## THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 199

### November 1992

#### FORTHCOMING SOCIETY MEETINGS Friday 20 November 1992, Burlington House Annual General Meeting J.F.C. Kingman, P. Whittle

Friday 11 December 1992, University of Warwick Memorial Meeting for Rolph Schwarzenberger S. Pirie, S.A. Robertson, D.O. Tall, E.C. Zeeman Friday 15 January 1993, Burlington House Friday 19 February 1993, York Friday 19 March 1993, Burlington House Thursday, Friday 13-14 May 1993, Cambridge Friday 18 June 1993, Burlington House

#### **THE 1993 HARDY LECTURER**

As was announced in the May issue of the Newsletter, Professor Walter Feit has accepted the Society's invitation to be the Hardy Lecturer for 1993. Walter Feit graduated from the University of Chicago in 1951 and was awarded the Ph.D. degree by the University of Michigan in 1954. He was affiliated to Cornell University from 1953 until 1964 when he was appointed Professor of Mathematics at Yale University. He has held Visiting Professorships at many institutions, including Cambridge, Oxford and Warwick. Professor Feit's outstanding contributions to mathematics have been recognised inter alia by the award of the Cole Prize in Algebra by the American Mathematical Society and election to the National Academy of Sciences of the U.S.A.

Professor Feit will be visiting the U.K. for four weeks beginning around 20 May 1993 and will give about twelve lectures including the 1993 Hardy Lecture to the Society on Friday, 18 June 1993. The list of topics on which he is prepared to lecture is given below. Institutions that wish to invite Professor Feit to give a lecture should write to Dr D.J. Collins, School of Mathematical Sciences, Queen Mary and Westfield College, Mile End Road, London E1 4NS by 31 December 1992, indicating first and second choices of lecture topics. It is expected that many more invitations will be received that can be accepted and neighbouring institutions are strongly encouraged to submit joint invitations. The itinerary and lecture title at each venue will be decided by the Society's Programme Committee in consultation with Professor Feit and the host institutions.

Lecture Topics: Steinberg characters; The number of characters in a block; The existence of algebraic number fields with given Galois groups; Maximal subfields of central division algebras over number fields; Representations of quivers and the generalised McKay correspondence.

The final topic "Representations of quivers and the generalised McKay correspondence" will be the subject of the Hardy Lecture at the Society meeting in London on Friday 18 June. Departments within reach of London are therefore encouraged to choose from amongst the other topics.

#### MATLAB AND MATHEMATICA

**MATLAB.** A one day course being held on 16th November 1992 provides hands-on experience of the MATLAB package, accompanied by an in-depth presentation of case studies from Signal Processing, Control System Design Numerical Computations, Splines and Optimization.

**MATHEMATICA.** A one day course being held on 17th November 1992 provides handson experience of Mathematica with illustrative case studies drawn from scientific and engineering applications.

Course Fee: £150 (Academic Staff: £112.50, Research Staff: £75). For further details, contact Mrs. P. M. Moore, Applied and Computational Mathematics Group, Royal Military College of Science, Shrivenham, Wilts., SN6 8LA, telephone (0793) 785317, email: sastry@uk.ac.cran.rmcs

#### **RETIREMENT OF J.R. RINGROSE**

A meeting to mark the retirement of Professor J.R. Ringrose FRS will be held in Newcastle starting at 3 pm on Friday 24th September and finish at 12.30 pm on Saturday 25th September 1993. We plan to have talks on topics which have interested John given by people closely associated with him. It is intended that the talks should be of a survey nature and accessible to Pure Mathematicians without a specialised knowledge of the subjects concerned. Further details can be obtained from Professor B.E. Johnson, Department of Mathematics and Statistics, University of Newcastle, Newcastle upon Tyne NE1 7RU.

