THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 278

January 2000

 FORTHCOMING SOCIETY MEETINGS
 Friday 31 March-Saturday 1 April 2000 - Oxford Modelling Dynamics in the Life Sciences
 Friday 19 May-Saturday 20 May 2000 - Oxford Hilbert's Problems: Past and Future Joint meeting with the
 British Society for the History of Mathematics
 Friday 23 June 2000 - London M. Buhmann, M.J.D. Powell

COUNCIL DIARY 19 November 1999

The meeting began as usual with the President's report. There are regular meetings of the presidents of the LMS, IMA, RSS and OR Society, where the societies' views on major current issues are aired and avenues for progress explored. One such issue is 'benchmarking', which is to be the backbone of the QAA's new system of Subject Review, and whose aim is to establish a common minimum standard or 'benchmark'. which every mathematics degree will have to meet for its curriculum to be approved. Most people will feel that it is impossible to articulate such a standard in a meaningful way to apply across the whole range of mathematics degrees; but if we do not contribute to the formulation of the benchmark, we can have no influence on the outcome, which could have disastrous consequences for degree programmes across the country. A working group from the societies is looking at this, and has circulated a paper to heads of departments; we had a brief discussion on what has been done so far.

Elsewhere in this Newsletter can be found a report of a decision taken by Council to rename some prizes. This was not a straightforward as it might appear. partly because some of the Society's prizes were set up through bequests. Disentangling the terms of these, and their (sometimes imaginative) interpretation by previous Councils drew the Council and General Secretary, John Pym into some interesting searches in the Society's archives. It appears that Professor Berwick, writing in 1927, had in mind that he should found one prize which would in alternate years be awarded to a younger member of the Society. Where the word 'Junior' came from is not clear, but Council agreed that nowadays it did not convey to those outside the society a correct view of the eminence of our 'Junior' prizewinners, and that the adjective will be dropped from this year.

Postponed from the October meeting was a proposal from the committee for Women in Mathematics to fund a Daphne Jackson Fellowship in

Mathematics. This is a half-time research fellowship, held for two years at a University, specifically intended for someone who has had a break from their career for family reasons to retrain in a supervised research project prior to reentering employment. The Daphne Jackson Trust administers these fellowships (in science and engineering) - there have been over 60 fellowships so far, supported by a wide range of universities, companies, trusts and funding councils. Council agreed to fund one such Fellowship itself in the first instance and to seek further sponsorship from industry.

We had a brief discussion about what influence, if any, Council could exert on the publishers of the more ludicrous of the league tables arriving at our breakfast tables. The latest piece from the Guardian was fresh in everyone's minds. Time and space does not permit this columnist to perform a similar analysis of the broadsheets (in which the value added to the English language by variant spellings, often erroneously called misprints, would be an important constituent). Whether our attempts to set the record straight will come to anything is anyone's guess. Maybe the only way to avoid such misrepresentations is for comparative statistical information to be published in a more digestible form by Universities and funding councils, although the temptation for the media to reduce the data to a single simplistic indicator will doubtless remain irresistible.

This was the last meeting of Council for 1999, and it is perhaps a good moment to look back at some of the year's happenings. The February Council Retreat (reported in the April issue of the *Newsletter*) generated a number of proposals which will occupy business for a while to come. We saw the formalisation of the LMS/EPSRC Short Courses programme, and the change from the Hardy Lecturer to a Hardy Fellowship. The issues of funding and evaluation of teaching and research are here to stay, and the President and members of Funding and Education Committees have put many hours into drafting responses to consultation papers from HEFCE and others. We have sometimes been criticised for being out of touch with the membership. The newly-proposed regional developments should give members, especially those outside London, a greater involvement in Society affairs, and we have just seen the first fruits of the long-running initiative to overhaul the democratic process in the Society - the first round of elections under the new nomination system took place at the AGM which followed the Council meeting. It looks as if 2000 will bring more interests and challenges, and the fresh ideas and new faces representing the wide Society membership will help to tackle the issues ahead.

Tony Scholl

NAMES OF PRIZES

Council considers that the description of some of the Society's prizes as "Junior" is no longer appropriate and has decided that the Junior Berwick and Junior Whitehead Prizes will, from this year, be known simply as the Berwick and Whitehead Prizes. More information about this decision can be found in the Council Diary in this issue.

EPSRC AND ROYAL SOCIETY RESEARCH FELLOWSHIPS

Professor C.M. Series (Warwick) has been awarded an EPSRC Senior Research Fellowship.

Professor N.J. Higham (Manchester) has been awarded a Royal Society Senior Research Fellowship.

Royal Society University Research Fellowships have been awarded to Dr M.R. Gaberdiel to work in the Department of Applied Mathematics and Theoretical Physics, Cambridge and Dr J.C. Robinson to work in the Mathematics Institute, Warwick. lany ılta-We eing The ents ose t in the ive the ns ok he rill nd Itill

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LONDON MATHEMATICAL SOCIETY

Two-day Meeting 31 March - 1 April 2000, Oxford

MODELLING SPATIOTEMPORAL DYNAMICS IN INTERACTING SYSTEMS

As experimental technology in the life sciences increases, generating more and more data, it is becoming clear that a theoretical framework is required within which these results can be interpreted. This has led to a number of exciting new challenges to mathematics, with the result that the application of mathematics to the life sciences is becoming a rapidly growing area. The aim of this meeting is to promote this area of mathematics. A major challenge concerns how to incorporate the properties and interactions of individual, component elements into a whole population (organ) model.

This meeting of the Society is open to all who are interested in exploring these issues. In particular, it is hoped that it will bring together young mathematicians and established senior scientists in the field. Particular topics to be studied include developmental biology, cardiac physiology, neurobiology, ecology and epidemiology.

Confirmed Speakers:

John Brindley (Leeds) Neil Ferguson (Oxford) Julian Lewis (ICRF, London) Hans Othmer (Minnesota) Sasha Panfilov (Utrecht) David Rand (Warwick) Roger Traub (Birmingham) Kees Weijer (Dundee)

Organiser: P.K. Maini

Scientific Committee:

H.G. Othmer (Minnesota), T.J. Pedley, FRS (Cambridge), B.D. Sleeman (Leeds)

Accommodation has been booked at Lady Margaret Hall; reservations will be held until **Friday 3 March**. A dinner will be held at Lady Margaret Hall on the Friday evening. Those wishing to book accommodation or attend the dinner should contact Miss Susan M. Oakes, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HP (oakes@lms.ac.uk).

Some funds are available to contribute in part to the expenses of members of the Society or research students who wish to attend the meeting. Requests for support should be addressed to the Meetings and Membership Secretary, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HP (requests should include an estimate of expenses and a very brief *curriculum vitae*; research students should include brief letters of endorsement from their supervisors).

TREASURER'S REPORT TO THE ANNUAL GENERAL MEETING 1999

As a hard copy of the Annual Report and Accounts is available to all members of the Society on request and it is also available on the Society's website; I will only highlight a few points in this report to the Annual General Meeting.

This year has yet again proved to be a period of growth for world equity markets. As a result, the total assets of the Society have increased from £10,016,868 to £11,655,701. Income from investments decreased slightly from £347,670 to £338,831; but if rental income for De Morgan House is included increases to £423,021.

Publication income was maintained at a reasonable level of £461,945 compared with the £452,536 in the previous year. There were a number of reasons why this was expected to be lower, for example, there was a large decrease in returns on Russian Mathematical Surveys now that it has joined the other Russian journals at Turpion. But the History of Mathematics Series produced jointly with the American Mathematical Society made a surplus of £10k which makes up for earlier losses. The advent of electronic publishing has not so far had the adverse effect which was feared earlier. Our gratitude to all involved in the production of all our publications is as great as ever.

The amount expended in the Society's efforts to support the mathematical community and to meet the requirements of the Charter to promote and extend mathematical knowledge continues to grow. What is classified as Direct Charitable Expenditure (which includes expenditure on publications) has increased from £1,027,620 to £1,217,682. For example, the total expended on grants, subscriptions and prizes increased from £203,576 to £231,974 - within this, the net amount spent by Programme Committee increased from £111,340 to £145,076. Next year, there will be a further considerable increase as innovations by the

Research Meetings Committee work their way through and with other new schemes in the pipeline. For example, Council have recently agreed to increase the annual contribution to the Isaac Newton Institute to £20,000 and replaced the Hardy Lectureship with a Hardy Fellowship. It also has been generous in its financial support to major international conferences held in the UK.

With the receipt of the final instalment, the total in the Verblunsky bequest has grown to £55,051, which makes it the largest monetary gift in real terms since the Hardy bequest which is still benefiting the Society in so many ways - the royalties, for example, produce a regular £4,000 or so per annum.

