at Newcastle upon Tyne.

15 January 1987, *Sufficient conditions for stability*, University of Newcastle upon Tyne.

19 January 1987, *Classification with or without unipotency*, Liverpool University.

1986 COUNCIL ELECTIONS

At the Annual General Meeting on 21st November 1986 the following members were elected to Council: E.C. Zeeman (President); J.H. Coates and K.W. Gruenberg (Vice-Presidents); J.D.M. Wright (Treasurer); C.J. Mulvey (Council and General Secretary); A.R. Pears (Meetings and Membership Secretary); D.A. Brannan

(Publications Secretary); P.A. Samet (Librarian); J.W. Bruce, D.E. Edmunds, D.J.H. Garling, P. Holgate, C. Kosniowski, E. Rees (Members-at-Large, 2-year terms); and W.N. Everitt, E.C. Lance, D. Strauss (Members-at-Large, 1-year terms). R. Penrose, R.Y. Sharp, and P. Vamos are Members-at-Large whose terms expire in 1987.

STATISTICAL MECHANICS

The Tenth Annual Open University Conference on Statistical Mechanics and Mathematical Physics will be held on Friday 6 February 1987 at 10 am - 5.15 pm at St Michael's Church, The Open University.

This one day meeting is the tenth of a series in

which mathematical physicists from the UK and abroad present recent results of their research in statistical mechanics and mathematical physics.

Further details may be obtained from Rita Quill, Mathematics Faculty, The Open University, Walton Hill, Milton Keynes, MK7 6AA.

1986/87 L.M.S. SUBSCRIPTION

Subscriptions were due on 1st November 1986. The Society reserves the right to discontinue the supply of periodicals to members whose subscriptions remain unpaid by

31st January 1987 (where the subscription arrives after 31st January back numbers will be supplied but with some delay.)

PROGRAMME AND CONFERENCE FUND

The Society's Programme and Conference Fund is used to give financial support to various mathematical activities in the UK. This fund is administered by the Society's Programming Committee. Grants are made under three main headings.

1. Scheme 1 Visitors.

Under this scheme, a speaker from abroad is invited to spend about two weeks in the UK, to address a Society Meeting and to give lectures in three or four separate institutions. The Society pays the cost of the visitor's travel to and from the UK and for accommodation in London, and the host institutions are expected to share the cost of travel within the UK and local accommodation. LMS Council is anxious that greater use should be made of this scheme to enhance, by such visits, the benefit of LMS membership to members who are not easily able to attend London meetings. In planning the Society's future meetings, Programme Committee will have this scheme in mind, and suggestions from UK institutions for visitors they would like to receive but whose expenses they could not normally afford are very strongly encouraged. Programme Committee tries to plan Society Meetings at least six months in advance; this should be kept in mind when making suggestions under this scheme.

2. Scheme 2 Visitors.

Under this scheme, some financial support is provided for visitors to the UK who do not address a Society Meeting but will give lectures in at least three separate institutions. Exceptionally support under this scheme might be provided for a speaker addressing a meeting which is regional in scope. The LMS contribution under this scheme will be for the visitor's travelling expenses to and from some convenient base in the UK. Host institutions are expected to share the cost of travel within the UK and local accommodation. All

arrangements for a visit supported under this scheme are the responsibility of the member who makes the application. Applications can be made at any time, but should normally be made at least two months before the starting date of the proposed visit, so that the lectures to be given can be publicized in the Society's Newsletter. The Society believes this scheme to be very useful, and applications are strongly encouraged.

3. Financial Support for Conferences

Grants are made from the Programme and Conference Fund to the organizers of conferences to be held in the UK. Funds for this purpose are limited and Programme Committee tends to give priority to small meetings where an LMS grant can be expected to make a significant contribution to the viability and success of the meeting. Support of larger meetings of high quality is not ruled out but for such meetings an LMS grant would normally cover only part of the total cost. An Application Form, obtainable from the Meetings and Membership Secretary, sets out conditions under which grants are normally made and requests the information Programme Committee usually requires when considering an application.

Further information about these activities of Programme Committee can be obtained from the Meetings and Membership Secretary, A. R. Pears, Department of Mathematics, King's College, Strand, London WC2R 2LS, telephone number 01-836-5454, who will be pleased to discuss proposals informally with potential applicants and to give advice on submission of an application to the Society. The next meeting of Programme Committee will be held in February and it would be a great help if suggestions and applications to be considered at that meeting could be submitted to the Meetings and Membership Secretary no later than 31 January 1987.

On the future funding of Mathematics and Computer Science.

Report by the London Mathematical Society.