#### SÉMINAIRE DE MATHÉMATIQUES SUPÉRIEURES NATO ADVANCED STUDY INSTITUTE

A seminar on Complex Potential Theory will be held at the Université de Montréal from 26th July to 6th August 1993. The seminar is held with the support of NATO, the Natural Sciences and Engineering Research Council of Canada, and the Université de Montréal. The principal speakers are B. Aupetit (Laval), K. Diederich (Wuppertal), J.E. Fornaess (Michigan, Ann Arbor), T.W. Gamelin (ULCA), P.M. Gauthier (Montréal), C.O. Kieselman (Uppsala), J. Korevaar (Amsterdam), N. Sibony (Orsay), N. Tarkhanov (Krasnoyarsk), J. Verdera (Barcelona), E. Vesentini (Pisa), J. Wermer (Brown). Partial financial assistance will be available. Priority will be given to graduate students. Requests for participation or financial assistance must be received before 15th March 1993. Further information is available from G. David, Secretary, Department of Mathematics & Statistics, Université de Montréal, C.P. 6128-A, Montréal, Quebec, Canada H3C 3JF, fax (514) 343-5700.

#### **MODEL THEORY AND GROUPS**

A meeting on Model Theory and Groups is to be held on Saturday 12th December 1992 at The Queen's College, Oxford. Speakers and titles of their talks are: C. Morgan, 'Large locally finite groups and amalgamations', (11.00-12.00); A. Ivanov, 'Finite covers of strictly minimal sets' (12.00-1.00); A. Borovik, 'Recent developments in groups of finite Morley rank' (2.30-3.30); R. Archer, 'Automorphism groups of Boolean powers' (4.00-5.00).

All are very welcome. There is a registration fee of £4.00 (£2.00 for students). For further details, contact Richard Kaye, Jesus College, Oxford (email: kaye@vax.ox.ac.uk) or Dugald Macpherson, QMW (email: dugald@qmw.ac.uk.). The meeting is receiving financial support from the London Mathematical Society.

## LONDON MATHEMATICAL SOCIETY

## **ANNUAL GENERAL MEETING**

## FRIDAY 20 NOVEMBER 1992 at 3.00

P. Whittle, FRS (Cambridge) will speak at 3.10 on

Large-deviation Theory; Manifestations Old and New

J.F.C. Kingman, FRS (Bristol) will give his Presidential Address at 5.00 on

Poisson Processes and Random Sets; Thoughts on a Theorem of Rényi

Tea will be served at 4.10. The meeting will be held at the Geological Society Burlington House, Piccadilly, London W1.

All interested are very welcome.

PLEASE NOTE EARLY START AT 3.00 pm

#### SERC AWARDS

#### **Research Grants**

Baker, C., Manchester. Numerical analysis and parameter estimation for functional differential equation models.

Budd, C., Wathen, A., Bristol. Numerical analysis of nonlinear effects in elliptic partial differential equations in 3-dimensional domains.

Bullet, S., QMW. Correspondences, Kleinian groups and rational maps.

Burmester, M., RHBNC. Efficient witness hiding protocols and signature schemes. Cassels, J., Cambridge. Quadratic forms. Edmunds, D., Elliott, C., Sussex. Topics in partial differential equations.

Edmunds, D., Sussex, Evans, D., Swansea. Function spaces and their applications. Elworthy, K., Warwick. Stochastic flows and related topics.

Epstein, D., Warwick. A Thurston conjecture. Evans, D., Swansea. Structure of amenable C\*-algebras.

Evans, W., Cardiff, Edmunds, D., Sussex. Weighted norm inequalities and applications. Evans, W., Brown, B., Cardiff. Workshop on computational techniques in spectral theory and related topics.

Evans, W., Cardiff. *Eigenvalues of Schrödringer and Dirac operators.* 

Gaster, M., Crighton, D., Cambridge.

Characterization of nonlinear boundary layer instabilities using a dynamical systems approach.

Green, M., Hull, C., QMW. Mathematical problems in relativistic string theory. Goddard, P., Cambridge. Quantum groups and conformal field theory.