In 1974, when the Society felt that it had to take steps to protect its assets, Royal Oak Farm, near Oxford was purchased for £57,463. With tenancy rights changed in the early eighties, the property was valued in 1995 at only £100,000. An opportunity has now arisen to sell the farm, with the expectation that the net receipts to the Society would be considerably higher than £350,000. By now, there is every likelihood that this will be nearer to £550,000.

It is my pleasure to recommend the Annual General Meeting to approve the Society's Accounts for the financial year 1 September 1998 - 31 August 1999 and to re-appoint Messrs Fraser Russell, Chartered Accountants, as Auditors for the financial year 1 September 1999 - 31 August 2000.

VISIT OF PROFESSOR N. S. ROMANOVSKII

Professor N.S. Romanovskii from the University of Novosibirsk will be visiting Professor J.S. Wilson at the University of Birmingham from 16 January - 16 February 2000. He is an expert on finitely presented groups (abstract and pro-p, and in proper varieties). This visit is supported by the LMS by a Scheme 5 grant. Further details about the visit may be obtained from Professor J.S. Wilson (j.s.wilson@bham.ac.uk).

LONDON MATHEMATICAL SOCIETY

BRITISH SOCIETY FOR THE HISTORY OF MATHEMATICS

JOINT TWO DAY MEETING

HILBERT'S PROBLEMS: PAST AND FUTURE

Friday 19 - Saturday 20 May 200 Mathematical Institute, Oxford

The following have agreed to speak:

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- Jeremy Gray (Open) Hilbert, Göttingen, and the Reputation of the Problems
- David Rowe (Mainz) Geometry, Axiomatisation and Foundations (The first 6 problems)
- Norbert Schappacher (Strasbourg) Modern Algebra (Problems 7 to 12 and 14)
- Craig Frazer (Toronto) Hilbert and Analysis (Problems 19 to 23)
- John Ball FRS (Oxford) Analysis (Calculus of Variations)
- Simon Donaldson FRS (Imperial College, London) Geometry
- Hugh Woodin (Berkeley) The Continuum Hypothesis

Organisers: Jeremy Gray and Peter Neumann.

A dinner on the Friday evening will be held in St Cross College.

Some funds are available to contribute in part to the expenses of members of the London Mathematical Society or research students who wish to attend the meeting. Requests for support should be addressed to the Meetings and Membership Secretary, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HP (requests should include an estimate of expenses and a very brief *curriculum vitae*; research students should include brief letters of endorsement from their supervisors).

ANNUAL LMS SUBSCRIPTION

The Society is appreciative of those members who have paid their 1999/00 subscriptions. May we remind those who have not yet paid that subscriptions were due on 1 November 1999. Prompt payment ensures continuity of publications and avoids the need for time-consuming reminders. The Society reserves the right to discontinue the supply of periodicals and the Newsletter to members whose subscription remains unpaid by 31 January 2000. The methods of payment are either by a sterling cheque drawn on a UK bank; a US\$ cheque drawn on a US bank. Direct Debit. Credit Card, Eurocheque (quoting your card number on the reverse) or by Giro. If you have misplaced your renewal of subscription form, contact the LMS office, e-mail: lms@lms.ac.uk: tel: 020 7637 3686; fax: 020 7323 3655.

VISIT OF PROFESSOR F.T. FARRELL

Professor F.T. Farrell (Binghamton) will visit the UK under a Scheme 2 grant of the London Mathematical Society. He will give talks on "The homeomorphism problem for manifolds" and "Calculating Whitehead groups (at least trying to)" as follows:

- Thursday 20 January at 4:45 pm, London Algebra Seminar. It is not yet decided whether this seminar will meet at Queen Mary College or Imperial College (further details will be announced later; local organizer P.H. Kropholler)
- Friday 28 January at 2.30 pm, Room 6 of the Appleton Tower, University of Edinburgh (local organizer A. Ranicki)
- Friday 4 February at 4.00 pm Room MI 1 of the Mathematics Institute, Gibbet Hill, Warwick University (local organizer J. Moody)

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"O'Meara (...) has given a clear account from first principles and his book is a useful introduction to the modern viewpoint and literature. In fact it presupposes only undergraduate algebra (up to Galois theory inclusive)... The book is lucidly written and can be warmly recommended."

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Corr. 3rd printing 1973 1999. XIV, 344 pp. 10 figs. (Classics in Mathematics) Softcover *DM 68 £ 26 / FF 257 / Lit. 75.090 ISBN 3-540-66564-1

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Gröbner Deformations of Hypergeometric Differential Equations

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1999. VIII, 254 pp. 14 figs. (Algorithms and Computation in Mathematics, Vol. 6) Hardcover *DM 69 £ 26.50 / FF 260 / Lit. 76.200 ISBN 3-540-66065-8

H. Cohen

Advanced Topics in Computional Number Theory

1999. Approx. 570 pp. 9 figs. in color. (Graduate Texts in Mathematics, Vol. 193) Hardcover *DM 119 £ 46 / FF 449 / Lit. 131.420 ISBN 0-387-98727-4



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H. Flenner, L. O'Carroll, W. Vogel

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WELCOME TO MATHS YEAR 2000

UNESCO has designated the year 2000 as the International Year of Mathematics.



MATHS YEAR 2000

Maths Year 2000, a DfEE funded initiative, is part of the United Kingdom's contribution to that celebration, promoting mathematics for all - pupils, parents, teachers, employees, employers.

Maths Year 2000 has its offices in the London Mathematical Society headquarters at De Morgan House. It will run from January to December 2000. It aims to give everyone the chance to increase their confidence and discover the fun and excitement of numbers. Though it is primarily targeted at improving numeracy among children, youngsters and adults, it also aims to create a positive culture around mathematics and to address a range of issues in addition to improving basic skills.

Recent research carried out by the Basic Skills Agency has shown poor numeracy to be more of a problem than poor literacy in finding and retaining full-time employment. Research from the London School of Economics has shown that graduates with A level Mathematics were found to earn around 10% more than other graduates when they started work.

The Year is launched with the first of its six bi-monthly themes, which will provide a creative focus for maths activities in schools, colleges, libraries, museums and galleries. *Maths on Time* (January and February) celebrates the history of maths through the millennium and explores the ways we use time. *Maths* takes Shape (March and April) takes a look at geometry, symmetry and patterns in the world around us. Maths at Work (May and June) explores maths in the workplace and how we can use it to embark on a chosen career. There are exciting schemes to introduce children of all ages to maths in the workplace. Many employers are willing to get involved with the national network of Education Business Partnership schemes taking part in maths workplace mentoring. Maths in Play (July and August) explores how games, sport and even music rely on mathematics. Maths and People (September and October) examines the way that statistics measure aspects of our lives from measuring our weight, height and shoe size to recording births, marriages and deaths - showing that maths is about people as much as it is about numbers! Maths and Money (November and December) explores how maths is the currency of every aspect of our daily lives.

Maths Year 2000 is organising six major regional festivals of mathematics called MathFests in Oxford (January), the South West (April), the North West (May), the East Midlands (July), York (October) and London (January 2001). It is organising nationwide Maths and Art and Maths and Poetry competitions.

Maths Year 2000 will also host an innovative and exciting web site providing a wealth of maths games and puzzles for children. It will provide a showcase for ideas, news, events, a virtual maths museum and a directory of education business links. Regular newsletters will go in to schools, colleges, universities, libraries, youth clubs, museums and galleries every two months.

To ensure even greater public awareness of *Maths Year 2000*, a television campaign will encourage parents to give their children positive messages and direct help in mathematics. A free booklet full of practical advice will be available. There will also be a radio campaign aimed at teenagers, using celebrity speakers to stress the importance of mathematics in their careers.

Major high street retailers and national newspapers are also involved, sponsoring token collection schemes, in-store maths activities, games and software. The Office of National Statistics, together with the Royal Statistical Society, is developing a pilot national census directed at young people on the internet, which will be available to all.

The Government has already brought maths to the front of the agenda in schools. It has invested £55m in the National Numeracy Strategy in England this year. All primary schools now teach a daily maths lesson, which emphasises mental arithmetic skills. In England there are over 500 family numeracy courses for around 3,000 parents and children and around 300 summer numeracy schools help children to make the transition from primary to secondary school.

Getting involved with Maths Year 2000 could make a real difference. Contact us with ideas and suggestions and we will add you to our mailing list: Maths Year 2000, De Morgan House, 57-58 Russell Square, London WC1B 4HP (e-mail: info@mathsyear 2000.org). For further information visit our web site (www. mathsyear2000.org).

