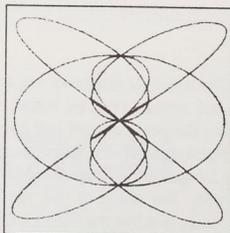


# THE LONDON MATHEMATICAL SOCIETY NEWSLETTER



No. 125

January 1986

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**Editor:** Czes Kosniowski, School of Mathematics, The University, Newcastle upon Tyne, NE1 7RU. Tel: 0632-328511 and 091-284 4209.

**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.

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## Forthcoming Meetings

**Friday 17 January 1986, Burlington House  
(S. M. Rees, C.M. Series)**

Friday 21 February 1986, Burlington House  
(S. K. Donaldson, G. Wilson)

21–22 March 1986, Two day meeting at Trinity College, Dublin

Friday 16 May 1986, Burlington House

Friday 20 June 1986, Burlington House

Friday 17 October 1986, Burlington House

Friday 21 November 1986, Royal Society

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## LMS FORDER LECTURESHIP

The LMS Council has agreed, in conjunction with the New Zealand Mathematical Society, to award biennially to a United Kingdom mathematician a Lectureship to visit universities in New Zealand for at least four weeks, dividing this time between a minimum of three centres.

The establishment of the Lectureship is made possible financially by the generous bequest made to the Society in 1983 by the late Professor H. G. Forder, for many years a member of the Society, who settled in New Zealand in 1934. In memory of Professor Forder, Council

has decided that the Lectureship, which is intended to encourage increased mathematical contact between the United Kingdom and New Zealand, shall be known as the Forder Lectureship.

The LMS Council has appointed Professor E. C. Zeeman, FRS, to be the Society's first Forder Lecturer. It is expected that Professor Zeeman will visit New Zealand in May, 1987.

C. J. Mulvey,  
Council and General Secretary.

## TREASURER'S REPORT

### Year ending 31 August 1985

The financial results for 1984/85 show an overall result very similar to that for 1983/84: a surplus of £44,500 on the General Account and a surplus of £104,500 on the Publications Account, offset by a gift of £20,000 to New College Oxford for the endowment of the Hardy Fellowship. The effect of this net addition of £129,000 to reserves is that the Balance Sheet of the Society has for the first time reached £1 million.

The detailed accounts, however, show substantial changes resulting mainly from the demise of C. F. Hodgson & Son. The firm went into receivership in October 1984 and was sold in December 1984. Printing of the *Newsletter* was transferred immediately to Boyatt Wood Press with a net saving to the Society. Printing of the *Bulletin* and *Journal* was transferred in stages to Cambridge University Press with new arrangements for the payment of printing bills which have caused a change in accounting policy.

Income in 1984/85 was down by £34,000 in comparison with 1983/84. The dominant factors were the change in accounting policy whereby income is adjusted to take account of future printing costs associated with unexpired subscriptions (– £60,000), loss of subscriptions to *Bulletin* and *Journal* (– £22,000), increased receipts

from *Russian Mathematical Surveys* (+ £18,000) and *Proceedings* (+ £10,000), dividends from investments (+ £16,000), rents from farm property (+ £4,000). It remains to be seen whether the set-back to the progress of the *Bulletin* and *Journal* is temporary or permanent.

Expenditure in 1984/85 was down by £41,000, despite an increase in general activities (+ £15,000), because of the hiatus in printing of *Bulletin* and *Journal* (– £55,000), and minor changes in other publications expenses (– £1,000). In this case the set-back has been overcome: production of all periodicals is back on schedule.

The events of 1984/85 placed an unusually heavy strain upon the Officers of the Society and also upon Editors of its periodicals. However the new printing arrangements negotiated with Cambridge University Press, for the *Bulletin* and *Journal*, and with Oxford University Press for the *Proceedings*, should in conjunction with the healthy state of the Society's reserves ensure a strong financial position in the short term future. Council is anxious to use this position to benefit the national development of mathematics, especially in areas which fall outside the responsibility of the S.E.R.C. and U.G.C.

R.L.E. Schwarzenberger

## BIRTHDAY CELEBRATION OF ALI FRÖHLICH

A meeting and a lunch will be held at Cambridge University on 27 and 28 of June 1986 to celebrate the 70th birthday of Ali Fröhlich.