Hannabuss, K., Oxford. Infinite dimensional groups, Riemann surfaces and operator algebras.

Heckl, M., Abrahams, I., Keele. *Development* of active control of wheel squeal from a nonlinear dynamical systems analysis. Hall, P., Manchester. *Nonlinear* 

hydrodynamic instabilities and vortex-wave interaction theory.

Higham, N., Manchester. *Numerical stability in matrix computations*.

Howie, J., Heriot-Watt. *Workshop on* geometric and combinatorial methods in group theory.

Howison, S., Oxford. Free boundary problems in heat and mass transfer.

Hudson, R., Nottingham. Quantum stochastic differential equations and the weak coupling and low density limits.

Jerrum, M., Edinburgh. Research programmes "Randomness and computations" and "Algebraic graph theory". Johnstone, P., Cambridge. 2-categories in computer science.

Jones, C., Zhang, K., Exeter. *Convection in rotating spherical shells*.

Landsman, N., Cambridge. Development and applications of the algebraic theory of superselection sectors.

Lansbury, A., Brunel. Geometric phase portrait analysis of dynamical systems. Mackay, R., Warwick, Mullin, T., Oxford. Topology from turbulent time series. Macintyre, A., Wilkie, A., Oxford. 0-minimal theories and p-adic analogues: examples, structure theorems and applications. McPherson, H., QMW. C-minimal structures, and other variations on 0-minimality. Merkin, J., Leeds. Mathematical modelling of reaction-diffusion waves in films and membranes.

Moss, I., Toms, D., Newcastle. Quantum gravity and the early universe III.

O'Neill, M., UCL. Impeded flow of viscous fluid through tubes.

Penrose, O., Carr, J., Heriot-Watt. *Kinetics of mixed micelle formation and ionic crystal nucleation.* 

Pedley, T., Leeds. Numerical simulation of peristaltic pumping.

Pilling, M., Brindley, J., Merkin, J., Leeds. A dynamical systems approach to reduced models of complex chemical reactions.

Plymen, R., Manchester. Operator K-theory and representation of p-adic groups. Ranicki, A., Edinburgh. K-theory and the Novikov conjectures.

Reade, J., Manchester. Integral operators eigenvalues and entropy numbers. Rees, S., Liverpool. Investigation of a

parameter space of rational maps.

Reid, M., Warwick. Algebraic surfaces.

Riley, D., Bristol, Mullin, T., Oxford. A study of free convection in low Prandtl number fluids subject to applied magnetic fields.

Robinson, D., KCL. *New variables, classical and quantum gravity.* 

Scholl, A., Durham. Complex dynamics - LMS Durham Symposia. Scholl, A., Durham. Analytic and geometric aspects of hyperbolic space - LMS Durham Symposia.

Sleeman, B., Dundee. *Hamiltonian dynamical* systems.

Straughan, B., Glasgow. *Improperly posed* problems for parabolic partial differential equations.

Streater, R., KCL. Wavelet transforms. Suli, E., Morton, K., Oxford. Analysis of finite volume schemes for nonlinear hyperbolic conservation laws in two dimensions. Taormina, A., Durham. Modular invariant partition functions for N=4 superconformal field theories.

Van der Berg, M., Heriot-Watt. Heat equation and spectrum of the Laplace operator. Whiteman, J., Brunel. The analysis of locking and robustness for problems of linear elasticity and elasto-plascity. Williams, H., Southampton. Computational logic applied to integer programming. Willis, J., Bath. Studies in nonlinear hypersingular integral equations. Willis, J., Bath. The overall sink strength of inhomogenous lossy media and related problems.

#### **INTERNATIONAL MATHEMATICAL OLYMPIAD: MOSCOW, JULY 1992**

Mathematical Olympiads in the UK are run by the *British Mathematical Olympiad Committee* - an independent group which the LMS helped to establish in 1991. They are concerned to encourage a broad range of young mathematicians. As part of these activities they are responsible for the selection and training of the team which represents the UK at the IMO each July.