> Barry Lewis Director

TOPOLOGY AND SET THEORY

The fifth in the series "Set theory and its neighbours", on "Topology and set theory", will take place on Wednesday 5 January 2000 at the London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1. The meeting will start at 11 am, when coffee will be available, and the first talk will be at 11.30.

The speakers at the meeting will include

- Chris Good (Birmingham)
- Istvan Juhasz (Renyi Institute of Mathematics, Budapest)
- Mike Reed (Oxford)
- Dona Strauss (Hull)

• Boban Velickovic (Paris VII)

For further details visit the web-site (http://www.ucl.ac.uk/~ucahcjm/stn. html) or e-mail the organisers Mirna Dzamonja (h020@uea.ac.uk) or Charles Morgan (charles.morgan@ucl.ac.uk). The organisers are grateful for the financial support of the LMS for these meetings.

COMBINATORICS 2000 First Announcement

The conference Combinatorics 2000 will be held in Hotel Serapo, Gaeta, from Monday 28 May - Saturday 3 June 2000. Gaeta is a little town on the coast between Rome and Naples. The conference will cover the following topics: combinatorial theory, Galois geometries, incidence structures and related algebraic topics, coding theory, designs, and graphs.

There will be invited lectures of 45 minutes and special sessions for contributed talks of twenty minutes each. The proceedings of the conference will be refereed and published. There will be a registration fee of 150.000 Italian Lire (77.47 Euros).

Invited speakers:

- Simeon Ball (Eindhoven)
- Arrigo Bonisoli (Potenza)
- Francis Buekenhout (Brussels)
- Marco Buratti (Perugia)
- Peter J. Cameron (QMW)
- Charlie J. Colbourn (Waterloo)
- Frank De Clerck (Gent)
- Hans Havlicek (Vienna)
- Josef Lauri (Malta)
- Klaus Metsch (Giessen)
- Fred Piper (Royal Holloway)
- Alexander Pott (Magdeburg)
- Heinrich Wefelscheid (Duisburg)

For further details about accommodation see: http://www.hotelserapo.com. To get the second announcement (with the registration form and hotel booking form) email: comb2000@dmmm.uniroma1.it. Further information about the conference may be found at: http://www.mat.uniro ma1.it/combinatorics2000.

OUP & AMS A Partnership in Mathematics Geometry Civilized History, Culture and Technique John Heilbron '[Heilbron] has written a marvellous tale of how, throughout much of recorded history, geometrical thinking and civilisation have been closely intertwined ... definitely a book to dip into and reflect on -Heilbron's enthusiasm is contagious.' - Ian Stewart, New Scientist 'If you thought Euclidean geometry was something only your greatgrandparents did - try it, you will be surprised.' - June Barrow-Green, THES 320 pp, 0-19-850690-2, February 2000, £25.00 NEW IN PAPERBACK From Kant to Hilbert A Source Book in the Foundations of Mathematics William Bragg Ewald This two-volume work provides an overview of this important era of mathematical research through a carefully chosen selection of articles, providing an insight into the foundations of each of the main branches of mathematics. The collection is an invaluable source for anyone wishing to gain an understanding of the foundations of modern mathematics. 1,440 pp (2 vols), 0-19-850537-X, January 2000, £50.00 NEW IN PAPERBACK The Feynman Integral and Feynman's **Operational Calculus** Gerald W. Johnson and Michel L. Lapidus This book aims to make these two beautiful but mathematically difficult subjects accessible to mathematicians, physicists and other scientists interested in quantum theory. OXFORD MATHEMATICAL 256 pp, 0-19-853574-0, January 2000, £90.00, Hardback MONOGRAPHS A Course in Operator Theory John B. Conway This text covers the central themes of operator theory, a significant part of many areas of modern mathematics. It is presented with the excellent clarity and style that readers have come to associate with John Conway's writing. GRADUATE STUDIES 387 pp, 0-8218-2065-6, November 1999, £30.00, Hardback IN MATHEMATICS **Representation Theory of Lie Groups** Ω IAS/PARK CITY Jeffrey Adams and David Vogan Representation Theory of Lie Groups Aimed at advanced graduate students and researchers, this is a book of lectures given at the PCMI Graduate Summer School. After Jeffrey Adams Darial Vogen Editors outlining the state of the subject in 1975, the contributors describe developments in the most active areas of research over the past 20 years. .00 340 pp, 0-8218-1941-0, February 2000, £34.00, Hardback IAS/PARK CITY SERIES NO.8

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PROGRAMME AND CONFERENCE FUND Society Grants for the Support of Mathematical Research

The Programme and Conference Fund is used to give financial support for mathematical research in the UK. The fund is administered by the LMS Programme Committee. Grants are made under five main headings which are described below. In general any mathematician working in the UK is eligible for a grant, but if an applicant is not a member then the application must be countersigned by an LMS member. For Scheme 4, only LMS members working in the UK are eligible.

Applications should be sent to the Executive Secretary at the Society's office (De Morgan House, 57-58 Russell Square, London WC1B 4HP). Applications cannot usually be considered between mid-June and mid-September. Queries regarding applications can be addressed to the Meetings and Membership Secretary, Dr N.M.J. Woodhouse (tel: 01865 277943, email: nwoodh@maths.ox.ac.uk) or to the Executive Secretary, Dr D.J.H. Garling (tel 020 7637 3686; e-mail: garling@lms. ac.uk) who will be pleased to discuss proposals informally with potential applicants and give advice on the submission of an application.

Multiple Applications

The Society does not like to receive sequential applications for grants to support the same or closely related events, and will not allow its limits for individual schemes to be exceeded by artificially sub-dividing an application into a number of separate requests under different headings. In the case of satellite conferences, organisers of the main meeting are asked to give brief details of any planned satellites as part of their application for a conference grant. Applications for support for satellite meetings should make clear the financial and organisational connection with the main meeting. This is particularly important in cases where the expenses of speakers could be shared between the two meetings. Special

arrangements apply to the BMC and its satellites.

Scheme 1 - Conference Grants

Grants are made to the organisers of conferences to be held in the United Kingdom. Programme Committee tends to give priority to the support of 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 will normally cover only a modest part of the total cost. Brief academic and financial reports of the conference are expected. An application form, obtainable from the Society's Office (address above), or (as a LaTex file) from the electronic archive, sets out conditions under which grants are normally made and requests the information Programme Committee usually requires when considering an application. The Society wishes to support research students, and applications should include details of the extent to which research students will be involved in the conference. Up to £1000 may be awarded to support student participants. The Society also wishes to encourage overseas participants from the former Soviet Union, Eastern Europe and other countries within the scope of Scheme 5 (see below); a further £1000 may be awarded to support such participants. Potential applicants should note that the Society is reluctant to award grants to conferences which clash with the British Mathematical Colloquium. Applications are considered three times a year and the deadlines for submission are 31st January, 31st May and 31st August. The current upper limit for grants is £5000, the size of the grant to take into account the length of the conference, the number of UK participants and the number of research students taking part. The total grant, less the support for research

students and 'Scheme 5' participants, shall not normally exceed £3000. (In this context 'research student' means 'research student of any nationality studying at a UK university'.)

Scheme 2 - Visitors

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Some financial support is provided for visitors to the UK who give lectures in at three separate institutions. least Exceptionally, support under this scheme might be provided for a speaker addressing just one meeting which is regional in scope. The LMS contribution under this scheme is principally for the visitor's travelling expenses to and from the UK up to a current upper limit of £1000. Host institutions are expected to share travel and subsistence expenses within the UK, and to meet any residual cost. The application should be made in a letter, usually of no more than two A4 sides, giving a brief summary of the following information:

- the academic standing of the visitor;
- the justification for the visit;
- the proposed itinerary;
- an estimate of travel and subsistence costs.

There are no specific deadlines but normally an application should be submitted at least three months before the date of the proposed visit to allow for consideration by the LMS Programme Committee and, in the case of visits to the UK, an announcement of the visit in the Society's *Newsletter*. All arrangements for a visit under this scheme are the responsibility of the applicant.

Scheme 3 - Support of joint research groups

The scheme is to provide support for groups of mathematicians, working in at least three different locations in the United Kingdom, who have a common research interest, who wish to engage in collaborative activities and whose geographical locations are such that reasonably frequent regular meetings - several per year - are a realistic possibility.

A grant may be used for a variety of purposes associated with the group's activities, such as expenses for speakers at common seminars, travel for group members between institutions either for research visits, seminars or study groups. The Society wishes to support research students and young postdoctoral mathematicians, and applications should indicate details of the extent to which they will be involved in the programme. No strict criteria will be laid down as to the use of the money but the Society reserves the right to judge whether the activities proposed in an application are appropriate for a grant. Applications should be made by a nominated 'grant-holder', who will be responsible for the use of the grant, and countersigned by a 'supporter' from each of at least two further institutions. (If none of the applicants is a member of the Society, the application must be countersigned by a member of the Society.) The grant will cover a twelve month period and the Society will expect to receive a report, both academic and financial. Applications for the renewal of a grant will be considered along with fresh applications. The maximum grant awarded is currently £1000; for this, at least four meetings a year should be held.