The meeting will be supported by the L.M.S. and will take the form of three lectures on Friday afternoon, and two lectures on Saturday morning. The lectures will be given by C. J. Bushnell, J. Coates, J.-P. Serre, Sir H. P. F. Swinnerton-Dyer and M. J. Taylor.

The celebration lunch will be held at Robinson College, after the last of the Saturday morning lectures. There will be the option of overnight accommodation on the Friday for those who wish.

The charges involved are as follows: there will be a registration fee of £5 for participation in the meeting; bed and breakfast at Robinson College will cost £15.20; and the price of the celebration lunch will be £6. Robinson College are also prepared to offer Friday lunch (cost £5) and Friday dinner (cost £7).

For further details please write to: Professor M. J. Taylor, Department of Mathematics, U.M.I.S.T., P.O. Box 88, Manchester M60 1QD.

## DYNAMICS

A half day meeting on Dynamics will be held on 6 January 1986 at the Physics Lecture Theatre, Queen Mary College, London. The programme is:

- 1300–1345 *Integrable Systems*  
R. K. Bullough (UMIST)
- 1350–1435 *Function Iteration, Functional equations and the 20th century 'Exponential' function*  
P. J. McCarthy (QMC, London)
- 1440–1525 *Chaos in Dissipative Ordinary Differential Equations*  
C. Sparrow (DPMMS, Cambridge)

- 1530–1615 *The Stability problem in Classical Mechanics*  
F. Vivaldi (QMC, London)
- 1620–1650 Tea (Upper Dining Room)
- 1650–1735 *Chaos in Nonlinear Convection*  
N. O. Weiss (DAMPT, Cambridge)
- 1740–1825 *Transport in Hamiltonian Mechanics*  
I. C. Percival (QMC, London)
- 1830–1915 Sherry Party (Senior Common Room)

Further details may be obtained from Dr. P. J. McCarthy, School of Mathematical Sciences, Queen Mary College, Mile End Road, London E1 4NS.

# LONDON MATHEMATICAL SOCIETY

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S. M. Rees (Liverpool)  
**RATIONAL AND DENJOY MAPS  
OF DEGREE TWO**

C. M. Series (Warwick)  
**DIOPHANTINE APPROXIMATION ON  
HECKE GROUPS**

FRIDAY, 17 January, 1986 at 3.30 p.m.

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

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

## 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 Programme 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 about a year in advance, so suggestions under this scheme should normally be made with at least 12 months' notice.

### *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. Exceptional 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, making ten such grants in 1985.

### *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 intends in future 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 1986.

# LONDON MATHEMATICAL SOCIETY

## Notice of General Meeting

**There will be a General Meeting of the Society on Friday 17 January, 1986 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-Law 1,2 and to substitute that printed below.**

**The new By-Law, if accepted, will make it possible for a President of the Society to be elected to a third year of office.**

### *Text of the Proposed By-Law 1,2*

No President or Vice-President shall hold the same office for more than such consecutive period as shall be determined by these By-Laws. In the case of a President, this period shall be of three years, and, in the case of a Vice-President, it shall be of two years. Each shall, however, be eligible for re-election to that office after the lapse of a period of one year.

C. J. Mulvey,  
Council and General Secretary.

## MATHEMATICS AND THE COMPUTER SCIENCE CURRICULUM

Last June LMS Council decided to set up a Computer Science Committee. The committee held its first meeting on 1 October 1985, when a wide range of issues was discussed and some tentative priorities for action by the LMS were agreed. One particular concern was the question of mathematics teaching for computer science undergraduates, and it was agreed that the chairman of the committee should prepare a report summarising recent developments in this area.

Most university Departments of Computer Science started life as offshoots of Mathematics Departments, and in the early days the curriculum in Computer Science reflected this fact, being heavily weighted towards Numerical Analysis. In the 1970s the rapid growth of Computer Science, and its establishment as an independent academic discipline, led to a reaction against mathematics in the curriculum. However, in recent years the climate of opinion has tended to put software engineering in the forefront of the curriculum, and this trend is now leading to new demands for mathematics courses, particularly in those areas of mathematics which are related to the design and analysis of software.

