THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 203 **March 1993**

FORTHCOMING SOCIETY MEETINGS

Friday 19 March 1993, Burlington House
D. Preiss, A.V. Arhangel'skii

Thursday, Friday 13-14 May 1993, Cambridge
Numerical Analysis and Dynamical Systems

Friday 18 June 1993, Burlington House
R.W.K. Odoni, W. Feit

Friday 15 October 1993, Burlington House

Friday 19 November 1993, Burlington House

1993 LIST OF MEMBERS

The Society is preparing a new List of Members which will appear in June 1993. A letter showing the information for your entry in the List of Members has been sent to every member. If any of the information is incorrect or incomplete please return the form enclosed with the letter to the LMS office by Wednesday 31st March. If you have not received the letter please let Susan Oakes, the LMS Administrator, know straight away by telephone 071 437 5377 or email: lms@uk.ac.kcl.cc.oak.

VISIT OF PROFESSOR A.V. ARHANGEL'SKII

Professor Arhangel'skii will visit the United Kingdom in the period 14th to 28th March 1993. He will deliver the following lectures: Tuesday 16th March at 2.15 pm. DPMMS, Cambridge "On the concept of Cleavability"; Wednesday 17th March at 2.30 pm, Department of Mathematics, University College, London "A survey of Cp-theory"; Friday 19th March at 5.00 pm, London Mathematical Society, Burlington House "Topological properties of function spaces"; Monday 22nd March at 4 pm, Mathematical Institute, Oxford "Countably compact spaces and topological groups". Further enquiries concerning the visit may be made to P.J. Collins, St Edmund Hall, Oxford OX1 4AR.

VISIT OF PROFESSOR H. RECKZIEGEL

Professor H. Reckziegel (Cologne) will be visiting the University of Durham from 15th to 17th March and the University of Leeds from 17th to 19th March. His visit has been made possible by a Scheme 2 travel grant from the London Mathematical Society. He will give lectures on "Hypersurfaces with harmonic curvatures" in Durham on 15th March at 2.15 pm and in Leeds, as part of a Differential Geometry Day, on 18th March. Further details may be obtained from J. Bolton, Department of Mathematical Sciences, University of Durham, Science Laboratories, South Road, Durham DH1 3LE, email john.bolton@uk.ac.durham or S. Carter, School of Mathematics, University of Leeds, Leeds LS2 9JT, email: pmt6sc@uk.ac.leeds.cms1.

HEADS OF DEPARTMENTS MEETING

A meeting of Heads of Departments of Mathematical Sciences was held on 9 December 1992 at Queen Mary and Westfield College, University of London. The meeting was attended by some 90 people representing just upwards of 70 different institutions, professional bodies and learned societies. Approximately 25 new and 45 old Universities were represented. Amongst the topics discussed were academic audit, three- and four-year degrees, future organisation of a Committee of Heads of Departments of Mathematical Sciences, and research selectivity.

Prior to the 1992 Higher Education Act, there were two Heads groupings in the Mathematical Sciences area, namely the Heads of University Departments of Mathematics, chaired by Professor I.W. Roxburgh, and the Conference of Polytechnic Heads of Mathematical Sciences, chaired by Professor A. Norcliffe. There was unanimous support at the meeting for a merger of these two groupings now that there is one new University system.

It was agreed to set up a Formation Committee to bring the new grouping formally into existence. The role of such a grouping of Heads was discussed and it was agreed that: the group should primarily be a lobbying group and concern itself with securing the resources and conditions necessary to enable Mathematical Sciences to flourish in the new University sector; the group should work closely with professional bodies, learned societies, and existing regional groupings to secure its objectives; to operate effectively the group would need financial support and that some form of institutional levy would be necessary; senior staff, who might not yet be a Head of Department, should be encouraged to attend meetings of the Heads' Group in order to gain a perspective of important issues.

The Formation Committee was given the task of drafting the terms of reference of the Heads' Group and organising an inaugural conference/meeting in Spring 1993. After that the Formation Committee will be dissolved and elections to a new committee will take place.

THE INSTITUTE OF PHYSICS' ANNUAL CONGRESS

New Pathways in Mathematical Physics is just one of the many one-day meetings at the Institute of Physics' Annual Congress. Held over four days at The Brighton Centre, 19th to 22nd April 1993, this Congress will cover the very latest developments across all fields of physics.

Hear D. Olive (University College of Swansea) on Conformal Symmetry and Modern Day Physics; G. Efstathiou (University of Oxford) on Cosmology after COBE; D. Chillingworth (University of Southampton) on Geometry, Symmetry and Chaos in Dynamical Systems; P. Bak (Brookhaven National Laboratory, New York) on Complexity and Self-organised Criticality; and M. Berry (University of Bristol) discussing Quantum Chaology.

In addition, find out what computer algebra can do for you, and see how experimentalists and theoreticians are working together on developing fundamental mathematical models to explain the characteristics of sound propagation. Running alongside the Congress is Physics World '93 (the largest and most important exhibition of physics related products and services ever held in the UK). In this issue of the Newsletter UK members will find a free visitor ticket. Why not come along and see the latest products from such companies as Cambridge Control/MathWorks, Cherwell Scientific Publishing, Data Translation, NAG, National Instruments, Keighley Metrabyte, Surrey University CTI, Leabrook Computing.

For further Congress details contact Lucy Bell on 071 235 6111. Extra free exhibition tickets can be obtained from Geraldine Pounsford on 0272 297481.

LONDON MATHEMATICAL SOCIETY

FRIDAY 19 MARCH 1993

D. Preiss (London)
will speak at 3.30 on

Current Trends in Geometric Measure Theory

A.V. Arhangel'skii (Moscow)
will speak at 5.00 on

Topological Properties of Function Spaces

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

All interested are very welcome.

Tea will be served at 4.30

MATHEMATICS IN THE FORMER SOVIET UNION

The universities and research establishments of the former Soviet Union ("the fSU") have been hit hard by political uncertainties and economic miseries. Although there are many parts of the world in which mathematicians face conditions of great difficulty, the fSU is exceptional in the size and power of its mathematical community. Serious damage to Russian mathematics is a loss to mathematics world-wide.

The situation is changing fast and may change faster. Nobody knows whether the old authoritarian system may raise its head again, or indeed how much of it still survives. Nobody knows whether unemployment will start to hit the universities as state finance dries up.