This year's UK team of Oliver Johnson (King Edwards School, Birmingham), Robin Michaels (Haberdashers Askes Boys School), Eva Myers (Streatham Hill & Clapham High School), Karen Page (South Bromsgrove High School), Luke Pebody (Rugby School), Mark Walters (The Weald School) performed superbly well to come 5th out of 58 officially competing countries. Mark Walters (11th overall) and Eva Myers (14th) received Gold medals. Robin Michaels and Luke Pebody (joint 47th) received Silver medals, and Oliver Johnson (88th) and Karen Page (96th) received Bronze medals. There were 351 official contestants.

The problems were hard and the marking was extremely tough. Most other countries arrange extensive training for their teams. The UK team is selected after a three day residential session in April for 20 students (currently held in Trinity College, Cambridge), and has to fit in what training it can bY correspondence during the A level exam period. Success therefore depends very much on the students doing their own work with limited assistance from their mentors - the team Leader, Tony Gardiner (University of Birmingham) and the Deputy Leader Christopher Bradley (Clifton College). The most pleasing thing about this years's team was the way they helped each other.

The IMO consists of two 4½ hour papers with three problems on each paper; each problem is worth 7 marks. The team from PR China scored 240 out of a maximum possible 252; USA (187) were second, Romania (177) were third, CIS (176) were fourth, and UK (168) were fifth, followed by Russia (158), Germany (149), Japan (142), Hungary (141), France and Vietnam (139).

Anyone who would like a copy of the problems should contact me (021 414 6579). I would be particularly interested to hear from colleagues who might like to contribute to the activities of the BMOC.

**Tony Gardiner** 

#### **ANNUAL DINNER**

The 1992 Annual Dinner will be held after the Annual General Meeting on Friday 20th November at 6.30 pm for 7.00 pm at the United Oxford and Cambridge University Club, 71 Pall Mall, London SW1. The cost is £26.00 per person and members may book places for guests. The booking form enclosed with the October Newsletter, should be returned together with payment to the London Mathematical Society office by Friday 13th November.

#### SALEM PRIZE

The Salem Prize for 1992 was awarded to Dr Mitsuhiro Shishikura, from the Tokyo Institute of Technology, for his work on complex dynamics and the Mandelbrot set. The prize established in 1968, is given every year to a young mathematician who is judged to have done an outstanding work in the field of interest of Raphaël Salem, primarily on Fourier series and related topics. The jury consisted of Professor J. Bourgain, Professor V. Havin, Professor Y. Katznelson and Professor E.M. Stein.

#### THE DEVELOPMENT OF BRITISH MATHEMATICS 1860-1940

The study of mathematics in Britain grew significantly in the second half of the 19th century and the first half of the 20th century. From being a country somewhat isolated from contemporary developments in mathematics, Britain became a recognised centre of excellence in many branches of pure and applied mathematics. Yet the history of modern mathematics in this country has so far eluded a coherent and systematic analysis, and there has been no attempt to survey the archival sources upon which such a study might be based. June Barrow-Green has been awarded a research fellowship by The Leverhulme Trust to work with Dr Jeremy Gray at The Open University on the development of mathematics in Great Britain from 1860 to 1940. Among the objectives are to establish a database of archival, published and unpublished sources relating to the growth of mathematics in Britain during the period and to compile a database of biographies of mathematicians and mathematical departments. Information relating to the collection of this material would be appreciated. If you know of any such sources, please contact June Barrow-Green at the Faculty of Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA, telephone 0908-652351 or 071-226 4555.

#### SITES OF SCIENCE

David Firnberg, a Member of the Foundation for Science & Technology, is preparing what is believed to be the first scientific guide book on UK sites of science and is asking for assistance in locating the sites. He is backed by COPUS. He explains that as well as old castles and guaint villages, we also have a great deal of modern science and technology to be proud of. Do you know of any sites that should be considered for inclusion in "Sites of Science"? If so contact David Firnberg at Home Farm, Ludgershall, Aylesbury, Bucks HP18 9NY, telephone 0844 238 600, fax: 0844 238 660.