An application should take the form of a letter giving details of:

- the proposed activities;
- a list of participants in the group;
- a provisional budget indicating how any grant awarded is likely to be used.

While a reasonable level of detail is desirable, it should not be excessive and altogether the documentation expected might run to at most three A4 pages. Applications are considered three times a year, in February, June and September and the respective deadlines for submission are 31 January, 31 May and 31 August. Grants are expected to run from 1 March or 1 October.

Scheme 4 - Collaborative small grants

The aim of the scheme is to provide small grants to individual LMS members with-

in the United Kingdom to help support a visit for collaborative research, either by the grantee to another institution within the UK or abroad, or by a named mathematician from within the UK or abroad to the home base of the grantee. The time available for joint research arising from the grant is expected to be several working days. The maximum sum available is £500 and, where necessary, grantees will have to cover further costs from other sources such as departmental or personal funds. The intention is to provide sufficient funds so that the call on other sources is held within manageable bounds.

Applications should be in the form of a letter setting out the proposed academic case for the visit, including a detailed description of a specific project, the standing of the collaborator and an estimate of costs. Whilst a reasonable level of detail is desirable, an application should not be excessively long, and the documentation should run to at most three A4 pages. A brief report on the use of the grant is expected: this should describe the academic outcome of the visit, together with very brief financial details.

Grants will be awarded three times annually, in September, February and June, with respective deadlines for applications of 31 August, 31 January and 31 May. Awards will be restricted to one in any given academic year (September to August) and in the event of over subscription in any particular round, applicants who receive an award in the previous academic year will not be considered.

Scheme 5 - International Short Visits

This scheme, originally to support mathematics in the countries of the former Soviet Union has been extended to other countries. It now includes the countries of the former Soviet Union and Eastern Europe including the former Yugoslavia, China, India, Pakistan, Bangladesh, and the countries of Africa. It excludes the countries of Western Europe and North America and Australia. The status of other countries will be determined by

Programme Committee case by case. For visits to Britain, the maximum grant shall be £50 a day for accommodation and subsistence, up to a maximum of £1400, and up to £500 for travel. For visits from Britain, the maximum grant is £1200. Success of an application will depend mainly on the likelihood of potential benefit to mathematics in the country concerned. Grants will not be made solely for attendance at conferences. Where a visit to or from the UK includes a conference. it should also include other academic activities which in themselves would justify the grant, and should be for a total period of not less than 14 days. For visits to the UK, any expenses during the period of a conference should be met by the conference organisers (see 'Conference Grants' above).

Applications for a grant under this scheme should be made by mathematicians at UK institutions, both for visits to the UK and for visits to the countries concerned. The application should be made in a letter, usually of no more than two A4 sides, giving a brief summary of the following information:

- the academic justification for the visit;
- the standing of the visitor (if from the fSU to the UK) together with a brief CV;
- the proposed itinerary;
- a statement of travel and accommodation costs.

Any grant for travel and subsistence will normally be determined according to the formula: actual accommodation costs up to £35 per day plus £15 per day for other subsistence costs.

There are no specific deadlines but normally an application should be submitted at least three months before the date of the proposed visit to allow for consideration by the LMS Programme Committee and, in the case of visits to the UK, an announcement of the visit in the Society's Newsletter. All arrangements for a visit under this scheme are the responsibility of the applicant.

CONFERENCE

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Topic	Applicant	Grant
Belfast Functional Analysis Day 1999	M. Mathieu	£680
Frondic Theory and Dynamical Systems	P. Walters	£2,310
Statistical Mechanics - satellite conference of the	Y.M. Suhov	£3,000
XIII IAMP Congress on Mathematical Physics		
ISIR Research Summer School on Inventory	R.M. Hill	£490
Modelling		
TIES/SPRUCE 2000	P.C. Chatwin	£1,000
Meeting in honour of David Burgess	R. Heath-Brown	£3,220
ERCOFTAC Conference on Mixing in	J.M. Rees	£1,000
Geophysical & Astrophysical Flows		
IUTAM 2000/10 Symposium on Diffraction and	C.J. Chapman	£1,000
Scattering in Fluid Mechanics and Elasticity	, 1	,
Scottish Computational Mathematics Symposium	D.B. Duncan	£469
1999		
BAMC 2000	J.W. Dold	£3,500
Disordered Systems	R.F. Streater	£4,000
Belfast Topology Colloquium	S.D. McCartan	£1,000
Mathematical Modelling in Biology and Medicine	D. Gammack	£471
One Day Function Theory Meeting	I.M. Anderson	£280
Practical and Theoretical Aspects of Particle	D. Crisan	£2,000
Filters Workshop	2. 0.1041	,
Mathematical Methods of Regular Dynamics	V. Kuznetsov	£5,000
Representations of Algebraic Groups and Related	R.J. Marsh	£2,275
Topics	1(.). 1/101511	22,270
Godunov Methods Conference and Short Course	C. Brand	£1,000
Research Students' Conference in Probability	S. Gilchrist	£1,000
and Statistics 2000		,
Ian Sneddon 80th Birthday Conference	B. Straughan	£1,500
British Topology Meeting	J.P.C. Greenlees	£2,500
Noncommutativity, Geometry and Probability	M. Lindsay	£4000
Noncommutativity, Geometry and Hoodomey	D. Applebaum	
One-day Workshop on Operator Theory	N.J. Young	£400
Time-Reversal Symmetry in Dynamical	J.S.W. Lamb	£1,000
	J.D Dame	,
Systems Workshop Meeting in Honour of Professor Sir Christopher	D.A. Rand	£3,300
Zernende 75th Birthday	D.n. Rund	20,000
Zeeman's 75th Birthday	E.C. Lance	£4,000
ICMS Instructional Conference in Operator	L.C. Lance	21,000
Algebras and Operator Spaces	V.C. Mavron	£1,485
2000 University of Wales Mathematics Colloquium	C.J.E. Pinnock	£1,336
Postgraduate Group Theory Conference	K.D. Elworthy	£2,000
UK - Japan Winter School	R.D. Elworthy	12,000

SCHEME 2

Applicant	Visitor	Places to Visit	Grant
I. Bárány	J. Matousek	UCL, LSE, Cambridge	£300

M. Wiercigroch	P.A. Zhilin	Aberdeen, Glasgow, Heriot-Watt	£720
S.T. Tsou	D. Kreimer	Oxford, KCL, Exeter	£300
M.R. Bridson	K. Vogtmann	KCL, Oxford, Warwick,	£600
	U	Southampton	
A.A. Ranicki	O. Cornea	Oxford, Edinburgh, Aberdeen,	£200
P. Kropholler	P. Linnell	QMW, Southampton, UMIST,	£400
1		Manchester	
J.A. Moody	F.T. Farrell	Warwick, QMW, Edinburgh	£673
J. Berndt	R. Miyaoka	Loughborough, Hull, Durham,	£900
		Warwick	
B.D. Sleeman	D.L. Colton	Leeds, Strathclyde, Dundee,	£1,000
		Brunel, North of England seminar	
J.W. Anderson	K. Ruane	Southampton, QMW, Oxford	£700
E.B. Davies	A. Boettcher	KCL, Oxford, Sussex	£250

SCHEME 3

Applicant	Institution	Topic	Grant
I.M. James	Oxford	History of Modern Mathematics	£500
B. Szendroi	Warwick	Junior Algebraic Geometry Seminar	£600
J. Brodzki	Exeter	K-theory and Analysis	£1,000
G. Delius	KCL	Integrable Boundary Quantum Field Theory	£1,000
Y.V. Kurylev	Loughborough	Multidimensional Inverse Problems	£990
D.E. Evans	Cardiff	Mathematical Physics - Physical	£1,000
		Mathematics	
R.S. MacKay	Cambridge	The UK Spatially Extended	£750
,	U	Dynamics Organisation	
A.P. Fordy	Leeds	Classical and Quantum Integrability	£1,000
N. Snashall	Leicester	Representation Theory of Algebras	£1,000
J.M. Ball	Oxford	Phase Transitions in Crystalline	£1,000
		Solids	
G.K. Sankaran	Bath	Algebraic Geometry	£1,000
C.R. Hajarnavis	Warwick	Noncommutative Rings	£1,000
N.M. Stephens	Goldsmiths	Computational Number Theory	£750
S. Reich	Surrey	Numerical Methods and Random	£1,000
		Dynamical Systems	
E. Shargorodsky	Sussex	Spectral Analysis for PDEs	£1,000
H.D. Macpherson	Leeds	Algebraic Model Theory	£1,000
R.M. Green	Lancaster	North British Quantum Groups	£1,000
		Collective	
R.J. Sharp	Manchester	Dynamical Systems	£1,000
A. Veselov	Loughborough	Mathematical Physics	£1,000