Two articles in the Notices of the American Mathematical Society are well worth reading. These are 'Alert! Assistance Needed for Mathematical Colleagues in the Former Soviet Union', *Notices Amer. Math. Soc.* July/August 1992, Volume 39 No. 6, p. 557f, and V. I. Arnold's article 'Will Russian Mathematics Survive?', Notices Amer. Math. Soc. February 1993, Volume 40 No. 2. Both articles review the situation and suggest how the west can help. Professor Arnold gives a poignant description of mathematical life in the aftermath of Communist rule.

How is the LMS helping?

The LMS has set up a scheme, the fSU Visitor Scheme, to support visits such as those mentioned under (b) and (c) below. Details are given in this Newsletter in the the following article. The visits can be in either direction; members of the LMS are warmly encouraged to consider offering visits to the fSU.

Communications are a serious problem. Mail in the fSU is unreliable, fax exists but tends to be inconvenient; e-mail is now being set up throughout the region. The LMS is hoping to compile a list of the main institutions where mathematicians are employed, together with mail, fax and e-mail addresses.

LMS Council has also set up a working party on the fSU, which will keep the situation under review.

How can individual members of the LMS help?

(a) Libraries in the fSU can no longer afford to buy western books or journals. Members of the LMS can help enormously by sending preprints, offprints and books to fSU mathematicians. Of course current research material is particularly welcome. But outside the largest centres, even elementary textbooks can be used, including for example actuarial mathematics and mathematical economics. Many universities are redesigning their programmes along western lines, and such apparently mundane items as syllabuses and prospectuses have been asked for.

(b) Members of the LMS can help fSU mathematicians by visiting them in the fSU or attending conferences in the fSU. For the fSU mathematicians this is a vital source of western contacts and information. It is also a help to fSU mathematicians within their institutions if they can demonstrate their value by showing that they can attract western visitors. Hospitality in the fSU is traditionally very generous, and western mathematicians who write to their fSU contacts with offers of visits can expect to be warmly welcomed and well looked after. It is not necessary to speak Russian.

(c) Members of the LMS can help by inviting fSU mathematicians to visit Britain, either for conferences or for research visits or lecture tours. This is particularly helpful for younger researchers, and for researchers from the remoter parts of the fSU who lack the contacts which are more easily made in Moscow or St Petersburg.

The working party on the former fSU will do its best to advise LMS members who are interested in helping in any of these ways but are unsure where to direct their efforts. Contact Professor Wilfrid Hodges, preferably by e-mail at w.hodges@qmw.ac.uk; alternatively at School of Mathematical Sciences, Queen Mary and Westfield College, Mile End Road, London E1 4NS; phone 071-975 5485.

fSU VISITOR SCHEME

Under this scheme the London Mathematical Society will fund a limited number of short visits either by mathematicians from the former Soviet Union (fSU) to the United Kingdom (UK) or by mathematicians from the UK to the fSU. The level of funding will be such that basic travel and subsistence costs will be covered.

Visits to a single institution, to a number of institutions or attendance at a conference will be eligible for funding. Success of an application will depend mainly on the likelihood of potential benefit to mathematics in the fSU.

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 fSU. They should be supported and countersigned by a member of the Society if the applicant is not already a member of the Society. There is no application form as such: a letter of application should be sent to the Meetings and Membership Secretary (address below) giving details of the academic case for support and details of anticipated costs. This can be done at any time, but normally at least three months before the date of the proposed visit to allow for consideration by the Society's Programme Committee and, in the case of visits to the UK, an announcement of the visit in the Society's Newsletter. A grant under the scheme would normally be for less than £1000.

All arrangements for a visit under this scheme are the responsibility of the applicant. Further information about the scheme can be obtained from the Meetings and Membership Secretary, D.J. Collins, School of Mathematical Sciences, Queen Mary and Westfield College, Mile End Road, London E1 4NS. telephone 071-975 5480 (email:d.j.collins@uk.ac.qmw) who will be pleased to discuss proposals informally with potential applicants and to give advice on the submission of an application.

D.J. Collins
Meetings & Membership Secretary

MATHEMATICAL WHO'S WHERE
Revised 1992/93 Edition

Council has authorised the publication of a revised and corrected version of the edition of the directory 'Mathematical Who's Where - United Kingdom' which was published by the London Mathematical Society in June 1992. The scope of the revised edition is the same as the June 1992 edition, so that it covers Mathematics Departments in UK universities before the abolition of the binary line. Departments in the new universities will be included in the next edition, to be published by the Society in 1994.

A copy is enclosed with this mailing of the Newsletter to each member with an address in the area covered by the directory. Copies are available for purchase, price £3.00 or US$6.00 inclusive of postage, from the Administrator, London Mathematical Society, Burlington House, Piccadilly, London W1V 0NL. Cheques should be made payable to 'The London Mathematical Society'.

NUMERICAL ANALYSIS AND DYNAMICAL SYSTEMS

The London Mathematical Society Spring meeting will be held on 13th - 14th May 1993 at DAMTP Cambridge. The theme of the meeting is "Numerical Analysis and Dynamical Systems" and the invited speakers are E. Doedel (California Institute of Technology), C. Elliott (Sussex), C. Foias (Bloomington, Indiana), C. Grebogi (College Park, Maryland), R. Skeel (Urbana, Illinois) and D. Watkins (Seattle, Washington).

Further details may be obtained from the organisers: Arieh Iserles (email: A.Iserles@uk.ac.cam.amtp) or Alastair Spence (email: as@uk.ac.bath.maths).

RESEARCH ASSESSMENT EXERCISE
Letter from the President to the Universities Funding Council

I am writing on behalf of the Council of the London Mathematical Society, in response to the invitation from Professor Graeme Davies in his letter of 17 December 1992, to comment on the recently completed Research Assessment Exercise.

We very much appreciate the immense amount of work undertaken by the members of the Assessment Panels, in attempting to make the exercise as fair and effective as such an assessment can be. We appreciate, also, the fact that our Society was given the opportunity, at an earlier stage, to suggest names of persons who might be included on the panels dealing with mathematics, and we observe with satisfaction that it seems that due note was taken of our suggestions.

We understand that the work of the panels was based on their assessment of research **quality**. We strongly support this approach, and would wish to see it used again as the basis of any future research assessment exercise. We view the assessment of research quality, made by a highly competent panel, as being by far the most important and reliable indicator of genuine research performance. We are strongly opposed to any suggestion that "research quality" should be replaced by other indicators, more easily measured in numerical terms, but in our view much less relevant - such as page counts, or paper counts, as an estimate of "research productivity".