Very clear evidence of this trend can be seen in the recent proposals for foundation courses in Computer Science, published in one of the foremost journals in the field (*Communications of the Association for Computing Machinery*, vol. 27 (1984) pages 998–1001, and vol. 28 (1985) pages 815–818). Earlier curricula formulated in 1978 had reflected a rather unmathematical approach to the teaching of Computer Science at this level, but these articles take the view that "a strong mathematics foundation is an essential component of the computer science curriculum and that discrete mathematics is the appropriate first mathematics course for computer

science majors". Of course, there are clear differences between the educational systems in the USA (whence these proposals came) and the UK (where the majority of LMS members are based). However, few of the mathematical topics specified in the proposals are covered in secondary school courses in the UK, and those that are covered, such as induction, are frequently treated from a viewpoint not especially compatible with their algorithmic applications.

The proposals envisage that students specialising in computer science would take a discrete mathematics course concurrently with a basic first course in Computer Science (CS1 – Introduction to Programming Methodology) and that it should be a prerequi-site for subsequent courses such as CS2 (Program Design and Implementation). The articles describe the kind of mathematical topics which are required, and their relationship to the computer science curriculum. It follows that opportunities to teach this material to computer science students will arise, and naturally debates about whether it is to be taught by mathematicians or computer scientists will ensue. In this particular case, the usual arguments in favour of the mathematicians should apply – the desirability of a wider perspective, the need to make use of existing expertise, and so on. An additional argument here is that there is a continuing shortage of computer scientists in universities, and so it makes sense to employ those there are in teaching specialist courses in computer science, rather than ancillary mathematics.

It is to be hoped that the mathematics community will face this new challenge and be prepared to make an appropriate response.

N. L. Biggs

### L.M.S. DURHAM SYMPOSIA 1986

There will be three Symposia in 1986:

2–12 July *Non-classical continuum mechanics: abstract techniques and applications:*  
Organisers: Professor R. J. Knops, Dr. A. A. Lacey★.

Main Speakers: J. L. Ericksen, O. A. Oleinik, P. J. Olver, G. Papanicolaou, L. E. Payne, L. Tartar.

12–22 July *Transcendental number theory:*  
Organisers: Professor A. Baker, Dr. R. C. Mason★.

Main Speakers: E. Bombieri, W. D. Brownawell, W. M. Schmidt, V. G. Sprindžuk, R. Tijdeman, M. Waldschmidt, G. Wustholz.

22 July –  
1 August *Completely solvable systems in field theory:*

Organisers: Sir Michael Atiyah, Dr. E. F. Corrigan★, Dr. R. S. Ward.

Main Speakers will include: R. Baxter, V. Korepin, V. Kac, W. Nahm.

These research symposia are organised under the auspices of the L.M.S., and are supported by Research Grants from S.E.R.C. There may be a few places available for mathematicians not yet invited. Those interested should write for more information to the organisers marked ★ at the following addresses: Dr. A. A. Lacey, Department of Mathematics, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS; Dr. R. C. Mason, Gonville and Caius College, Cambridge CB2 1TA; Dr. E. F. Corrigan, Department of Mathematical Sciences, University of Durham, South Road, Durham DH1 3LE.

## COUNCIL NEWS

Amongst the matters discussed by the LMS Council at its meetings in June, October and November 1985 were the following:

1. Council agreed to establish an LMS Computer Science Committee, to consider and to advise Council on all matters concerning the interaction of mathematics with computer science. The Committee, under the chairmanship of N. L. Biggs, presently consists of R. Brown, P. Holgate, J. B. Paris, P. A. Samet, and J. C. Shepherdson, with further appointments still to be made.
2. Council agreed to extend significantly the role of the LMS Popular Lectures Committee, to include all matters concerning promoting the understanding and appreciation of mathematics and its place in society by the general public. In 1986 the existing Popular Lectures series will be expanded to include lectures in Leeds, as well as at the existing venue of Imperial College, London. It is hoped that there will also be an LMS Lecture at the Annual Meeting of the British Association to be held at Bristol. An attempt is being made to bring to the United Kingdom the successful exhibition *Horizons mathématiques* which has been touring France and other countries for the last few years.
3. Council decided that a Society Meeting should be held at the International Congress of Mathematicians at Berkeley in August 1986, in order to admit members to the Society. In connection with the ICM, Council approved the allocation of a grant of £1000 to the International Mathematical Union's fund which provides assistance for mathematicians from developing countries in attending the Congress. It was also agreed that a response would be made to the request of the World University Service for the donation of periodical subscriptions to the University of El Salvador, with the gift of a year's subscription to the Bulletin of the LMS.
4. The following appointments were made by Council:

S. Burns and A. R. Camina to the LMS Education Committee for the period from 1 January 1986 to 31 December 1990; I. R. Porteous succeeds N. L. Biggs as Secretary of LMS Education Committee with effect from 1 January 1986; J. C. Robson to the LMS Popular Lectures Committee for the period from 1 January 1986 to 31 December 1990; I. R. Porteous to be the LMS Representative on the Joint Mathematical Council for the period from 1 January 1986 to 31 December 1987; R. Y. Sharp and E. C. Zeeman to serve on the LMS Programme Committee, in succession to G. R. Allan and D. R. J. Chillingworth; E. B. Davies to serve on the LMS Publications Committee, in succession to B. E. Johnson, for the period from 1 January 1986 to 31 December 1990; N. H. Bingham was reappointed Book Reviews Editor for the period from 1 January 1986 to 31 December 1990. It was also agreed that C. J. Mulvey would represent the Society at the meeting of the European Mathematical Council Data Base Committee held at Oberwolfach in November 1985, that A. J. Ellis would represent the Society at the 50th Anniversary Meeting of the Chinese Mathematical Society held in Shanghai in December 1985, and that J. B. Paris would represent the Society at a seminar being organised by the International Committee of Scientists for Soviet Refuseniks in January 1986.

5. Council agreed to convene a Meeting of Heads of Departments of Mathematics at the Royal Society at the end of January 1986 to consider a number of important issues concerning the future of the Universities in the United Kingdom and relating to teaching and research within their Departments of Mathematics. The meeting will be chaired by the President of the Society, and its Agenda will be drawn up by J. M. Howie, in collaboration with those heads of Departments who are members of Council.

C. J. Mulvey,  
Council and General Secretary.

## LOGIC COLLOQUIUM '86

Logic Colloquium '86, will be held in the University of Hull, England, from 14–19 July, 1986. This meeting will be co-sponsored by the British Logic Colloquium and by the University of Hull. It will be the 1986 European Summer Meeting of the Association for Symbolic Logic.

*Topics:* We hope to have parts of our programme devoted to Set Theory, Model Theory, Recursion Theory, Theoretical Computer Science, Natural Language Semantics, History of Logic, Logic Teaching Systems and Philosophy of Logic. We plan short series of introductory lectures on the topics of Theory of Logic Programming and Natural Language Semantics. Speakers invited include: Jan Bergstra, Chantal Berline, Sam Buss, Keith Devlin, Erwin Engeler, Sy Friedman, Dov Gabbay, Robin Gandy, Peter Gibbins, C. Ward Henson, H. Jerome

Keisler, Richard Laver, Angus Macintyre, Gregory Moore, Mike Prest, Michael Richter, John Shepherdson, Viggo Stoltenberg-Hansen, Stevo Todorovic, Philip Welch, Kit Fine.

*Contributed papers* are invited from all areas of Logic. Abstracts of no more than one page should be sent to F. R. Drake (address below) by 1 April, 1986. Abstracts accepted from members of the ASL may be published in the report of the meeting in the Journal of Symbolic Logic.

*Further information* will be sent in due course to those writing to Dr. F. R. Drake, Logic Colloquium '86, School of Mathematics, University of Leeds, Leeds LS2 9JT.

## UNIVERSITY OF EL SALVADOR

The University of El Salvador is trying to recover after four years of military occupation of its campus. Support from the British academic community for its reconstruction is channelled through the Friends of the University of El Salvador, under the organization of the World University Service, London.

The Friends of the U.E.S. have appealed for donations of subscriptions to journals in order to re-establish the library, over half of which was looted or destroyed. At its meeting on 15 November 1985, Council agreed to donate one year's subscription to the *Bulletin*. Members are invited to continue this support by making donations towards subscriptions for future years, or towards subscriptions to other journals.

Further details may be obtained from Liz Morrell, Friends of the University of El Salvador, 20 Compton Terrace, London N1 2UN, to whom offers of donation should initially be addressed.



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**Announcement of Opening**  
**BARNARD COLLEGE OF**  
**COLUMBIA UNIVERSITY**  
**New York, New York 10027**

Barnard College of Columbia University announces a new senior level position, starting in the 1986–87 academic year, as part of its program to build an outstanding mathematics department for talented women undergraduates, within the framework of an urban coed university. In addition to a commitment to this aim, candidates should present a distinguished record in scholarly research and teaching. Salary and terms will be competitive.