#### **RALPH BOAS**

Emeritus Professor Ralph P. Boas of Northwestern University died on 25th July 1992 at the age of 79. He was elected a reciprocity member of the London Mathematical Society on 16th June 1938.

#### **DANIEL GORENSTEIN**

Professor Daniel Gorenstein of Rutgers University died on 26 August 1992 aged 69.

#### **LESLIE FOX**

Professor Leslie Fox, formerly Professor of Numerical Analysis and Director of the Computing Laboratory at Oxford University, died on 1st August 1992 aged 73.

#### JOHN TYRRELL

Dr John A. Tyrrell, formerly of King's College London, who was elected a member of the London Mathematical Society on 15th January 1959 died on 13th September 1992. He served on the London Mathematical Society Council from 1969-73 and was Secretary from 1970-73.

#### JOHN LEECH

Professor John Leech of the University of Stirling died on 28th September 1992 at the age of 66. He was elected an ordinary member of the London Mathematical Society on 13th December 1955.

## THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

The Fields Institute for Research in Mathematical Sciences invites applications for Institute Junior Fellowships for the 1993-94 program year. These fellowships will be tenable for two years, the second of which being held at McMaster University, the University of Toronto or McGill University. Candidates should possess a PhD degree in mathematical sciences and have a strong research record. Partial support may also be available for a limited number of additional participants and graduate students working in the program area.

For the 1993-94 academic year the topic of concentration is L- Functions. The organising committee for the programme consists of Manfred Kolster and Victor Snaith (McMaster University), Kumar Murty (University of Toronto) and Ram Murty (McGill University) supplemented by an advisory panel of Spencer Bloch (University of Chicago), John Coates (University of Cambridge), and Martin Taylor (University of Manchester Institute of Science and Technology).

Applications, including curriculum vitae and three letters of reference sent directly to the Institute on your behalf, should be sent by January 15, 1993 to: Dr J.E. Marsden, Director, The Fields Institute for Research in Mathematical Sciences, 185 Columbia Street. W., Waterloo, Ontario, Canada N2L 5Z5.

The Institute is a collaboration involving McMaster University, the University of Toronto, the University of Waterloo and affiliate universities across Canada. It is supported by the Ministry of Colleges and Universities of Ontario and the National Sciences and Engineering Research Council of Canada.

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#### **Stopping Times and Directed** Processes

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The notion of 'stopping times' is a useful one in probability theory. This book presents this technique in the context of the directed set, stochastic processes indexed by directed sets, and many applications in probability, analysis, and ergodic theory. £35.00 net HB 0 521 35023 5 416pp. 1992 Encyclopedia of Mathematics and its Applications 47

### **Designs and their Codes**

#### E. F. ASSMUS JR. and J. D. KEY

The authors begin with five chapters that give a fairly thorough general background in both design and coding theory, and develop the relationship between the two areas. The last three chapters treat applications of coding theory to some important classes of designs, namely finite planes, Hadamard designs and Steiner systems, in particular the Witt systems.

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#### MATHEMATICS AND COMPUTING

This month's column is devoted to a review of MacFourier. MacFourier offers a comprehensive and easily used tool for learning about the Fourier transform, its applications and related topics. The program can generate a number of standard functions, with user control over amplitude, frequency and phase, as well as user specified functions. A range of operations are available to be applied to the functions.

Produced by a group in Australia and published by Oxford, MacFourier makes good use of the user-friendly features of the Macintosh interface. A palette of commands, operations and actions, illustrated bv appropriate icons, reduces almost to zero the time needed to get started with the package. A help facility is available to smooth the path further, while menu items give access to dialogues which can provide finer control over the accuracy of the computations and other features. Four main windows, which can be viewed all together or separately, show the real and imaginary parts of a function, and the corresponding transforms. For display purposes, the user can choose between a line graph, points and a filled curve. A further two windows can show the power spectrum and Hartley transform, while the intriguing Audio... viewing option allows the waveform to be listened to!