While the subjective element cannot be eliminated entirely, in judgement of mathematical research quality, we believe that it represents only a minor component in an assessment made by a well- qualified panel. Its long-term effect can be reduced even further if there is variation in the membership of panels, from one Research Assessment Exercise to the next. This is a matter we would bear in mind, if once again given the opportunity to suggest names for the panels on some future occasion. We are firm in our conviction that the (minor) subjectivity involved in the assessment of research quality is infinitely preferable to the use of alternative (easily quantified, perhaps objective, but artificial) indicators.

We believe that there are two fairly major aspects on which the procedure could be improved, although both involve some increase in workload for the panels. In the first place, we believe that two publications from an individual do not necessarily provide an optimal basis for the assessment of that individual's research quality over the period under review, and we would prefer the possibility of listing up to five publications per individual in any future exercise. In the second place, we believe that papers written by research students or research assistants as sole authors should be included in the exercise. We have two reasons in support of the latter point. Firstly, we regard such papers as a relevant part of the research activity of the department. Secondly, we are concerned to avoid any pressures leading to the introduction of bad practice whereby research supervisors put their names on papers to which they have made little contribution. We believe it important that the Funding Councils announce **as soon as possible** that papers by research students or research assistants will be admissible in future Research Assessment Exercises.

It is clear that some university departments encountered difficulty in determining the proper basis for deciding which members of staff to include, and which to exclude, in the recent exercise. In consequence, the exercise has been seen, at least in some quarters, as involving an undesirable element of "gambling". I think there is a general support for the proposition that, in a future exercise, the "rules of the game" should be made clear at the outset. If it is the intention that all staff who have published research during the relevant period (and only those staff) should be

included in the exercise, we would like this made specific at the outset.

May I conclude with one or two "administrative" points? It would be helpful if the period under review at any future Research Assessment Exercise could be a block of **calendar years**. It would be of great assistance to all university departments if there was compatibility between the data reporting systems required by the Funding Councils, the USR and the CVCP. It seems reasonable to suggest that, in future Research Assessment Exercises, there could be separate forms for the various broad subject groups (arts and humanities, sciences, technology), on which to make returns. There is such an enormous range of activity being covered here, that the "all purpose" form appears not particularly well-suited to any one of them. We believe that your mathematics panel could have drawn up a form better adapted to the needs of our subject.

I apologise for writing at some length. But I am grateful for the opportunity to put forward these views, on behalf of the Council of the London Mathematical Society. In a matter of such importance, we wish both to support those aspects in which we believe the procedure is working well, and also to suggest such improvements as we believe to be possible.

J.R. Ringrose
President

NATIONAL MATHEMATICS COMPETITIONS 1992/3

Members may be interested in a brief report of this year's round of national mathematics competitions. Entries for the National Mathematics Contest (a multiple choice paper for those in School Years 11-13, run by the Mathematical Association) increased from 25 to 30,000. Of these 630 students (those scoring > 90/125 in the FMC, and those who their teachers feel are of comparable standard) took Round 1 of the British Mathematical Olympiad (a 3½ hour written paper run by the British Mathematical Olympiad Committee) in January; the top four British participants were Luke Pebody (Rugby S), Alex Paseau (St Pauls S), Stephen Boyd (KES, Birmingham), and Desmond Sheiham (RGS, High Wycombe). Eighty students have been invited to take Round 2 (in February); these include the top 40 in Round 1 together with a further 40 students chosen to allow for age and background. Twenty students will then be invited to a 4 day residential session to be held in Trinity College, Cambridge.

Despite innumerable pressures on teachers, the corresponding activities for students in School Years 8 and 9 have continued their dramatic growth. And despite (or because of?) the difficult economic conditions NatWest and IBM have both renewed their support respectively for the UK Schools Mathematical Challenge, a multiple choice paper which took place on 4th February with an entry of 105,000 from 1550 schools, and for the UK Junior Mathematical Olympiad, a 2 hour written paper for around 1,500 students which takes place in March.

In April we also hope to see the first fruits of an international collaboration (with the Canadians, Americans, New Zealanders and South Africans) to produce a 2 hour written paper for around 200 invited Year 10 and 11 students in each country.

The emphasis in all these events is on solving interesting mathematical problems - not on competition. As a result of this year's UK SMC, 40,000 pupils will receive certificates. These go into homes and are valued by parents and pupils alike. This year (thanks to a grant from COPUS) we have printed a short sermon on the importance of Mathematics on the back of each certificate!

If any member would like further information on any of these events, or a copy of the problems set, please write to me at: School of Mathematics, University of Birmingham, Birmingham B15 2TT.

Tony Gardiner
University of Birmingham

TUITION FEES FOR MATHEMATICS AND STATISTICS STUDENTS
Letter from the President to the Minister for Education

The Council of the London Mathematical Society is concerned about an undesirable, possibly unintentional effect that your proposal to increase the differential between the fee rates of Humanities/Social Sciences (Band 1) and that of Science/Technology courses (Band 2) will have on the recruitment of students to Mathematics and Statistics courses.

Mathematics and Statistics courses are presently classified as 'classroom based' and therefore belong to Band 1. Your stated aim in introducing this change of policy is to increase recruitment to Science and Engineering courses. Mathematics and Statistics are of course Science disciplines themselves and therefore it is cruicial that recruitment to these subjects should also be increased. Although we understand that the proposed fee reductions are unlikely to change the overall unit of funding of *fully funded* students in 1993/94, it will act as a powerful disincentive for recruitment in this area for the coming year and may diminish the numbers in years to follow. Neither does this proposal sit well with your Department's policy to increase recruitment to PGCE courses in Mathematics by the offer of an extra bursary. If intakes to first degrees in Mathematics are decreased due to reduced fee banding, then even fewer graduates will take on teacher training. Surely this is not in the national interest and we doubt whether it is what you really desire.

Thus, it is now of crucial importance that a formal decision should be made that *Mathematics and Statistics courses should now be designated as Band 2 courses* and that this should be formally announced.

In any case, we believe that as an effect of recent developments in the subject, this is the correct designation for these subjects. In fact, the language of mathematics, and also the mathematical and statistical tools form an indispensable part of all scientific and engineering courses. The Kingman Report (Mathematics Strategy Review Report, SERC, 1991) puts it thus:

> The need for mathematics and mathematicians is an expanding and all-pervasive aspect of a modern science-based economy. The understanding of fundamental scientific phenomena and subsequent technological development and implementation requires the models and techniques of the Applied Mathematician, including specialist skills of numerical analysis and scientific computing. The collection, analysis and interpretation of data for use in inference, prediction and decision-making require the expertise of the Statistician. The planning, analysis and optimisation of systems and processes require the inputs of the Operational Researcher and the Control Theorist. And all this, in turn, rests on the work of the mathematical tool-maker, the Pure Mathematician, who creates the discipline itself.