Candidates should send curriculum vitae and the names of three references to Professor Joan Birman, Chairperson, Department of Mathematics, Barnard College, Columbia University, New York, New York 10027. The deadline for applications for the fall of 1986 is 31 January, 1986.

**UNIVERSITY OF GLASGOW**  
**Department of Mathematics**  
**RESEARCH ASSISTANTSHIP (1A).**

Applications are invited for this SERC-supported post. The appointee will work with Dr. N. J. Young on a project on the numerical solution of certain interpolation/approximation problems which arise in control engineering. Candidates should have or expect soon to have a Ph.D. in a relevant branch of mathematics or engineering. The appointment *will be on* the 1A scale (£7,820–£12,636) and for a duration of approximately 3 years, starting on 1 April, 1986. Applications, including a curriculum vitae and addresses of three referees, should be sent by 31 January to Dr. N. J. Young, Department of Mathematics, Glasgow University, Glasgow G12 8QW, from whom further particulars of the project may be obtained.

## 1986 LMS PRIZES

In Summer 1986 the Council proposes to award a De Morgan Medal, a Senior Berwick Prize, and one or more Junior Whitehead Prizes. Accordingly, it has appointed P. M. Cohn, D. J. H. Garling, I. M. James, R. Penrose and E. C. Zeeman to the 1986 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 1 March 1986. 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 De Morgan Medal is awarded to a mathematician who is normally resident in the United Kingdom on 1st January 1986. The sole grounds for the award of the Medal is the candidate's contribution to mathematics. The Senior Berwick Prize is awarded to a mathematician who is a member of the Society on 1 January 1986 in

respect of a piece of work actually published by the Society in any of its publications during the period from 1 January 1982 to 31 December 1985. The Junior Whitehead Prizes are awarded to mathematicians who on 1 January 1986 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 members 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 Divisions, University of Sussex, Falmer, Brighton, BN1 9QH.

## TAYLOR TO BRANNAN

The following is an extract of a letter from S. James Taylor (University of Virginia) to David A. Brannan (Open University):

"At U. Va. we are fortunate in having achieved the reputation of being one of the best State Universities for undergraduate training, so that those who care about the quality of their first degree and cannot afford \$9,000 tuition in the Ivy League are knocking on our door. We also have a Mathematics Faculty that are vigorous and active in research and the atmosphere in the department is a happy one.

"Our next priority is to try to build up our graduate program by attracting more good quality students. This is why I am writing to you because you may be able to help us, while at the same time finding the right solution for one of your students. There are two main differences between the U.S. and U.K. systems for training Ph.D.'s. The first is that students here are required to pursue

mathematical studies in greater breadth than is normal in the British Hons B.Sc. system before specializing in a particular research topic. The other is that most students can finance themselves completely by some mixture of fellowships, grants, and work as a T.A. (usually teaching elementary undergrad courses). It is quite practical for a U.K. student to finance himself while a graduate student from funds available here.

"So if you know of potential mathematicians who should do a Ph.D. and

- (i) either cannot get support in U.K. because of failing to meet an SERC hurdle, or
- (ii) for whom an American type training is more appropriate,

please do consider U. Va. as one of the places you can recommend – and encourage them to apply to us. The earlier we get an application the better, but our normal deadline is 1 February for starting 1 September."

## EXCHANGE POSTS

An American professor of mathematics seeks to exchange his teaching duties and house in the United States with an individual having similar duties in England for the 1986–87 academic year. The average teaching load is 9 class hours per week for 2 fourteen-week semesters. A variety of courses are possible. His research interests are in probability, linear algebra, and the location-allocation problem. For more information contact John H. Drew, Dept. of Math., College of William and Mary, Williamsburg, Virginia, 23185, USA. (Phone

804–253–4481 (work) or 804–229–9596 (home)).

Similar exchanges in the past between William and Mary and English universities have used the following financial arrangement. The William and Mary professor is paid the English professor's salary by the English university. William and Mary pays the English professor a salary determined by negotiation with the Dean, based on experience and other professional qualifications.

## VARIATIONAL METHODS IN NONLINEAR PROBLEMS

A "Séminaire de Mathématiques Supérieures - NATO Advanced Study Institute" will be held at the Université de Montréal from 7 - 25 July 1986.

The Seminar is 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.

The Principal Speakers will be:

V. Benci (Pisa): *The Conley Index and Functional Analysis*.

H. Berestycki (Paris XIII): *Méthodes variationnelles directes dans des problèmes elliptiques non linéaires et applications*.