To take MacFourier through its paces, I tried presenting it with some real data, a very long time series of a Lorenz attractor with noise, on a 4MB MacPlus with MultiFinder. It took me a little while to realise that the palette input-output only works for MacFourier standard text files. Mine, which had been dragged through kermits and word processors on the way (the latter were not necessary), could only be read in using the Open... dialogue with TEXT selected. Once the data was read in (and MacFourier stopped reading at its maximum of 1024 points), the transform and power spectrum were calculated. Although data storage size is mentioned. I did not seem to be able to discover from the documentation how much memory may be needed when MacFourier is working. There occurred a sudden reboot when scrolling the newly calculated transform. This was not repeated when I closed down the two word processors which had still'been running, and tried again.

The MacFourier manual provides four distinct sections, the first being a tutorial. This takes the user through a series of exercises. The early examples show Fourier transforms of simple periodic functions, enabling the user to get a feel for the way the transforms work, for instance with even or odd functions, and with real or imaginary components. Later, non-periodic and complex functions are investigated. A further section suggests examples of a variety of operations on functions, such as addition, multiplication and convolution. The final part of the tutorial section contains a collection of exercises which allow the user to gain deeper insight: showing how a square wave is the sum of a series of sine waves; demonstrating amplitude and frequency modulation; looking at auto-correlation; diffraction by slits; high frequency filters; and many more besides. Just enough mathematical explanation is given to whet the appetite for more, and the user who has plastered the screen with a hopelessly complicated collection of windows full of transforms and convolutions can readily wipe the slate clean with a Reset All command.

A concise but sufficient reference section follows the tutorial, and explains each palette button and menu item. Here, the numerical accuracy of the program is specified, along with details of how external data must be formatted for input to MacFourier. There is also information on display modes, window organization and printing of graphs and data.

The third section of the manual goes into more detail on the construction of functions required by the user. This can be done by importing externally generated data, or by use of the built-in functions, or by combining the two. Modifications to functions can be introduced manually by the user. There are a number of more demanding exercises prompting the user to learn various techniques for enhancing features of wave functions, including filtering, differentiation and smoothing.

The final section contains an encyclopaedia

of ideas and concepts connected with Fourier analysis and associated subjects. Here the user can browse, or clarify some elusive definition, or read up on the way in which Fourier methods are applied in physics or electronics or whatever. More mathematical detail is provided as background to the various operations and transforms which the user performs experimentally on the computer.

What more can one say, except that my fourteen year old son already has his eye on it, and in a world with far too many mesmerizing computer games, that must be a good recommendation!

> Catherine Wattebot (e-mail: ceh@uk.ac.warwick.maths)

#### THE SEVENTH INTERNATIONAL CONGRESS ON MATHEMATICS EDUCATION

The First International Congress on Mathematics Education was held in Lyons in 1969. (Since then ICMEs have been held "Olympics" years, two years away in from ICMs.) The then President of the International Commission on Mathematics Instruction, Hans Freudenthal, perceived a need for a forum in which matters relating to mathematics education could be professionally presented and debated. feeling that the slot traditionally given to ICMI at the ICMs no longer sufficed. A vestigial education section still appears on the ICM programme, but nowadays few mathematics educators attend these meetings. Perhaps it is also not surprising that few mathematicians were amongst the 3500+ attending ICME 7, held in Quebec, 17th 23rd August 1992. Even so, UK mathematics departments and the LMS Education Committee were particularly poorly represented.