There was a time when it could be argued that Mathematics and Statistics were correctly designated as classroom-based subjects. But this is no longer the case and some departments have already been redesignated on an *ad-hoc* basis. This is due to the increased use of specialised computer-based courses reflecting the new experimental and computational changes in the discipline itself. To quote again from the Kingman report:

> The trends are clear. Between 1985 and 1990 there has been a virtual doubling of the proportion of undergraduate courses involving a significant amount of computer-based activity. (Mathematics Strategy Review Report, SERC, 1991.)

These changes can be observed and supported by effectively measured data. The Kingman Committee conducted a survey, which showed that between 1984/85 and 1989/90 the number of courses components having at least a 'medium level' of computer based activity

roughly doubled to over 20%. It can safely be assumed that this 'trend' continued beyond the survey year of 1989/90. This is also borne out by data on the computerisation of Mathematics departments showing that the gap in expenditure on equipment between Mathematics and that of Computer Science and Physics, two sample laboratory-based subjects in Band 2, is closing rapidly. The HEFCE has also recognised that mathematics has now become a laboratory based subject on par with Computer Science when it decided that from 1993 Mathematics and Computer Science will be merged into the new Academic Subject Category 6.

Mathematics and Statistics need to be recognised as more laboratory than classroom-based in the present age and this needs to be reflected by the correct setting in the fee bands. Unless this is done we are in danger of losing the scientifically trained graduates the country and yourself so desire.

J.R. Ringrose
President

ERASMUS STUDENTS EXCHANGES

According to the ERASMUS directory for 1991-92, there were 27 universities and polytechnics in the UK operating European student exchanges in mathematics. After several years' experience of operating an undergraduate ERASMUS programme, I want to set out some of the advantages of such an exchange.

For students: Our students are going to look to the EC for their jobs, not just to the UK. A year abroad equips them well. They become fluent in a language other than English and learn to survive in an alien system. The practice here, and elsewhere, is to lengthen the degree course for students going abroad to four years. The students thus get an extra year of mathematics. Students remaining here may get some benefit of working with students from abroad.

For staff: What we learn about the teaching of mathematics in Europe challenges our notions of what is possible or desirable (for instance, curriculum, length of lectures, proportion of examples classes to lectures, undergraduate seminars, oral examinations). We can learn something of the standards required abroad. For instance, the failure rate (for all students), in third year mathematics examinations in Paris, is usually not less than 40%. But the interpretation of this needs some care.

Finally some typical reactions from the students themselves:

"I thoroughly enjoyed the year (abroad) and feel that it should be an integral part of every degree scheme."

"Basically, I've worked harder than I ever did in Leeds, but I've also enjoyed myself more."

"..a positive and enriching experience...with a minimum of adaptation, one can ..greatly improve one's scientific and cultural knowledge."

I would be prepared to collate information on student exchanges in mathematics and make it generally available, as long as I am sent the information by email in the first place.

David Salinger, University of Leeds
email: pmt6dls@uk.ac.leeds.gps

FOURIER ANALYSIS AT YORK

A four day meeting on "Fourier Analysis and its Applications" will be held at the University of York from Tuesday 30th March to Friday 2nd April. The programme will consist mainly of talks lasting 30-45 minutes.

The London Mathematical Society has given financial support but funds are nevertheless very limited. The following have agreed to participate: P.L. Butzer (Aachen), W.K. Hayman (York), T. KÖrner (Cambridge), T.J. Lyons (Edinburgh), K. Seip (Trondheim), H.S. Shapiro (Stockholm), R. Stens (Aachen).

Anyone who is interested in attending should contact the organisers Jim Clunie and Maurice Dodson at the Department of Mathematics, University of York, York YO1 5DD, telephone 0904-433091 or 0904-433098, fax 0904-433433 and email mmd1@uk.ac.york.

MATHEMATICS AND COMPUTING

a m turing

PROOF THEORY AND FOUNDATIONS OF PROGRAMMING

The First International Summer School in Logic for Computer Science will be held from June 28 to July 9, 1993, University of Chambéry (France), Parc Scientifique Savoie-Technolac, Le Bourget-du-lac.

The series of International Summer Schools in Logic for Computer Science is part of the "Euroconferences" program of the European Community, and is supported by the European Association for Computer Science Logic. It is intended primarily for young researchers in Computer Science or in Mathematics, who are interested in "Logical Tools and Methods for Computer Science", from the viewpoints of both theory and applications. Each school is devoted to a specific topic, whose theoretical foundations have developed recently, and which has promising applications.

The topic of this year's school is "Proof Theory and Foundations of Programming". The lectures will analyse the relations between formal proofs and programs, from their historical roots in Proof Theory and Lambda Calculus to their most recent theoretical and practical advances. The well-known correspondence between constructive proofs and functional programs provides a theoretical framework for the mathematization of programming, and has important consequences, which include program correctness, modularity, and reusability. The subject is undergoing at present impressive developments in various directions, including automatic extraction of programs from proofs, correspondence between classical logic and imperative program constructs, control of computational complexity at the level of proof systems, and new computational paradigms derived from proof theory.

During the two week school participants would be able to attend comprehensive courses as well as informal talks, and to take active part in discussions of open problems. The following courses will be offered: J.Y. Girard (Marseille, France): Fundamentals of Proof Theory: Proofs and Types; S. Ronchi (Torino, Italy): Fundamentals of Lambda-calculus; S. Berardi (Torino, Italy): Program Extraction from Constructive Proofs; J.L. Krivine (Paris, France): Programming with Proofs in Second Order Logic; D. Leivant (Bloomington, USA): Computational Complexity inherent in Type Systems; M. Parigot (Paris, France): Algorithmic Interpretations of Classical Logic; L. Regnier (Marseille, France): New Models of Execution derived from Proof Nets; A. Scedrov (Philadelphia, USA): Linear Logic; J. Tiuryn (Warsaw, Poland): Type Reconstruction.

The school will take place at the University of Chambéry, near Lake Bourget ("Lac du Bourget") in the High Alps. In addition to its stunning alpine setting, Chambéry offers a broad range of activities and recreations, benefitting from its proximity to both high mountains and an 18 km long lake. Participants will also be offered organized activities.