H. Brézis (Paris VI): *Méthodes topologiques dans les problèmes variationnels avec défaut de compacité*.

A. Cellina (Trieste): *Non-Convexity in Differential Inclusions*.

F. H. Clarke (Montréal): *Nonsmooth Analysis and Variational Methods*.

E. De Giorgi (Pisa): *Nouveaux problèmes dans le calcul des variations*.

I. Ekeland (Paris IX Dauphine): *The Mountain-Pass Theorem*.

E. Fadell (Wisconsin-Madison): *Cohomological Techniques for Non-Free G-Actions and the Lusternik-Schnirelman Method*.

A. Granas (Montréal): *On Some General Principles in Convex Analysis*.

A. Marino (Pisa): *Équations d'évolution et multiplicité de points stationnaires en présence d'un obstacle*.

J. Mawhin (Louvain): *Points critiques et équations différentielles ordinaires*.

P. H. Rabinowitz (Wisconsin-Madison): *Minimax Methods in Critical Point Theory and Applications*.

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.

## SYMBOLIC BRONZES BY JOHN ROBINSON

Visitors to London may like to visit the Freeland Gallery, 18 Albemarle Street, W.1, to see some remarkable symbolic and representative bronzes by John

Robinson, which include some with a definite mathematical content, including for example a (5,3)-torus knot, called *The Rhythm of Life*.

## 1985 COUNCIL ELECTIONS

At the Annual General Meeting on 15 November 1985 the following members were elected to Council: I. M. James (President); D. E. Edmunds and J. M. Howie (Vice-Presidents); R. L. E. Schwarzenberger (Treasurer); C. J. Mulvey (Council and General Secretary); A. R. Pears (Meetings and Membership Secretary); J. S. Pym (Publications Secretary); P. A. Samet (Librarian); J. B.

Paris, R. Penrose, R. Y. Sharp, P. Vamos, J. D. M. Wright, E. C. Zeeman (Members-at-Large, 2-year terms). W. N. Everitt, D. J. H. Garling, P. Holgate, C. Kosniowski, and E. C. Lance are Members-at-Large whose terms expire in 1986.

C. J. Mulvey,  
Council and General Secretary.

## LMS 1985 PRIZES

The Junior Berwick Prize is awarded to C. J. Read for his work on the construction of an example of a bounded linear operator on a Banach space, having no non-trivial, closed, invariant subspace.

Junior Whitehead Prizes are awarded to P. J. Rippon

for his work on harmonic functions in the disc, and to D. Segal for his work in group theory.

C. J. Mulvey,  
Council and General Secretary.

## FRONTIERS OF CHAOS

The exhibition *Frontiers of Chaos* will be at the Nuffield Theatre, Southampton University for the week 3rd-8th

February, 1986 further details from David Chillingworth (0703 559122 ext 3677) or David Whitley (ext 3673).

## PATTERN REFERENCES

Issue 122, October 1985 of the LMS Newsletter contained a pattern and question by David Singmaster.

The following references have been supplied by L. H. Lange (San Jose State University, California, USA):

*Mathematics and the Imagination* by E. Kasner and J. Newman (pp. 310–312), *American Mathematical Monthly*, March 1959 (p. 242).

## BERNOULLI SOCIETY

The First World Congress of the Bernoulli Society in Mathematical Statistics and Probability will take place in Tashkent, U.S.S.R., 8–14, September, 1986.

The programme covers a wide range of topics in theoretical and applied statistics and probability theory.

There may be limited financial support available from The Royal Society. Non Government supported scientists normally resident in the U.K. and of Ph.D. status

wishing to apply for such support, are asked to write to Professor Sir David Cox (Department of Mathematics, Imperial College, Huxley Building, 180 Queen's Gate, London, SW7 2BZ) by 1 February, 1986.

The Scientific Secretary of the Bernoulli Society, is Professor R. Sibson, Statistics Group, School of Mathematics, University of Bath, Bath, Avon, BA2 7AY.

## CHARTER CENTENARY CONFERENCE

An international conference to celebrate the 100th Anniversary of the granting of the Royal Statistical Society's Royal Charter will be held in Cambridge on 8–10 April 1987. The theme of the conference is *Statistics in Society*.

Further details will be circulated in due course and an application form about September 1986. In the meantime potential participants are requested to make a note of the date and location.