THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 191 **February 1992**

FORTHCOMING SOCIETY MEETINGS

Friday 21 February 1992, Bristol
R.E. Borcherds, S. Donkin
Friday 20 March 1992, Burlington House
R.A. Bailey, L.C.G. Rogers
Friday 15 May 1992, Burlington House
A.J. Scholl, M.J. Taylor
Friday 19 June 1992, Burlington House
W.B.R. Lickorish, V.G. Turaev
Monday 29 June - Wednesday 1 July 1992
Joint meeting of AMS and LMS, Cambridge
Friday 16 October 1992, Burlington House
Friday 20 November 1992, Burlington House

VISIT OF PROFESSOR YU.V. KUZ'MIN

Professor Yu.V. Kuz'min, of the Moscow Institute of Railway Engineers, will be visiting the United Kingdom from 19th January for approximately 4 weeks. His visit has been made possible by a Scheme 2 travel grant from the London Mathematical Society. He will lecture on Homological Topics in Group Theory at UMIST on 28th January, at the University of Manchester on 5th February, and will be at Queen Mary & Westfield College, London from 10th to 15th February. These lectures are open to all interested. Further details may be obtained from Professor B. Hartley, Department of Mathematics, University of Manchester. E-mail: mbbgsbh@uk.ac.mcc.cms.

MATHEMATICAL WHO'S WHERE 1992

The 1992 edition of 'Mathematical Who's Where - United Kingdom' will be published by the London Mathematical Society. This directory was established in 1980 and has been produced biennially by Professor I.M. James. The Society gratefully acknowledges the work done by Professor James in maintaining the directory over this period and making it so useful to the UK mathematical community.

The format of the 1992 edition will be similar to that of preceding editions but will also incorporate the LMS 'Electronic Mail Directory' which appeared in pilot form in 1990. All members of UK mathematics departments will be listed and information for these entries will be obtained from the departments. Other members of the Society, resident in the UK, who wish to have their e-mail addresses included in the directory should inform the Society's Administrator (lms@uk.ac.kcl.cc.oak) no later than 21 February 1992 giving e-mail address and telephone number. It is anticipated that the directory will appear in May 1992.

1993 FORDER LECTURER

The Society is very pleased to announce the appointment of Professor Roger Penrose, FRS (University of Oxford) to the 1993 Forder Lectureship in New Zealand.

RECEMT LMS PUBLICATIONS

Solitons, Nonlinear Evolution Equations and Inverse Scattering by M.J. Ablowitz and P.A. Clarkson, pp 528, ISBN 0 521 38730 2. LMS Lecture Note Series 149. £27.95. LMS members discount price £20.95.

Solitons have been of considerable interest to mathematicians since their discovery by Kruskal and Zabusky. This book brings together several aspects of soliton theory currently only available in research papers. Emphasis is given to the multi-dimensional problems arising and includes inverse scattering multi-dimensions, integrable nonlinear evolution equations in multi-dimensions and the δ method. Thus, this book will be a valuable addition to the growing literature in the area and essential reading for all researchers in the field of soliton theory.

Topics in Varieties of Group Representations by S.M. Vovsi, pp 216, ISBN 0 521 42410 0. LMS Lecture Note Series 163. £19.95. LMS members discount price £14.95.

This book is devoted to the theory of group representations, a young and promising area of modern algebra. It provides a detailed exposition of several central topics in the field, leading to the most current advances and developments. Much of the included material has never been available in book form before. It is intended for a broad audience of researchers and graduate students, working in abstract algebra and its many applications.

Quasi-symmetric Designs by M.S. Shrikhande and S.S. Sane, pp 240, ISBN 0 521 41407 5. LMS Lecture Note Series 164. £17.95. LMS members discount price £13.46.

Design theory is a branch of combinatorics with applications in number theory, coding theory and geometry. In this first book on the subject, the authors discuss the generalization of results and applications to quasi-symmetric designs. The coverage is comprehensive and will be useful for researchers and graduate students. An attractive feature is the discussion of unsolved problems.

Complex Algebraic Curves by F. Kirwan, pp 272, ISBN 0 521 41251 X hardback, ISBN 0 521 42353 8 paperback. LMS Student Texts Series 23. Hardback £30.00. LMS members discount price £22.50, paperback £13.95, LMS members discount £10.45.

Complex algebraic curves were developed in the nineteenth century. They have many fascinating properties and crop up in various areas of mathematics, from number theory to theoretical physics, and are the subject of much research. By using only the basic techniques acquired by most undergraduate courses in mathematics, Dr Kirwan introduces the theory, observes the algebraic and topological properties of complex algebraic curves, and shows how they are related to complex analysis. This book grew from a lecture course given by Dr Kirwan at Oxford University and will be an excellent companion for final year undergraduates and graduates who are studying complex algebraic curves.

Lectures on Elliptic Curves by J.W.S. Cassels, pp 137, ISBN 0 521 41517 9 hardback, ISBN 0 521 42530 1 paperback. LMS Student Texts Series 24. Hardback £24.95. LMS members discount price £18.71, paperback £12.95, LMS members discount £9.71

The study of (special cases of) elliptic curves goes back to Diophantos and Fermat, and today it is still one of the liveliest centres of research in number theory. This book, which is addressed to beginning graduate students, introduces basic theory from a contemporary viewpoint but with an eye to the historical background. The central portion deals with curves over the rationals: the Mordell-Weil finite basis theorem, points of finite order (Nagell-Lutz) etc. The treatment is structured by the local-global standpoint and culminates in the description of the Tate-Shafarevich group as the obstruction to a Hasse principle. In an introductory section the Hasse principle for conics is discussed. The book closes with sections on the theory over finite fields (the 'Riemann hypothesis for function fields') and recently developed uses of elliptic curves for factoring large integers. Many examples and exercises are included for the reader. For those new to elliptic curves, whether they are graduate students or specialists from other fields, this will be a fine introductory text.