1. Introduction.

The London Mathematical Society views with concern the current imbalance of funding between Mathematics and Computer Science, which is tending to pull the two subjects apart to the detriment of them both. The interdependence of the two subjects, and their potential future enrichment of each other, makes it essential that they be closely involved at all levels of teaching and research, and demands a policy of equal support for both subjects.

2. Background

(a) Information Technology is a "growth industry". Substantial government funds are available in this area in Universities, through the UGC, the SERC and Alvey, for example. In particular, the UGC has substantially increased the unit of resource for Computer Science, whereas the unit of resource for Mathematics has been allowed to deteriorate to being one of the lowest for any subject. Here "unit of resource" means the allocation per full time equivalent student for academic staff, non-academic staff and equipment.

(b) In the larger universities, where both Mathematics and Computer Science are already well-founded, the increased funding for information technology has indirectly proved beneficial to mathematics departments. In some smaller universities, however, the opposite effect has been observed, and it is this that causes concern. In at least one case the increase in size of Computer Science has been accompanied not only by a contraction of Mathematics, but also by the discontinuation of the degree course in mathematics. This shortsighted development leads to the danger that, in the long term, there may not even be enough mathematics staff to teach the necessary service courses for students in other departments. A very wide range of subjects - for example Economics, Business Studies and Earth Sciences, as well as the traditional scientific and engineering disciplines - now require mathematics at undergraduate level, and a small and underfunded mathematics department cannot be expected to provide the range of expertise required.

(c) Due to the rapid expansion of Computer Science some universities have recently experienced difficulties in recruiting staff of sufficient calibre. At the same time, due to the reduced support of Mathematics, able young postdoctoral mathematicians with substantial research achievement already behind them have been unable to obtain teaching positions in this country, and have had to either brain-drain to the USA, or move into other professions thereby becoming permanently lost to the subject.

(d) In schools the growth of computer science has exacerbated the critical shortage of mathematics teachers in several ways. Firstly some teachers have shifted across from teaching mathematics to teaching computer science. Secondly the high salaries offered by industry and commerce to computer scientists coupled with the low salaries paid to teachers are persuading more and more mathematics teachers to leave the teaching profession; the wastage rate in mathematics has recently risen alarmingly to about double that in other subjects. Thirdly the computer industry is absorbing so many fresh graduates that this has made serious inroads into the initial recruitment of mathematics graduates into the teaching profession. All indicators suggest that the mathematics teacher shortage will reach crisis proportions in the 1990's.

(e) Student demand for degree courses in Mathematics and Computer Science have been closely linked over the past six years. Demand rose steadily from 1980-84, but has slumped badly since then, at a rate greater than that due to the reducing cohort of population. Although it is too early to attempt to interpret this slump, it must inevitably cause concern, especially in the light of the critical and worsening shortage of qualified mathematics teachers. However, there is no statistical evidence of any increase in applications for Computer Science courses at the expense of Mathematics courses.

3. Computer Sciences and computer users' need of Mathematics.

Computer Science (as opposed to the broader Information Technology) is largely based on mathematical ideas. In its early development the mathematics of Computer Science was fairly elementary, but this is no longer true. Theoretical Computer Science is blossoming, and many of the leading mathematicians in the world (including some Fields medallists) have recently been giving it their serious attention. Mathematical logic, which was once regarded as one of the most abstract and esoteric branches of mathematics, is being increasingly applied and developed in new directions by computer scientists. The next ten years will see a deepening and widening use of sophisticated mathematics in the theory of programming, of algebra, combinatorics and discrete mathematics as well as logic, particularly with the advent of parallel processing. Mathematicians are rapidly becoming aware that the mathematics of Computer Science is penetrating and rewarding, with respect to both teaching and research. Conversely, computer scientists are becoming aware of both the vast potential usefulness of mathematics, and the expertise reposing in the mathematical community, and

should be prepared to use them both. Many of the leading theoretical computer scientists of today took their first degree in mathematics, and this is likely to continue to be the case in the future given the way that the subject is developing. If the future computer scientists who take their first degree in Computer Science in this country wish to acquire the ability to keep abreast of future theoretical developments, it is vital that their current training should contain a major component of mathematics, taught by mathematicians.

Unfortunately there have been undesirable developments in the opposite direction. The effect of the above mentioned large injections of capital has sometimes resulted in an excessively hardware-orientated approach to computing. This is leading to the "competence gap" in which some of the people with the computers do not know how to use them efficiently. There are several concrete examples of research by computer scientists flawed by ignorance of the relevant mathematics, and research by statisticians using supercomputers where the use of a little more mathematics and a microcomputer or even a hand calculator would have produced better results. In the long term, a mathematical training (because of its emphasis on logical thinking) is an essential and an ideal component of the computer scientist's education.