The participation fees amount to 5200FF, which include registration fees and living expenses (lodging, meals, coffee breaks, etc). A limited number of grants will be offered. Deadline for applications is 15th April 1993. For further information and application forms for participation and for grants please contact: M. Parigot, School LCS, Laboratoire de Logique, UFR de Mathámatiques, Université Paris 7, 2 place Jussieu, 75251 Paris Cedex 05, France, e-mail: school@logique.jussieu.fr.

GEOMETRY AND COMPUTATION

The 1993 Annual Easter Course at St Andrews University will be held from 15th to 16th April 1993. The theme of the course this year is Geometry and Computation. The lecturers on the course are Professor J.R. Sack (Carleton University, Canada) and Dr. R.R. Martin (University of Wales, Cardiff) who will each give several lectures for a non-specialist audience. Further details may be obtained from the Secretary, Division of Computational Science, North Haugh, St Andrews, Fife KY16 9SS, tel. 0334 76161 Ext 8262; email: helen@uk.ac.st-and.cs.

This occasional column is for the discussion of topics on the boundary between mathematics and computer science, thus covering both applications of mathematics in computer science and uses of computers in mathematics. Relevant material such as opinions, notices about Maths & CS meetings and reviews of research, teaching and support software is solicited. Contributions should be sent to the editors of the column: rd@dcs.st-and.ac.uk (Roy Dyckhoff, University of St Andrews) dfh@maths.warwick. ac.uk (Derek Holt, University of Warwick).

PROFESSOR SIR MICHAEL ATIYAH PRS
A CORRECTION

A regrettable error occurred in the caption to the photograph of Sir Michael in the last issue of the Newsletter. He was elected to Fellowship of the Royal Society in 1962 and not in 1988 as stated. The Editors apologise for this error.

NEW YEAR HONOURS

Congratulations to Professor John M. Howie, FRSE, Regius Professor of Mathematics, University of St Andrews, and Dr Alan B. Tayler, Director, Oxford University Centre for Industrial and Applied Mathematics, who were awarded CBEs.

CAMBRIDGE COMBINATORIAL CONFERENCE

The conference, which is in honour of Professor Paul Erdős on the occasion of his 80th birthday, will be held in Trinity College, Cambridge, from 23rd to 27th March 1993. The meeting is organized with the financial assistance of the London Mathematical Society, the University of Cambridge and Trinity College, Cambridge. The speakers at the conference include Paul Erdős, Rudolph Ahlswede, Martin Aigner, László Babai, Joseph Beck, Claude Berge, Norman Biggs, Peter J. Cameron, Walter Deuber, Ralph Faudree, Alan Frieze, Roland Häggkvist, Rudolf Halin, Peter Hammer, Neil Hindman, Svante Janson, András Hajnal, Péter Komjáth, N. Linial, Tomasz Luczak, Wolfgang Mader, Jarik Nesetril, János Pach, Hans Jürgen Prömel, Pierre Rosenstiehl, Vojtek Rödl, Richard H. Schelp, Miklós Simonovits, Vera Sós, Andrew Thomason, William T. Trotter, W.T. Tutte, Bernd Voigt, Dominic Welsh and Herbert Wilf. The registration fee is £25. Accommodation is available for about £100 for the four nights. For further details contact Dr Béla Bollobás, Department of Pure Mathematics and Mathematical Statistics, 16 Mill Lane, Cambridge CB2 1SB, Fax: (0223) 337920.

F.V. CHORLEY

Mr Frank V Chorley who was elected a member of the London Mathematical Society on 17 June 1977, died on 9 January 1993.

J.H. MCDONNELL

Mr John H. McDonnell who was elected a member of the London Mathematical Society on 12 October 1979, died at the age of 61, on 13 January 1993. He was President of the Institute of Mathematics and its Applications since 1 January 1992.

SERC SUPPORT FOR MATHEMATICS

I would like to thank Professor Ripley (Newsletter, January, 1993,) for broadening the debate on the support for research in Mathematics in the UK. The more widely information is available the better.

I confess the term "peanuts" was borrowed from a conversation with an industrialist who is aware of the broad pattern of spending within the SERC Boards. As a statistician, Professor Ripley should suggest how one can produce a number to measure the relative contributions to wealth creation of the areas SERC supports, not just the Science Board. The theoretical investigations of mathematics, pursued initially for their own sakes, have given crucial contributions to X-ray tomography, error correcting codes, cryptography, to name but a few. The influence of mathematics is both pervasive, and often delayed. How should this be compared with astronomy, or nuclear physics? How can contributions of this nature be continued?

I would argue that, in view of this influence, Mathematics should be regarded as "Big Science". It is investigating fundamental structures which have actual and potential application across the board in Science and Technology.

Computers themselves were in this country developed by Mathematicians, yet now the equipping and technical support of Mathematics departments falls behind that of other subjects. Despite the special relation of mathematics and computation, there is no specific SERC allocation for computational support in Mathematics, unlike the NSF allocation.

Professor Ripley's proposed definition of "active researcher" as "someone who has applied for a grant in the last few years" is outrageous.

I hope that those with access to data will examine and publish international comparisons of support for mathematics. Many who referee grant applications will know of the generous support given in Canada to young researchers, and the CNRS is known to support in Mathematics 250 full time researchers,. and 1500 academics through the CNRS Laboratory Scheme.

The worry is that in terms of international comparisons, the UK is allowing its mathematical base to leak away. The evidence of UK decline through lack of support is in the Kingman Report. It would be useful to know if any of the recommendations of that report have been implemented.

Ronald Brown
UCNW, Bangor

The item by B. D. Ripley (January 1993 Newsletter) justifying the grant levels to Mathematics contains the somewhat surprising definition- "..active research worker (someone ho has applied for a grant in the last few years)". Surely this is a strange definition of an active research worker. Supervising research students may well be as active as applying for a research grant and do more for the mathematical community. Given the bureaucratic world we now live in I suppose that just asking people whether they are active would not be acceptable, although it is probably the most accurate.

Another method might be to count people who have published a paper or book which at least refers to a recognisable research activity. Perhaps an even more generous method could be to accept attempted research - after all one is not always successful. Here the time scale is crucial; perhaps nothing published after five years might seem a little long. Unfortunately Professor Ripley does not tell us how many years the term "few" refers to. But it does show the rather depressing attitude that many academics now have; perhaps I could call it the 'never mind the quality, feel the width' attitude of the penny bazaar.