SCHEME 4

Applicant	Institution	Collaborator	Institution	Grant
A.C.C. Coolen	King's	D. Saad	Aston	£400
T.H. Lenagan	Edinburgh	L. Rigal	Saint-Etienne	£300
S.J. Pride	Glasgow	M.F. Newman	ANU	£500
	U	E.A. O'Brien	Auckland	

		Minnesota	£300
King's	A. Agboola	Harvard	£500
Exeter	P. Baum	Penn State	£500
Glasgow	E. Kirchberg	Berlin	£230
Edinburgh	A. Premet	Manchester	£250
UCL	R. Diestel	Hamburg	£500
Imperial	J.C. Eilberg & V.Z. Enloskii	Heriot-Watt	£300
Aberdeen	N. Iwase	Kyushu	£500
Bangor	T. Porter	Bangor	£400
	R. Steiner	Glasgow	
	E. Goubault	France	
	P. Gaucher	Strasbourg	
Leicester	E. Green		£500
KCL	F.P. Gardiner	Brooklyn	£500
QUBelfast	A.R. Villena &	Granada	£500
	M.I. Berenguer		
Cambridge	Z. Liu & B. Xu	Beijing	£500
Glasgow	A. Pickering	Salamanca	£500
	Glasgow Edinburgh UCL Imperial Aberdeen Bangor Leicester KCL QUBelfast Cambridge	King'sA. AgboolaExeterP. BaumGlasgowE. KirchbergEdinburghA. PremetUCLR. DiestelImperialJ.C. Eilberg & V.Z. EnloskiiAberdeenN. IwaseBangorT. Porter R. Steiner E. Goubault P. GaucherLeicesterE. Green KCLKCLF.P. Gardiner QUBelfastQambridgeZ. Liu & B. Xu	King'sA. AgboolaHarvardExeterP. BaumPenn StateGlasgowE. KirchbergBerlinEdinburghA. PremetManchesterUCLR. DiestelHamburgImperialJ.C. Eilberg & Heriot-WattV.Z. EnloskiiV.Z. EnloskiiAberdeenN. IwaseKyushuBangorT. PorterBangorR. SteinerGlasgowE. GoubaultFranceP. GaucherStrasbourgLeicesterE. GreenVirginiaKCLF.P. GardinerBrooklynQUBelfastA.R. Villena & GranadaM.I. BerenguerCambridgeZ. Liu & B. XuCambridgeZ. Liu & B. XuBeijing

SCHEME 5

Applicant	Visitor	Institution	Place to Visit	Grant
A. Iserles	G.N. Milstein	Ekaterinburg	FOCM and various	£3000
	V. Tikhomirov	Moscow	other UK	
	S. Pereverzev	Ukraine	universities	
	S. Matveev	Chelyabinsk		
I.J. Leary	P.A. Minh	Vietnam	Southampton, UMIST,	£1,642
			Manchester	
T.S. Griggs & M.J. Grannell	J. Siran	Bratislava	Open	£1,300
A. Grigor'yan	A. Telcs	Budapest	Imperial	£950
S.B. Kuksin	A. Fursikov	Moscow	Heriot-Watt,	£850
S.D. KUKSIII	A. FUISIKOV	WOSCOW	Edinburgh, Bath	1030
M.A.J. Chaplain	A. Polezhaev	Moscow	Dundee,	£995
and the strapture			Heriot-Watt	
J.S. Wilson	N.S. Romanovskii	Novosibirsk	Birmingham	£1,900
J.C. Wood	C-L. Bejan	Iasi, Romania	Leeds	£1,340
J.R. Hubbuck	M. Cadek	Masaryk	Aberdeen	£1,748
V.P. Smyshlyaev	V.V. Zhikov	Russia	Bath	£1,800
D. Crisan	J.P.N. Bishwal	Calcutta	Cambridge	£1,700
M. Dzamonja	I. Juhasz	Budapest	UEA, Oxford,	£550
,	,		Essex	
A.A. Ivanov	A.I. Kostrikin	Moscow	Moscow	£650
K.C.H. Mackenzie		1.2965.0	Peking University	£657
			& conference in	
			Hangzhou	

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CORPUS CHRISTI COLLEGE CAMBRIDGE

RESEARCH FELLOWSHIPS IN BIOMEDICAL SCIENCES, MATHEMATICS AND ARCHAEOLOGY

Applications are invited for two or more Research Fellowships in Biomedical Sciences, Mathematics or Archaeology, for three years from 1 October 2000. The Fellowships are open to men and women graduates of any university who on 1 October 2000 will have completed not more than five years of research. Candidates with their own source of funding will be eligible for a non-stipendiary award and are encouraged to apply.

Further details and application forms may be obtained from the Master's Secretary, Corpus Christi College, Cambridge CB2 1RH, tel: (01223) 338062, fax: (01223) 338020, e-mail: mb271@cam.ac.uk or on our web site: http://www.cor pus.cam.ac.uk/fellowship/research_fellow/

Application forms and testimonials must be received by 28 January 2000.

QUEENS' COLLEGE, CAMBRIDGE

LECTURESHIP IN MATHEMATICS (Fixed Term)

Queens' College invites application for a fixed term Lectureship in Mathematics. The post carries with it an Official Fellowship. The appointment, which is open to men and women, is for three years in the first instance (with possibility of renewal for two further years). Candidates should be active in research in a branch of pure mathematics or mathematical statistics (including probability).

The pensionable stipend is at present age-related, ranging from $\pounds 17,108$ to $\pounds 28,358$. Candidates will normally be expected to have a PhD at the time of taking up the post.

Application (four copies), including a curriculum vitae and a statement of current research, should be addressed to the Senior Tutor, Queens' College, Cambridge, CB3 9ET, from whom further details may be obtained. The closing date for receipt of applications is **28 January 2000**. Applicants should ask two referees to write directly to the Senior Tutor by the closing date.

ASSOCIATION FOR SYMBOLIC LOGIC MEETINGS

The 2000 ASL Annual Meeting will be held from 3 - 7 June 2000 at the University of Illinois Urbanaat Champaign, USA. This meeting will be organized to have a special impact on the future of logic, in recognition of the new millennium. In addition to the usual features of an ASL annual meeting, it will include panel discussions on the topics: "The Development of Logic in the 20th Century", "The Prospects for Mathematical Logic in the 21st Century". and "Does Mathematics Need New Axioms?". The University of Illinois and the Institute for Mathematics and Its Applications will provide financial support for these panel discussions. Invited hour addresses will be given by I. Neeman, M. Rathjen, D. Scott, W. Sieg, R. Soare, A. Wigderson, and A. Wilkie. The Eleventh Annual Gödel Lecture will be given by Jon Barwise. D. Marker will give a two-hour tutorial on model theory. There will be special sessions on Model Theory (D. Haskell and S. Starchenko). Computability Theory (S. Lempp and M. Lerman), Set Theory (G. Hjorth and A. Kanamori), Proof Theory and Complexity (J. Avigad and T. Pitassi), Constructivism and Categorical Logic (S. Awodey), and Philosophy of Mathematics (M. Hallett and W. Tait).

Further information may be obtained from the Programme Chair: Carl G. Jockusch, Jr., Mathematics Department, University of Illinois at Urbana-Champaign, 1409 West Green Street, Urbana, Illinois 61801 (e-mail: jockusch@math.uiuc.edu).

The 2000 ASL European Summer Meeting (Logic Colloquium 2000) will be held from 23 - 31 July 2000 in Paris, France. The programme will include four tutorials: J. Longley (realisability and computability of higher-order functionals), E. Bouscaren (geometry and logic), L. Blum and S. Smale (complexity and real computation), and W. H. Woodin (the continuum hypothesis). Other invited speakers include P. Aczel, J. Barwise, S. Buss, M. Davis, P. deRouilhan, I. Farah, M. Hallett, L. Harrington, R. Heck, W. Hodges, M. Hofmann, G. Jaeger, Y. Lafont, R. Laver, A. Macintyre, D. Marker, D. Martin, P. Shor, T. Slaman, O. Spinas, S. Starchenko, M. Zeman, and B. Zil'ber. These lectures will be grouped into the following topics: proof theory and logical foundations of computer science, set theory, model theory, computability and complexity, history of logic in the 20th century, and philosophy and logic applied to cognitive science. There will be a symposium on the foundations of mathematics around 1900.