Reasons for non-attendance are easy to give: the European Congress, shortage of funds and, it must be admitted, an unwillingness to subject oneself to what can easily turn out to be a barrage of witter and classroom anecdotes. Yet can the university mathematician afford to neglect what is happening in mathematics education? Certainly, we in the UK cannot. Despite the vast increase in the numbers of undergraduates, the number of mathematics degrees awarded in the last decade has hardly changed, and that number conceals a great movement away from specialist mathematics degrees to combined ones. At a school level, the number of A-level mathematics entrants in 1994 is likely to be

about half that in 1984. Far from taking advantage of the great increase in the proportion of students remaining at school post-16, we are not even attracting the same proportion of the age cohort to mathematics. The government's concerns about standards might to a considerable degree be politically motivated, but nevertheless there are real questions to be answered.

A separation of those involved in teaching mathematics into three, largely non-communicating camps. university mathematicians, mathematics educators and schoolteachers, is a recipe for even further disasters. The ICMEs (and the recently instituted B(British)CMEs planned for ICM years) provide an opportunity for the discussion of issues vital for the future of our subject: curriculum design and development at all levels, the problems of recruitment (students and teachers), of student motivation and learning, of the status and image of mathematics and mathematicians. the incorporation of new technologies into our teaching, .... It would seem essential that we attempt to learn from the experiences of others as they grapple with similar problems. There were, for instance, several presentations by US university mathematicians on their use of computers in undergraduate mathematics teaching. Attendance at such Congresses will not by itself solve problems, but it can certainly lead to a clearer identification of them.

ICME 8 will be held in Seville in 1996. I hope that UK university mathematicians will be better represented at that.

Geoffrey Howson

#### WILLIAM WALDEGRAVE LAUNCHES CONSULTATION ON SCIENCE AND TECHNOLOGY WHITE PAPER

Mr Waldegrave has identified a number of key issues which he wishes to address in a White Paper on Science and Technology. These were set out in a News Release issued by the Cabinet Office on 9th July 1992, copies of which can be obtained from the LMS Office. The White Paper is planned for publication in the early part of 1993 and views on the issues are now being sought.

So the presentation of views on the future of science and technology is encouraged, and this is a unique opportunity to convey to Government the serious situation facing Mathematics. If the role of Mathematics is not presented, the case will go by default. It is noticeable that no follow-up letter to mine on the "Crisis in mathematics" in the Independent (Sept Newsletter) was published by the Independent. Am I a voice crying in the wilderness? I have conveyed the following views in my submission.

The Government may not appreciate that University Mathematics is funded in the UK at the lowest of all subjects, except Politics and Law, and that the dependence on Service Teaching for the support of staff also has its dangers. For example, there is pressure on say Engineering to be more practical, to let the mathematics for students arise from the engineering, and so not be taught by mathematicians. In the long run, the effect will be that Engineers will not be equipped for the new conceptual and mathematical tools that will appear. In the short run, the effect will be a loss of financial support for mathematics departments, and so a smaller number of staff. and very few jobs for young mathematicians. This must affect the mathematical research base in the long term.

The level of support for Mathematics at SERC is peanuts compared with other subjects. There seems to be no clear reason why the number of say SERC Research Assistantships in Mathematics should not be comparable, say on a basis of staff numbers, to the numbers in other sciences and in engineering.

Many of our best lines get filched: a really good applicable concept and development becomes a part of the applied area, in which it is much easier to get research support. This is not the way to ensure a steady supply of new methods and a flow of mathematical expertise.

In the Government analysis of the Fourth

Framework Programme, on EC Cooperation in Science and Technology, the word Mathematics does not occur once, and there is no pressure to link with individual applications with mathematics, so as to ensure that they have a proper mathematics base, and also to stimulate the development of the relevant mathematics.

The level of UK funding for computers in mathematics is surely not appropriate to the subject which invented them in the first place, continues to make a considerable contribution to their theoretical development, and requires them for teaching and research. By contrast, the NSF in the USA has programmes for support of computational initiatives in mathematics ("Scientific Computing Research Environment for the Mathematical Sciences", Oct 2, 1991, available from stis.nsf.gov in the directory MPS/programs).