As an alternative I used the recent figures from the HEFC research rating exercise, an activity which itself deserves some serious analysis. This allows individuals to make some assessment of their own activity but with institutional approval. It seemed reasonable to add up the number of staff that Universities decided to call "active research

workers". This came to approximately 1700 for Pure Mathematics, Applied Mathematics, Statistics and Operational Research. Given the figure of £22k per active research worker which Professor Ripley quotes, we would have a total figure for research funding in Mathematics of approximately £37 million. That would be generous.

Alan Camina
University of East Anglia

THE A/AS CORE FOR MATHEMATICS: SOME RECENT DEVELOPMENTS

Colleagues may be interested in the following account of the activities of a Joint Mathematical Council (JMC) working group, and may welcome the opportunity to contribute their thoughts to its future discussions.

In 1991 an exemplar core syllabus for A/AS Mathematics was proposed by SEAC which formed the basis of a consultative exercise. It received a rather mixed response. The LMS made comments in which the major criticism was that the proposed core was so unspecific that it failed to provide a well-defined body of knowledge on which employers and institutions of higher education could rely or build. The reason for this statement is typified by the following description of 'Differential Calculus', from the exemplar core

1. The concept of differentiation. The equivalence of gradient and rate of change.
The ideas of increasing and decreasing functions. Optimisation.
2. Approximations concerning differentiation using

$$f'(x) = \frac{f(x+h)-f(x)}{h} \text{ OR } \frac{dy}{dx} \approx \frac{\delta y}{\delta x}$$

In Autumn 1992 a SEAC development group was formed to progress the matter of the core. The JMC working group was convened at that time by Professor J.C. Robson (the LMS representative on the JMC) and I was invited to join it to represent the interests of the LMS.

Our initial brief was to produce comments and proposals reflecting the concerns of the constituent societies which might be conveyed to the SEAC group at an early stage in their thinking. For simplicity and speed the JMC working group took the existing exemplar core as a basis, and attempted among other things to spell out appropriate details on content and methodology to meet the objection mentioned earlier (among other things). Thus for example we propose that the differential calculus statement is elaborated by restricting the formal development of rules and basic derivatives to just those necessary to deal with polynomial functions and simple rational powers. In addition we suggest that the basic derivatives for trigonometric, exponential and logarithmic functions are inferred through visual and numerical explorations/examples. We were very concerned not to overload the syllabus, and to allow flexibility of choice in applications, in the hope that pupils, interest and intellectual satisfaction might be sustained when interpreted in the classroom. We also tried to encourage good practice in the use of calculators and appropriate graphical aids, as tools to assist study.

The results of our discussions are summarised in a position paper which was transmitted to the SEAC development group in November 1992 under the aegis of the JMC (after a brief consultation with the constituent member bodies). Any colleague who would like to see the details is invited to write for a copy from me, Len Smith, Schools Liaison Office, The University of Leeds, Leeds LS2 9JT. We would welcome comments and suggestions to add to our discussion. They could be sent to me at the address given, or to any of the other members of the JMC working group, whose names are listed, with the bodeis which they represent: Doug French MA (Chairperson), Anne Haworth ATM, Adrian Oldknow IMA, Ed Redfern RSS.

Len Smith
University of Leeds

SUBMISSION TO THE DEPARTMENT FOR EDUCATION

In December 1992, the Joint Mathematical Council of the United Kingdom, with the support of the LMS, IMA, and RSS, submitted a request to the Department for Education that it should issue a statement declaring that the new 4 year MMath (or MSci) degree is eligible for mandatory award status. Readers might be interested to see the material provided to the DfE. We reproduce below the main document, which describes in broad terms what is proposed, together with the first of 2 annexes. The second annex is too bulky to reproduce here. (It consists of extracts from documentation prepared in each of 5 universities about their plans.)

Proposed Four-year First Degree in Mathematics

Following the recommendations of a working group set up by the London Mathematical Society, a number of university mathematics departments are proposing to introduce a new four-year first degree in mathematics. At two universities plans are well advanced with the intention of admitting students to the new degree course in October, 1993, while at many others it is hoped to start the new course in 1994 or 1995.

The final report of the working group, entitled The Future of Honours Degree Courses in Mathematics and Statistics, was published in February, 1992 with the approval of the Councils of the London Mathematical Society, the Royal Statistical Society and the Institute of Mathematics and its Applications. No attempt is made here to summarise the detailed arguments contained in the report (a copy is attached). The working group identified three factors which made it necessary to review the structure of first degree courses in mathematics and statistics as a matter of urgency:

(i) the continuing changes in secondary mathematics education and in access to higher education;
(ii) the continuing growth of mathematics, both in depth and in breadth, leading to the danger of overload in undergraduate courses in mathematics;
(iii) the increasing need to ensure comparability with mathematics degree courses in the universities of continental Europe.

A consideration of these factors alone suggests that first degree courses in mathematics should be lengthened to four years. However, the working group did not recommend such a change for all students because it recognised that they have differing needs depending on their ability, interests and career aspirations. For the majority who do not wish to become professional mathematicians, a broadly based three-year course, as intellectually demanding as any other three-year honours degree course, would be appropriate. For those who have in mind a professional career as mathematicians a four-year first degree programme would be required.

Accordingly the working group recommended that departments should consider introducing four-year courses alongside three-year courses, as an option for some students. The first two years of the two courses would be the same, leading to a Part I examination. Those students taking the three-year course would graduate with an Honours BA or BSc after one further year of study. It is a common criticism that current three-year Honours courses contain too much material and give students too little time to think about it. The new three-year course would contain less material and would place greater emphasis on skills and understanding. Those students taking the four-year programme would follow, after Part I, a two-year course leading to the new MMath (or similar name) Honours degree. This two-year programme would be designed to provide students with a broader and deeper knowledge, with a fuller understanding of the subject, than can be achieved at

present. The last two years would together form an integrated course, but some of the teaching in the third year may be shared with the three-year course. The two degree programmes would ensure that high standards were maintained while also meeting the differing needs of students.

Regulations relating to registration, and transfer between the courses are likely to vary in detail from one institution to another. At registration it may not be clear to the student or the department whether the three-year or four-year degree would be appropriate. Transfer from the three-year course to the four-year course would be allowed up to the end of the fourth term, but would not be permitted thereafter. Transfer from the four-year to the three-year course would be possible until the end of the second year, and in special circumstances during the third year.

It is estimated that about 25% of students studying for a first degree in mathematics would complete the four-year course.

As the comments above indicate, the two degrees have different aims. Nevertheless, graduates of both the three-year and four-year degree courses will be eligible to apply for courses leading to higher degrees, either MSc or PhD.

The Joint Mathematical Council has agreed to act nationally on behalf of all departments of mathematics and statistics in England, Wales and Northern Ireland.