4. *Mathematics' need of Computer Science and computing equipment.*

Applied mathematics has always made considerable use of the computer, notably for numerical analysis. In statistics virtually all but the most trivial calculations are computerised. However, until recently the rest of the mathematical community had made relatively little use of the computer compared with experimental scientists. The situation has now changed dramatically. What has caused the change is the major improvement of the man-machine interface, and the advent of fast interactive graphics. Computers were originally used mainly for calculations, but they can now be used for sophisticated man-machine mathematical conversation and exploration. As a result there is currently an explosive growth of the use of computers in all branches of mathematics.

To take a few examples: in computational group theory the construction of large simple groups and their representations could not have been achieved without many hours of machine computation time. Spectacular advances in hyperbolic geometry and low dimensional topology have been stimulated and enhanced by the computer. Computer assisted proofs are no longer a new innovation but are now a standard technique. Computational aspects of geometry

are being developed and applied to robotics. The use of increasingly sophisticated mathematical ideas in the development of numerical methods for the solution of differential equations is resulting in a vastly increased understanding of fluids at the onset of turbulence. Fast interactive graphics are used to understand all types of complexity, and to formulate conjectures that would otherwise never have been suspected, which can then be proved by traditional methods. It is no accident that major advances such as the discoveries of solitons, period-doubling cascades, and renormalisation self-similarities, were first made on computers and then developed into substantial mathematical theories. Symbolic manipulation has now entered several branches of mathematics, and where computers were once used for number crunching they are now used for crunching formulae; and in some cases this demands the resources of the most powerful supercomputers.

The SERC is already recognising the research needs of mathematicians by providing specialised personal computers and fast interactive graphics, which are not usually available on university mainframe computers. SERC is also anticipating a growing demand for this type of equipment in the future. By contrast, the UGC has not yet acknowledged the need, nor made the financial provision, for Mathematics to take its place amongst the major users of computers.

The London Mathematical Society's Computer Science Committee is actively pursuing liaison with specialist groups within the British Computer Society. It is also planning Weekend Instructional Conferences in relevant aspects of Computer Science for the university mathematical community. Computing expertise is a necessity for the mathematician of the future.

Conclusion.

Support for Mathematics in parallel with the current increasing support for Computer Science is not a dispensable luxury. On the contrary, it is essential to maintain the mathematical base, if the Government's long-term technological aims for the future are to be realised. The three most immediate requirements are

- (i) Universities should take care not to erode Mathematics when building up Computer Science;
- (ii) Computer Science courses should maintain a strong mathematical component;
- (iii) the UGC should increase the unit of resource for Mathematics, and in particular designate Mathematics as one of the major users of computers so that Universities can deploy their resources accordingly.

EVOLUTIONARY THEORY

A seminar on Mathematical and Statistical Developments of Evolutionary Theory will be held with the support of NATO, the Ministry of Education of Québec, the Natural Sciences and Engineering Research Council of Canada, and the Université de Montréal at the Université de Montréal from 3 - 21 August 1987.

The principal speakers will be:

E. Akin (City Coll. CUNY): The Differential Geometry of Population Genetics and Evolutionary Games.

F.B. Christiansen (Aarhus): Selection Models and Natural Populations.

W.J. Ewens (Monash): Inference Problems in Human and Evolutionary Genetics.

W.G.S. Hines (Guelph): The Evolutionarily Stable Strategy, a Game Theory Approach to Understanding Behaviour.

A. Jacquard (I.N.É.D. Paris): Les mathématiques de l'apparementement.

S. Karlin (Stanford): Mathematical Models of

Multigene Selection.

S. Lessard (Montréal): Evolution du rapport numérique des sexes et modèles dynamiques connexes.

S.A. Levin (Cornell): Ecological and Evolutionary Aspects of Variable Environments, and Evolution in Host-Parasite Systems.

C. Matessi (Pavia): Mathematical Theories of the Evolution of Social Behaviours.

T. Ohta (Mishima): Population Genetics of Multigene Families and Other Repetitive DNA Sequences.

D. Sankoff (Montréal): Cladistique mathématique et l'inférence de philogénie.

The deadline for application is 20 March 1987. Partial financial support is available to selected participants, in particular citizens of NATO countries. For further information write to: Ghislaine David, Secretary, Department of Mathematics & Statistics, Université de Montréal, C.P. 6128, Succ. A, Montréal, Qué. H3C 3J7, Canada.

L.M.S. OFFICE

The London Mathematical Society Office will be closed until Monday 19 January 1987.