Other countries will equip departments with networks of SUNs, while we struggle to run PC Labs, without the money to pay for the new software tools in say computer algebra and computer graphics which are appearing, and without the technical support for programming and maintenance. It will not be possible for staff to use these in teaching and research without these facilities being easily available, in the same way that microscopes are regarded as a necessity for biologists. Without such developments, mathematical graduates will not be trained in the latest technologies and outlooks.

Further, Mathematics needs support for itself, and not just with a view to immediate payoff in applications. But developments in Mathematics also contribute to the scientific and technological future of the UK. The UK needs expertise in and people who are trained in the new tools provided by mathematics.

Views on the issues identified by Mr Waldegrave should be sent, by 30th November 1992, to Professor Bill Stewart, Room 310, Office of Science and Technology, Cabinet Office, 70 Whitehall, London SW1A 2AS. I urge those who are concerned at the future of Mathematics in the UK to write in with their views. The more who write in, either as individuals or in their capacity as Head of Department or representative of bodies such as Boards of Studies, Learned Societies, the better.

Ronald Brown

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### **Calculus of Variations** and Partial Differential Equations

Volume 1 Number 1 January 1993

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- Monge-Ampère equations and other fully nonlinear partial differential equations related to problems in differential geometry, complex geometry, and physics.

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Sir Edward Collingwood (1900-1970) came from a distinguished Northumberland family, being related to Admiral Collingwood of Trafalgar. At Cambridge he came under the influence of Hardy, and Littlewood who was his PhD supervisor. He is best remembered for his work in the early 1950s with Dame Mary Cartwright that put the theory of cluster sets on the map. An active public servant, he was Chief Scientist in the Admiralty mine design department in 1943, and for most of the 1950s and 1960s chairman of the Council of Durham University and the Newcastle Regional Hospital Board. He was the Society's 54th President, elected in 1969 but dying in office.

#### DIARY

The diary lists Society meetings and other events publicised in previous issues of the Newsletter. For further information, refer to the figure in brackets, which is a cross reference to the LMS Newsletter Number.

#### 1992

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20	London Mathematical Society Meeting, London
DECEMBER	3
11	Edinburgh Mathematical Society Meeting, Edinburgh (197)
11	Rolph Scwarzenberger Memorial Meeting, Warwick
1993	
JANUARY	
15	Edinburgh Mathematical Society Meeting, Heriott-Watt (197)
15	London Mathematical Society Meeting, York
FEBRUARY	
7-11	Australian Applied Mathematics Conference, South Australia (197)
12	Edinburgh Mathematical Society Meeting, Edinburgh (197)
15-27	Langlands Programme Instructional Course, Cambridge (196)
19	London Mathematical Society Meeting, London
MARCH	Ediphurah Mathematical Society Meeting, Stirling (197)
19	London Mathematical Society Meeting, Jondon
29-1 Apr	British Mathematical Colloquium, Reading
29-8	Geometry and Combinatorial Methods in Group Theory Workshop, ICMS,
	Edinburgh (198)
MAY	
7	Edinburgh Mathematical Society Meeting, Aberdeen (197)
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18	London Mathematical Society Meeting, London
29-2 July	Number Theoretic and Algebriac Methods in Computer Science, Moscow, Russia (197)
JULY	14th Dritich Compliantarial Conference Kacle (199)
5-9 5-0	Annual Meeting of the Australian Mathematical Society, Wollongong, Australia (198)
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12-16	Algebraic Graph Theory, ICMS, Edinburgh (197)
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6-9	Bubble Dynamics and Interface Phenomena Conference, Birmingham (188)

The Newsletter is published monthly except in August. Items and advertisements for inclusion in the Newsletter should be sent to the Editor, Susan Oakes, London Mathematical Society, Burlington House, Piccadilly, London WIV 0NL, to arrive before the first day of the month prior to publication. Telephone 071- 437 5377, Fax 071-439 4629, E-mail Ims@uk.ac.kcl.cc.oak.