Annex 1 gives a list of departments who are at present proposing to introduce a 3/4-year degree programme. This includes, where available, the names to be attached to the four-year degree and the dates when it is proposed to admit students to the new courses. Annex 2 contains extracts of material of the sort that could appear in prospectuses or course descriptions of the new courses.

ANNEX 1

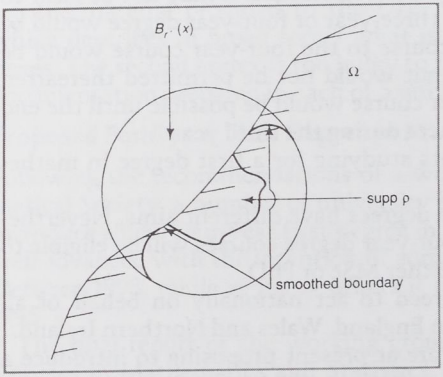
Summary : 3-4 year degrees
(As at 30 November 1992)

We list here in summary form the universities planning (some firmly, some more tentatively) to introduce new four year Mathematics degrees of the form envisaged by the Neumann report. The proposed title of the four year degree is given where known. The dates, if given, are all subject to revision, and all plans are subject to approval by university authorities and the agreement of the DfE that the new degree attracts a mandatory grant.

1995 Bath
1994 Bristol (MSci)
1994 Durham (MMath)
1995 Lancaster
1994 Liverpool (MMath)
1994 London-Imperial (MSci)
1995 London-QMW (MSci)
1994 Loughborough (MMath)
1995 Newcastle
1994 Oxford (BA)
1994 Reading (MMath)
1993 Southampton (MMath)
1994 UMIST (MMath)
1994 Wales-Bangor (MMath)
1994 Warwick (MMath)
1994 Birmingham (MMath)
1994 Coventry
1993 Greenwich
1994 Leeds (MMath)
? London- Goldsmiths
1995 London-Kings (MSci)
? London-University College
1993 Manchester (MMath)
? Nottingham
1996 Plymouth (MMath)
1994 Sheffield (MMath)
1995 Sussex
1994 Wales-Aberystwyth (MMath)
1994 Wales-Swansea (MMath)
1995 York (MMath)

J.C. Robson
University of Leeds

TWO NECESSARY TEXTBOOKS OF PDE



M. Renardy, R.C. Rogers

An Introduction to Partial Differential Equations

1993. Approx. 440 pp. 21 figs. (Texts in Applied Mathematics, Vol. 13) Hardcover £ 29.00 ISBN 3-540-97952-2

The book provides a thorough introduction to partial differential equations, bringing the student up to the level where he or she can begin research in the field. This text is specifically directed at a beginning graduate student audience. The book is intended to be used in a three or four semester mathematics course entitled "Partial Differential Equations".

J. Rauch

Partial Differential Equations

1991. X, 263 pp. 42 figs. (Graduate Texts in Mathematics, Vol. 128) Hardcover £ 36.50 ISBN 3-540-97472-5

The objective of this book is to present an introduction to the ideas, phenomena, and methods of partial differential equations. This material can be presented in one semester and requires no previous knowledge of differential equations, but assumes the reader to be familiar with advanced calculus, real analysis, the rudiments of complex analysis, and thelanguage of functional analysis. Topics discussed in the text include elliptic, hyperbolic, and parabolic equations, the energy method, maximum principle, and the Fourier Transform. The text features many historical and scientific motivations and applications. Included throughout are exercises, hints, and discussions which form an important and integral part of the course.

Figure taken from:
Rauch, Partial Differential Equations

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IBERIA IN THE GOLDEN AGE
Mathematical Sciences and their uses, 1500 - 1700

A conference on "Iberia in the Golden Age" is being held at Imperial College London from 31st March to 3rd April 1993. It is being organised jointly by the British Society for the History of Mathematics, the British Society for the History of Science, the Royal Academy of Sciences, Madrid, and the Society for Renaissance Studies.

The speakers include U. Baldini (Italy) "The Jesuit Order and organised mathematics, training in Spain, Portugal and the East Indies: 1570-1640", G. Cifoletti (Italy) "Guillaume Gosselin's uses and critique of Nunes' *Libro de Algebra*", J. Dhombres (France) "North and South: Jesuit mathematicians in Spain and Portugal from the school of Gregoire de Saint Vincent in Louvain", A. Dou (Spain) "Spanish Jesuit mathematicians in the 16th and 17th centuries", J.V. Field (England) "Mathematical books in the library of Diego Velázquez (1599-1660)", P. García Barreno (Spain) "The Madrid Mathematical Academy of 1582", L. Giard (France) "The Logic of Domingo de Soto", D. Goodman (England) "Philip II's dream of Spain's technological self-sufficiency", P. Holgate (England) "Caramuel and Izquierdo", A. Keller (England) "The new mathematical arts of the sixteenth century"; U. Lamb (U.S.A.) "*The Repertorio de los tiempos* and the training of sailors", J.M. Lopez-Piñero (Spain) "The introduction of modern science in Spain" (to be confirmed), V. Navarro (Spain) "Astronomy and Cosmology in Spain in the 16th and 17th century", E.L. Ortiz (England) "The 19th-century controversy on mathematics in Iberia in the 16th century", W.G.L. Randles (France) "The emergence of nautical astronomy in Portugal in the fifteenth century", R. Rashed (France) "Archimedean learning in the Middle Ages: Banū Mūsā".

There will be a lecture at the National Gallery on its Spanish paintings (Gabriele Finaldi, Curator of Later Italian and Spanish Painting) and a lecture at the British Library on its Hispanic holdings (Margaret Johnson, Head of Hispanic Section). There are plans for a concert of Spanish Renaissance music, to be given by the ensemble Concordia.

Registration fee is £100 (£40 for members of BSHM, BSHS or SRS). Some basic accommodation is available at about £20 per night. For further information, contact the organisers: J.V. Field and E.L. Ortiz, Department of Mathematics, Imperial College, 180 Queen's Gate, London SW7 2BZ, fax 071 225 8361.

SCOTTISH ALGEBRA DAY

The 6th Annlual Scottish Algebra Day will be held on Friday 19th March 1993 at the Department of Mathematics, University of Glasgow. Support has been applied for from the London Mathematical Society. There will be four talks, each lasting one hour: 10.45 am, W.W. Crawley-Boevey (Oxford) "Recent advances in representations of quivers"; 12.00, J. Alev (Reims) "The fields of fractions of certain quantum algebras"; 2.30 pm, D. Segal (Oxford) "Subgroup growth problems"; 4.00 pm, R.W. Carter (Warwick) "Canonical bases for irreducible modules".