Abstracts of contributed talks must be received by 31 March 2000; they should be sent by e-mail (lc2000-robot@logique. jussieu.fr), by fax (+33 1 44 27 61 48) or by mail (LC2000, UFR de Mathématiques, case 7012, Université Paris 7, Denis Diderot, 2 place Jussieu, 75251 Paris Cedex 05, France). Further information may be obtained from these addresses or at the meeting website: (http://lc2000.logique.jussieu.fr).

These meetings are part of World Mathematical Year 2000, a special international program organized by the International Mathematical Union to celebrate the future of mathematics. For more information about WMY 2000 see their website (http://wmy2000.math. jussieu.fr/).

BRITISH WOMEN

British Women Mathematicians' A Discussion Day will be held on Saturday 12 February 2000 at the Mathematics Institute. University of Warwick. This meeting will be a follow up to the discusheld British Women sion at Mathematicians' Meeting in September 1999 in Edinburgh on the topic: "Why is it harder for women doing Maths at Cambridge to get a first?" Figures show that in many subjects at Cambridge, women tend to do significantly less well in the final exams than their male counterparts with the same entry qualifications. Cambridge have commissioned Dr

Chris Mann in their Faculty of Social and Political Sciences to investigate. For more details please see the LMS Women in Mathematics Committee web page (http: //www.lms.ac.uk/activities/women_ maths_com/00feb_meeting.html). For further information contact the organisers: Caroline Series (cms@maths.war wick.ac.uk) and Helen Robinson (mtx057 @coventry.ac.uk).

1999 LMS POPULAR LECTURE VIDEOS

The videos of the 1999 LMS Popular Lectures are now available. Once again we have recorded the actual lectures given in London, not studio versions. They can be purchased from the LMS at De Morgan House at a cost £10 for one or £7.50 each for two or more videos (including postage and packing).

1999

Floating, Spinning, Tumbling (Frank Berkshire)

How do objects like to float, tennis racquets spin and polyhedral dice come to rest? Order and chaos in action!

Tangent Circles Patterns & Packings (Caroline Series)

Patterns of tangent circles have led to geometrical problems from ancient Greece to old Japan. Classical geometry has much to say about this, but the full solution is a wonderful 20th century idea.

1998

Marrying, Voting, Choosing (Tom Körner)

Mathematics cannot tell us how to marry, vote or choose, but it can cast an interesting light on these problems.

Giraffe Blood Flow and Pattern-forming Bacteria (Tim Pedley)

Why is a giraffe's heart so huge, and why do swimming bacteria form patterns? Biological fluid dynamics has the answers.

ICME-9 - Tokyo

The ninth International Congress on Mathematical Education (ICME-9) will be held in Tokyo from 31 July to 6 August 2000. ICME-9 is organised by the International Commission on Mathematical Instruction (ICMI), a subcommission of the International Mathematical Union (IMU), of which the London Mathematical Society is the United Kingdom's adherent body.

As a result of generous funding, in particular by the Royal Society, the Mathematics Education Trust, the London Mathematical Society and Trinity College, Cambridge, funds are available to support participants from the United Kingdom. A first round of grants has just been made on behalf of the Joint Mathematical Council, and it has been decided to have a second round.

The closing date for applications for this is **1 March 2000.** Application forms, which contain more information, can be obtained by e-mail from lms@lms.ac.uk, or by post from the Administrator, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HP.

AMS SCAND 2000

first American Mathematical The Society-Scandinavian International Mathematics Meeting, is taking place from 13-16 June 2000 in Odense, Denmark. Plenary speakers are: Tobias Colding (NY), Nigel J. Hitchin (Oxford), Johan Hastad (Stockholm), Elliott Lieb (Princeton), Pertti Mattila (Jyvaskyla), Curtis McMullen (Harvard), Alexei Rudakov (Trondheim). Karen K. Uhlenbeck (Austin) and Dan-Virgil Voiculescu (Berkeley). For further information write to: AMS.Scand.2000, IMADA, SDU-Odense Universitet, Campusvej 55. DK-5230 Odense M, Denmark (e-mail: AMS.Scand.2000@ imada.sdu.dk) or visit the web site (www.imada.sdu.dk/~hjm/ams.Scand. 2000.html).

LONDON MATHEMATICAL SOCIETY

INVITED LECTURE SERIES

Boris DUBROVIN (SISSA, Trieste) The Geometry of Isomonodromic Deformations

PROGRAMME

A series of 10 lectures, supplemented by classes for graduate students, will be given at the **Mathematical Institute**, **Oxford** from **20 - 24 March 2000**. The lectures will be addressed to a wide audience of experts and non-experts, and should be accessible to research students. There will also be some seminars with speakers including Nigel Hitchin and Nick Woodhouse.

ABSTRACT

Analytic aspects of the theory of monodromy-preserving deformations of linear ordinary differential equations with rational coefficients have been studied since the beginning of the century, especially in connection with the 'Painlevé property' of integrable systems. Recently, a geometric understanding of the structure of the parameter spaces of the deformations has emerged. In particular, the structure of a Frobenius manifold was discovered on the space of isomonodromic deformations of certain systems of first order linear differential equations.

The lectures of Professor Dubrovin will explain how the geometry of Frobenius manifolds connects the theory of isomonodromic deformations with the (topological) quantum field theory associated to Gromov - Witten invariants for symplectic manifolds and with the bihamiltonian geometry of loop spaces.

BOARD AND LODGING

Board and lodging can be arranged at St Peter's College (4 nights bed & breakfast £100; Dinner for 3 nights of Monday, Tuesday and Wednesday £30; Special Dinner Thursday evening £20). Please book with Jean Wright, St Peter's College, Oxford OX1 2DL (Jean.Wright@spc.ox.ac.uk) by 18 February 2000.

REGISTRATION

For further details contact the organizer Lionel Mason (lmason@maths.ox. ac.uk) or visit the web site (http://www.maths.ox.ac.uk/~lmason/invlect. html).

Some limited financial support is available for UK participants.

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OR CONTACT: A K Peters, Ltd. 63 South Ave, Natick, MA 01760 USA Tel:508/655-9933 Fax:508/655-5847 History of Topology I.M. James (ed), North Holland/Elsevier, Amsterdam, 1999, 1056pp, US\$190.50, Dfl375.00, ISBN 0-444-82375-1.

It is not possible in the space of a review to do full justice to this magnificent volume, which combines scholarship, namely the bringing of past trends to current view in the light of later developments, with excellent exposition.

The major emphasis is on what is called in the Preface 'classical topology', rather than on general (point-set) topology, which will be the subject of another volume. Largely this means algebraic topology, including dimension theory, and parts of general topology which have influenced algebraic topology. Some of the articles are written by professional historians of mathematics, and others by historically-minded mathematicians.

It is also valuable as a human story. We have moved away from the Bourbaki idea of the possibility of erecting a final story of the structure of mathematics. The concepts at the root of mathematics are continually evolving and interacting, rather like individuals in an ecosystem. The struggle with the concepts and problems of topology, of 'continuous geometry', is a great story. All from beginners to experts in mathematical research now have an opportunity to pick a way through the origins of the problems which we see as important today. This reexamination of the past, of the roots of the subject, is an essential part of the development of our subject, to see the controversies of the past, to see the questions that were examined, to make sure that the intuitions of the past have been properly expressed in terms of the language of today, to ensure that vital ideas and problems are not lost but are enabled to be tackled again with a new range of tools and concepts.

Also there are many fascinating, even moving, stories on the mathematicians involved. The story of Listing, who originated the term 'Topologie', is one such, and the stories of mathematicians under the Nazis is another, at a more tragic level. Who can failed to be moved by the story of the suicide of Hausdorff and his wife, in 1942, when he was aged 72?

There are forty articles, of which three are by the Editor. The articles cover a very broad range, from personal accounts to detailed histories of particular areas, or fields, such as homological algebra, shape theory, stable homotopy theory and so on. There are also detailed assessments of the contributions of particular mathematicians, and brief assessments of others.

It is interesting to see laid out the slow development of concepts which to us seem so familiar, such as for example those covered in separate chapters on dimension, manifold, homotopy, complex, fibre bundle, triangulation and continuous group. Of course there has to be a chapter on the contribution of Poincaré, and there are chapters also on Listing, Heegard, Brouwer, Dehn, Nielsen, Hopf, Freudenthal, Seifert, as well as summaries on many others.