Coffee and biscuits will be available from 10.00 am and between talks, in the Mathematics Department. There will be a meal arranged, to follow the final talk, to which all are welcome. It would be helpful to let one of the organisers know by 16th March, if you plan to come to the meal. K.A. Brown (Glasgow) tel. 041 339 8855 ext 6535, email k.a.brown@uk.ac.glasgow.vme, J. Howie (Heriot-Watt) tel. 031 451 3240, email: mthjh@uk.ac.heriot-watt.vaxb. T.H. Lenagan (Edinburgh) 031 650 5078, email: T.Lenagan@uk.ac.edinburgh.

UNIVERSITY OF ST ANDREWS

Research Fellowship in Analysis
School of Mathematical and Computational Sciences

Applications are invited for a postdoctoral Research Fellowship, tenable for two years from October 1993. The person appointed will have interests in an area of analysis and will be expected to work in collaboration with Professor K. Falconer who has been appointed to a Chair in Pure Mathematics in the School.

Salary will be at the appropriate point on the IA scale for research staff: (£12,638 - £20,140 per annum).

Application forms and further particulars are available from THE HEAD OF PERSONNEL SERVICES, The University, College Gate, St. Andrews KY16 9AJ, tel: 0334 76161 ext: 393/522 (out of hours 0334 78856), fax: 0334 75851, to whom completed forms accompanied by a letter of application and a CV should be returned to arrive not later than **12 March 1993.** Please quote Ref No VK103/4.

The University operates an Equal Opportunities Policy.

UNIVERSITY OF BIRMINGHAM

SCHOOL OF MATHEMATICS AND STATISTICS

MASON CHAIR OF PURE MATHEMATICS

Applications are invited for the vacant Mason Chair of Pure Mathematics. The appointment will take effect from 1st September 1993 or as soon as possible thereafter. Candidates should have a proven research record and demonstrate strong academic leadership qualities.

There is a vacant lectureship post in Pure Mathematics which will be filled in consultation with the successful candidate.

The closing date for applications is **Wednesday 31st March 1993.** Further particulars may be obtained from the Director of Staffing Services, The University of Birmingham, Edgbaston, Birmingham B15 2TT (Telephone: 021-414-3841; Fax: 021-414-4802).

Informal enquiries may be directed to Professor J.R. Blake, Telephone 021-414-6581; E-mail: j.r.blake@uk.ac.bham; Fax: 021-414-3389; or Dr A.H.M. Hoare; Telephone: 021-414-6584.

John William Scott Cassels was born in 1922 in Durham and educated in Edinburgh (MA 1943) and Cambridge, where he took his PhD in 1949. After a year at Manchester he returned to Cambridge, and was Sadleirian Professor there from 1967 to 1986. He has worked on every aspect of number theory, notably the theory of rational quadratic forms and local fields. He was elected to Fellowship of the Royal Society in 1963, and awarded their Sylvester Medal in 1973 and was a Vice-President from 1974-1978. The London Mathematical Society awarded him its De Morgan Medal in 1986. He was the Society's 58th President, from 1976 to 1978.

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.

1993

MARCH	
12	Edinburgh Mathematical Society Meeting, Stirling (197)
19	London Mathematical Society Meeting, London
22-26	LMS Invited Lectures, Professor L. de Branges, Lancaster University (201)
29-1 Apr	British Mathematical Colloquium, Reading University (200)
29-2 Apr	Study Group with Industry, Nottingham (202)
29-3 Apr	Quantum Probability and Applications Conference, Nottingham (202)
29-8 Apr	Geometric and Combinatorial Methods in Group Theory Workshop, ICMS, Edinburgh (198)
APRIL	
5-8	British Applied Mathematics Colloquium, Strathclyde University (200)
8-10	Clifford Algebras in Analysis Lecture Series, Arkansas, U.S.A. (201)
18-24	Functional Analysis Spring School, Czechoslovakia (201)
22-23	Mathematics in Finance - The Future, ICMS Conference, Royal Society Edinburgh (201)
26-8 May	Mathematical Biology Study Centre/Workshop, Maine-et-Loire, France (201)
28	Novel Mathematical Methods in Petroleum Science, ICMS Workshop, Royal Society Edinburgh (201)
MAY	
7	Edinburgh Mathematical Society Meeting, Aberdeen (197)
13-14	London Mathematical Society Meeting, Cambridge
29	Edinburgh Mathematical Society Meeting, St Andrews (197)
JUNE	
4-7	European Women in Mathematics, Warsaw, Poland (201)
6-12	Potential Theory and Analysis Spring School, Czechoslovakia (201)
7-18	Analysis, ICMS Short Course, Edinburgh (201)
18	London Mathematical Society Meeting, London
20-2 Jul	Real and Complex Dynamical Systems, Hillerod, Denmark (201)
28-2 Jul	Integrability and Chaotic Behaviour Conference, Torun, Poland (201)
29-2 July	Number Theoretic and Algebraic Methods in Computer Science, Moscow, Russia (197)
JULY	
4-11	Analytic and Geometric Aspects of Hyperbolic Space, LMS Durham Symposia, Durham University (200)
4-16	Probability Theory of Spatial Disorder and Phase Transition, Cambridge (202)
5-9	14th British Combinatorial Conference, Keele University (188)(200)
5-9	Annual Meeting of the Australian Mathematical Society, Wollongong, Australia (198)
11-16	Computational Techniques in Spectral Theory and Related Topics Workshop, Gregynog, Wales (201)
11-21	Complex Dynamics, LMS Durham Symposia, Durham University (188)(200)
12-16	Combinatorial Mathematics and Combinatorial Computing Conference, Adelaide, Australia (189)
12-16	Algebraic Graph Theory, ICMS, Edinburgh (197)
22-1 Aug	Vector Bundles in Algebraic Geometry, LMS Durham Symposia, Durham University (200)
26-30	Randomness and Computation Workshop, Edinburgh (197)
26-30	Classical and Axiomatic Potential Theory Workshop, France (202)
26-6 Aug	Séminaire de Mathématiques Supérieures, Montreal, Canada (199)
AUGUST	
1-14	Groups Galway/St Andrews 1993, Galway, Ireland (201)
17-20	The Mathematical Heritage of Sir William Rowan Hamilton, Dublin, Ireland (193)

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 lms@uk.ac.kcl.cc.oak.

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