Even in a work of this size, there have to be omissions. R.H. Fox is well mentioned for his work on knots, but not for his seminal paper on the compact-open topology, a term which itself does not appear in the index. This does seem an omission from the chapter on the interaction of general topology with other areas of mathematics. Fox's paper led to a lot of work on the topology of function spaces, and the widely used notion of a category of spaces 'adequate and convenient for all purposes of topology' [2] is not mentioned.

In the history of fibre spaces, the theorem on the local-to-global property of the CHP (Covering Homotopy Property) played a key rôle, as explained in Zisman's article. However it is not stated that Dyer and Eilenberg felt that Hurewicz' 1955 paper had a gap in a crucial continuity claim. It is interesting that Spanier's book [8] does not prove that a similarly defined function is continuous (in the first edition the function was not even well-defined). This illustrates the difficulty of the area. An elegant version of this theorem, building on Dold's proof, and generalising it to a result on path spaces and 'schedules', is published in [5].

As is explained in several places in this volume, the higher homotopy groups were first defined by Čech, and he submitted a paper on this to the ICM at Zürich in 1932. This paper was withdrawn, since it was proved that these were abelian. This was a disappointment since people were looking for a higherdimensional version of the fundamental group which bore a relation to homology similar to that of the fundamental group to the first homology group. That is they were seeking non-commutative higherdimensional structures, in order better to reflect geometric and analytic properties. This disappointment gradually came to seem a quirk of history, and this attitude is reflected in this book. In particular, J.H.C. Whitehead's general programme of algebraic homotopy, of modelling homotopy theory, is seen in this book only as associated with rational homotopy theory.

In fact, Whitehead pursued a non-commutative structure in dimension 2, namely what he called crossed modules. He developed significant work on these, related to work of Eilenberg and Mac Lane on the cohomology of groups in dimension 3. He was also very proud of his description with Mac Lane of homotopy 2-types (then called 3-types) in terms of crossed modules [7].

To give now a personal view, in 1974 Philip Higgins and I found that one could define *homotopy double groupoids*; that these were in a sense equivalent to Whitehead's crossed module of a pair, consisting of the second relative homotopy group, with its boundary and operations of the fundamental group; and that these could be used to prove theorems which led to new calculations. Now one can see, with further work of Loday [6]. that there are non-commutative higher homotopy groupoids in all dimensions and this can lead to new calculations in homotopy theory, separate from those referred to in this volume (see for example the references in the web survey article [3]). For example, these methods allow some computations even of homotopy types, and so of actions of the fundamental group on higher homotopy groups - I remember Whitehead saying that this action was one of the fascinations of the early workers in homotopy theory. However, neither of the terms 'groupoid' or 'crossed module' appear in the index, and this in the end, particularly in view of the work of Connes on groupoids [4], and Baues in algebraic homotopy [1], may also come to seem a quirk of history.

It is interesting to recall the atmosphere in the late 1950s in which topology was seen as a central area, a meeting of many fields, in which the student had to master an array of different techniques from Ext and Tor in homological algebra, to free products with amalgamation of groups. The scene has somewhat shifted, and in the reviewer's opinion it is category theory, following on from Eilenberg, Mac Lane, Ehresmann and Grothendieck, which nowadays has a comparable prospect of foundational influence, and applications, in a wide number of areas. Certainly Eilenberg and Mac Lane were proud of the development of Category Theory, and were seen as often as possible at Category Theory meetings. The 1999 Category Theory meeting at Coimbra was very much in honour of Mac Lane, who attended and spoke with vigour.

All this suggests that we cannot be expected to come to a final view, even on the history of topology. Taken on its own terms for the subjects covered, this book is valuable and will repay repeated study for its view of developments by many of those who took part in them, knew those who did, or have deeply studied the history of the subject. It is unfortunate that the price is likely to deter many mathematicians, particularly young ones, from buying it for themselves.

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Ronnie Brown University of Wales, Bangor

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GRESHAM COLLEGE GEOMETRY

During the Spring 2000 Semester three Public Lectures in Geometry will be given by Professor Sir Roger Penrose (Gresham Professor of Geometry).

Thursday 17 February at 1.00 pm 'Spinors and Quaternions' Tuesday 22 February at 5.30 pm 'Infinity' Thursday 9 March at 5.30 pm 'Quasicrystals'

The first and third lectures will be delivered at Gresham College, Barnard's Inn Hall, Holborn, London EC1 and the second one will be given at Latymer Upper School, King Street, London W6. Admission to the lectures is free and without tickets. Further details can be obtained from Gresham College (tel: 0171-831 0575; fax: 0171-831 5208; email: enquiries@gresham.ac.uk; web site: http://www.gresham.ac.uk).

PROFESSOR SIR CHRISTOPHER ZEEMAN FRS 75TH BIRTHDAY

A meeting in honour of the 75th birthday of Professor Sir Christopher Zeeman FRS will be held on Friday 25th February 2000 at the Mathematics Institute, University of Warwick. The programme is as follows:

- 10.00 M.W. Hirsch (Berkeley) On the Number of n-Orbits of a Surface Diffeomorphism
- 11.30 D.A. Rand (Warwick) Mathematics and the immune system: how T cells recognise invaders while tolerating self
- 12.30 Buffet lunch in Mathematics Institute Common Room
- 1.30 Toast and celebration of Christopher¹s Birthday
- 2.00 M.L. Zeeman (Texas, San Antonio) Title: TBA
- 3.00 Birthday Tea in Mathematics Institute Common Room
- 4.00 J. Palis (IMPA, Rio de Janeiro) A global scenario for dissipative dynamics
- 5.00 Wine and snacks in Mathematics Institute Common Room

All are welcome to attend. Please tell the MRC if you are planning to come. This Meeting is partially funded by the London Mathematical Society. Within this grant there are funds for Postgraduate Students at UK Universities to attend. To apply for these Postgraduate funds, and anyone wishing to attend Peta McAllister. inform: please Mathematics Research Centre, University of Warwick, Coventry CV4 7AL (tel: +44 (0)24 7652 4403; fax: +44 (0)24 7652 3548; e-mail: peta@maths.warwick.ac. uk: http://www.maths.warwick.ac.uk).

HONORARY DEGREE

David Crighton was awarded an honorary degree from Loughborough University in July 1999.

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DISORDERED AND COMPLEX SYSTEMS

First Announcement and Call for Papers

The Department of Mathematics, King's College London is organizing a one-week conference on Disordered and Complex Systems. This is an official satellite meeting of the XIII International Congress on Mathematical Physics (17 - 22 July 2000, Imperial College, London). Topics to be covered include: Spin glasses and neural networks (10/7), Reaction-diffusion equations (11/7), Quantum dynamical systems and quantum chaos (12/7), Information geometry (13/7) and Financial mathematics (14/7).

The conference fee of £50 (£25 for fulltime students) has been kept low to encourage postgraduate students and young researchers in these exciting subject areas to attend. In addition, there are scholarships to provide financial assistance for postgraduate students at universities in the UK or the Republic of Ireland who would like to attend. Accommodation at the new Dover Street Apartments can be reserved at favourable rates. Electronic registration for the conference is now available at http://www. mth.kcl.ac.uk/icmp2000/compsys.html.

To encourage early registration, registrations received by **21 January 2000** will benefit from a 20% discount on the conference fee.

Submissions of abstracts for talks or posters to be presented at the conference are invited. The preferred method of abstract submission is via the electronic registration form (see URL above). Alternatively, abstracts may be e-mailed (compsys.maths@kcl.ac.uk). Abstracts should be brief, but include references to published work or electronically available preprints. For talks, the preferred duration and the most suitable day of the conference should also be specified. Notification of acceptance of talks and posters will be given by March 2000.

For further information, please see the web page above, or contact The Conference Secretary, Disordered and Complex Systems, Department of Mathematics, King's College London, Strand, London WC2R 2LS (tel: 020 -7848 2107, fax: 020 - 7848 2017, e-mail: compsys.maths@kcl.ac.uk).

THE XIII INTERNATIONAL CONGRESS ON MATHEMATICAL PHYSICS

The local organising committee is pleased to invite you to register for participation in the XIII International Congress on Mathematical Physics which will take place at Imperial College, London, from 17 - 22 July 2000. Besides traditional features, this time there will be a few novelties: The Scientific Programme has been expanded by two topics - Biophysics and Quantum Information/Computing. In preparation for the congress, an additional publication with invited contributions presenting personal perspectives in Mathematical Physics will be published. The congress will be accompanied by a programme for postgraduate students and young researchers helping to achieve a broader horizon.

Plenary Speakers

V. Bach (Berlin); M. Berry (Bristol); D. Buchholz (Göttigen); R.H. Dijkgraaf (Amsterdam); S. Donaldson (London); V. Gelfreich (Berlin); G. Huisken (Princeton/Tübingen); S. Leibler (Princeton); E. Lieb (Princeton); E. Presutti (Rome); S. Shlosman (Marseille); P.W. Shor (Florham Park); A. Schwarz (Davis).

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Each topical session will include four invited lectures. A number of contributed talks/ posters in each topic are expected.

Congress Publications

- Proceedings (International Press)
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Public Programme

Including lectures on mathematics and theoretical physics by M. Atiyah; A. Connes; M. Gell-Mann; D. Ruelle.

The congress will be accompanied by a number of satellites (http://icmp2000. ma.ic.ac.uk/satellites.htm) including a special programme for postgraduate students and young researchers (The Young Researchers' Symposium, Imperial College : 17 - 22 July 2000, http://www.ma.ic.ac.uk/mathematical physics/mp 2000kg.html).

For further information and registration visit the congress web page (http://icmp2000. ma.ic.ac.uk) or e-mail (icmp2000@ic.ac.uk). The organisers are pleased to acknowledge the support of the London Mathematical Society.

SUMMER SCHOOL AND WORKSHOP ON ALGEBRAIC AND CO-ALGEBRAIC METHODS IN THE MATHEMATICS OF PROGRAM CONSTRUCTION

Lincoln College, Oxford, 10 - 14 April 2000

This school specifically aims to equip mathematicians embarking on a PhD degree with the knowledge and expertise to contribute to current research in computing science. It is also of interest to other PhD students and lecturers with an active interest in the mathematics of program construction. The school will consist of the following intensive courses together with a one-day workshop at which participants will be given the opportunity to present their own research.

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- Peter Aczel (University of Manchester) Initial Algebras and Final Coalgebras: The Categorical Perspective
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- Jeremy Gibbons (Oxford University) Calculational Properties of Folds and Unfolds
- Bart Jacobs (Nijmegen Catholic University) Exercises in Coalgebraic Specification
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Deadlines

For financial support: 31st January 2000 For registration: 11th February 2000

Organizers

Roland Backhouse (University of Nottingham) Roy Crole (University of Leicester) Jeremy Gibbons (Oxford University)

If you have any further questions, please e-mail (acmmpc-info@comlab.ox.ac. uk) or contact Jeremy Gibbons, Oxford Computing Laboratory, Wolfson Building, Parks Road, Oxford OX1 3QD (fax 01865 273839). Please note that places on the School are limited, and early registration is advisable.

This workshop is funded under the MathFIT initiative, which is sponsored by the EPSRC and LMS.

Information can be found at the School home page http://www.comlab.ox.ac.uk/oucl/research/areas/ap/acmmpc/

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SECOND INTERNATIONAL BOUNDARY INTEGRAL METHODS: THEORY AND APPLICATIONS University of Bath 11 – 15 September 2000

SHORT COURSE AND THIRD IMAGING AND DIGITAL IMAGE PROCESSING: MATHEMATICAL METHODS, ALGORITHMS AND APPLICATIONS De Montfort University, Leicester 12-15 September 2000

SHORT COURSE AND FIRST FRACTAL GEOMETRY: MATHEMATICAL TECHNIQUES, ALGORITHMS AND APPLICATIONS De Montfort University, Leicester 19-22 September 2000

FIFTH MATHEMATICS IN SIGNAL PROCESSING University of Warwick 18 - 21 December 2000

THIRD SPATIAL PATTERNS IN PERMEABLE ROCKS Churchill College, Cambridge 27 - 29 March 2000

FOURTH MATHEMATICAL MODELS OF MAINTENANCE University of Salford 9-11 April 2001

ADVANCED SIMULATION AND CONTROL FOR AUTOMOTIVE APPLICATIONS Keble College, Oxford 24 - 26 September 2001

FURTHER DETAILS FROM: Pamela Bye, Conference Officer The Institute of Mathematics and its Applications Catherine Richards House 16 Nelson Street Southend-on-Sea Essex, SS1 1EF.

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A. ZYGMUND Honorary Member 1967

DIARY

The diary lists Society meetings and other events publicized in the Newsletter. Further information can be obtained from the appropriate LMS Newsletter whose number is given in brackets. A fuller list of meetings and events is given in the Society's web site (http://www.lms.ac.uk/meetings/diary.html).

IANUARY 2000

5 Topology Set Theory Meeting, London (278) 5-8 Non-Fermi Liquid Effect in Metallic Systems Conference, Isaac Newton Institute, Cambridge (275) 14 Edinburgh Mathematical Society Meeting, Edinburgh University (275)

26 Winter Combinatorics Meeting, Open University (277) **FEBRUARY 2000**

4-6 Meeting in Honour of David Burgess's 65th Birthday, Nottingham University (274)

11 Edinburgh Mathematical Society Meeting, Edinburgh University (275)

12 British Women in Mathematics Discussion Day, Warwick University (277) (278)

18 Postgraduate Open Day, King's College London (277) 21-25 Adams Lectures (L. Smith of Göttingen University) Manchester University (277)

25 Meeting in Honour of Professor Sir Christopher Zeeman's 75th Birthday, Warwick University (277) 28 Feb -3 Mar Hyperbolic Problems Conference, Magdeburg, Germany (275)

MARCH 2000

10 Edinburgh Mathematical Society Meeting, Dundee University (275)

20-24 LMS Invited Lectures: The Geometry of Isomonodromic Deformations (B. Dubrovin), Oxford (277) (278)

20-24 Stochastic Analysis, LMS/EPSRC Short Course,

Oxford (276) (277) 27-31 Quantum Computing Instructional Course, ICMS Edinburgh (276)

31-1 Apr Modelling Spatiotemporal Dynamics in Interacting Systems, LMS Meeting, Oxford (276) (278)

APRIL 2000

3 - 7 Workshop on Ergodic Theory of Z^d-actions, Warwick University (277

5-14 Operator Algebras and Operator Spaces Instructional Conference, ICMS, Edinburgh (276)

10-14 Algebraic and Co-algebraic Methods in the Mathematics of Program Construction Summer School and Workshop, Oxford (278)

8-15 Topology, Geometry & Physics Workshop, Warwick University (277

10-20 New Theoretical Approaches to Strongly Correlated Systems NATO/EC Summer School, Isaac Newton Institute, Cambridge (276)

11-14 Differential Geometry Workshop, Leeds University (274)

11-14 Probability and Statistics Research Students' Conference, University of Wales (277)

17-20 British Mathematical Colloquium, Leeds University (274)

25-27 Postgraduate Combinatorial Conference, Queen Mary & Westfield College, London (276)

25-29 British Applied Mathematical Colloquium, UMIST

MAY 2000

5 Edinburgh Mathematical Society Meeting, Stirling University (275) 19-20 Hilbert's Problems: Past and Future, 2-day BSHM-LMS Meeting, Oxford (278) 28 Combinatorics 2000 Conference, Gaeta, Italy (278) **TUNE 2000** 2 Edinburgh Mathematical Society Meeting, St Andrews University (275)

3-7 Association for Symbolic Logic Annual Meeting, Illinois, USA (278)

13-16 AMS Scand 2000 Meeting, Odense, Denmark (278) 23 LMS Meeting, London

ПЛ.Ү 2000

3-7 Functional Analysis Meeting, Technical University, Valencia, Spain (265) 3-14 Approximation, Complex Analysis & Potential Theory Seminar, Montreal University (276) 9 - 22 Geometry & Topology Workshop, Warwick University (277) 10-14 3rd European Congress of Mathematics, Barcelona, Spain (272) 10-14 Free Surface Flows IUTAM Symposium, Birmingham University (272) 17-21 Integrable Systems in Differential Ceometry, Tokyo, Japan (275) 17-22 International Congress on Mathematical Physics, Imperial College, London (257) (278) 17-22 Disordered and Complex Systems Conference, King's College, London (278) 23-31 Association for Symbolic Logic European Summer Meeting, Paris, France (278) SEPTEMBER 2000 10-17 Geometry of Quiver-Representations and Preprojective Algebras Summer School, Isle of Thorns, Sussex University (275) 13-15 Royal Statistical Society International Conference.

Reading University (277) 15-18 Physical Interpretations of Relativity Theory

Meeting, Imperial College London (277) 18-23 Differential Geometry International Congress, Bilbao, Spain (275)

APRIL 2001

9-12 British Mathematical Colloquium, Glasgow University **TULY 2001**

1-6 British Combinatorial Conference, Sussex University (276)

9-13 Stochastic Processes and their Applications Conference, Cambridge (275)

AUGUST 2001 12-19 Homological Conjectures for Finite-Dimensional Algebras Summer School, Nordfjordeid, Norway (275) AUGUST 2002 20-28 ICM2002, Beijing, China (272)

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