These books have recently been published and are available from Cambridge University Press, Customer Services, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU. Payment (including £1.85 postage) should be sent with your order, quoting account no. 089.4900.001.

LONDON MATHEMATICAL SOCIETY

FRIDAY 21 FEBRUARY 1992

S. DONKIN (QMW London)
will speak at 3.30 on

Matrix Invariants

R.E. BORCHERDS (Cambridge)
will speak at 5.00 on

Superstrings and the Riemann Zeta Function

The meeting will be held in the
Mathematics Lecture Theatre 1,
School of Mathematics, University of Bristol

All interested are very welcome

Enquiries may be addressed to Dr M.D. Gladstone,
School of Mathematics, University of Bristol,
University Walk, Bristol BS8 1TW.

Telephone 0272 303316

SERC AWARDS

Research Grants

Berry, M.V., Bristol. *Semiclassical limit of the geometric phase for chaotic systems.*

Baines, M.J., Reading. *Institute for computational fluid dynamics.*

Blake, J.R., Birmingham. *Transient inviscid bubble dynamics.*

Bruce, J.W., Newcastle. *Singularities and geometry.*

Carbery, A., Sussex. *Problems in harmonic analysis related to curvature.*

Clifford, P., Oxford. *Specification and simulation of random fields on a continuum.*

Cooper, S.B., Leeds. *Rigidity and definability in the non computable universe.*

Davis, M.H.A., Imperial College. *Stochastic control free boundary problems and applications to finance.*

Dawid, A.P., University College London. *An abstract approach to expert systems.*

Diggle, P.J., Lancaster. *Advanced course: time series and repeated measurements.*

Elgin, J.N., Imperial College. *Aspects of chaos in nonlinear partial differential equations.*

Hartley, B., Manchester. *Group rings of simple locally finite groups.*

Johnson, B.E. Newcastle. *Cohomology and Banach algebras.*

King, A.C. Keele. *Analysis of bubbles in slow viscous flow.*

Lloyd, N.G., UCW Aberystwyth. *Conservative systems and their perturbation.*

Lyons, T.J., Edinburgh. *Dirichlet processes in analysis.*

Mond, D.M.Q., Warwick. *Classification and geometry of singularities of mappings.*

Pedley, T.J., Leeds. *Fluid transport in the lung.*

Percival, I.C., Queen Mary & Westfield College. *Dynamics over finite fields.*

Race, D., Surrey. *Theory of ordinary and quasidifferential equations.*

Rand, D.A., Warwick. *Nonlinear systems laboratory VI.*

Rogers, C., Loughborough. *Nonlinear boundary value problems in continuum mechanics.*

Silverman, B.W., Bath. *Minimax approaches to statistical inverse problems and complex stochastic systems.*

Smith, A.F.M., Imperial College. *Studies in Bayesian computation and display methodology.*

Smith, F.T., University College London. *Computations for boundary-layer transition and separation.*

Smith, F.T., University College London. *Hypersonic internal flows and transition.*

Sudbery, A., York. *Classification of quantum groups.*

Toland, J.F., Bath. *Theory and application of nonlinear mathematics.*

Walters, K., UCW Aberystwyth. *The stress singularity problem in viscoelastic fluid flow.*

Wathen, A.J., Bristol. *Iterative solution methods for indefinite linear systems.*

Wheeler, A.A. , Bristol. *A mathematical study of aspects of interfacial instability in solidification.*

Visiting fellowships

Baker, C.T.H., Manchester. J.C. Butcher, *Numerical analysis for delay differential equations.*

Ball, F.G., Nottingham. G.F. Yeo, *Semi-Markov models for single and multiple ion channels.*

Ball, J.M., Heriot-Watt. R.D. James, *Mathematical problems in solid mechanics.*

Bishop, S.R., University College. S.W. Shaw, *Chaos and nonlinear dynamics of impacting and other mechanical systems.*

Brenner, S., Liverpool. I. Assem, *Unfoldings of algebras.*

Brown, P.J., Liverpool. L.R. Pericchi, *Bayesian measurement error modelling.*

Brown, S.N., University College. A.F. Messiter, *Stability of hypersonic boundary layers.*

Cameron, P.J, Queen Mary & Westfield College. J.I. Hall, *Investigations in geometry groups and coding theory.*

Chadwick, P., East Anglia. A.N. Norris, *Wave propagation and scattering in anisotropic elastic solids.*

Clarke, C.J.S., Southampton. Various visitors. *Workshop on approaches to numerical relativity.*

Coates, J.H., Cambridge. K. Iwasawa, *Algebraic number theory.*

Collins, M.J., Oxford. *Symposium on the inverse galois problem.*

Corrigan, E., Durham. A. Morozov, *Conformal field theory.*

Daniels, P.G., City. M. Weinstein, *Stability of convection in a vertical slot.*

Dawid, A.P., University College. Various visitors. *An abstract approach to expert systems.*

Donkin, S., Queen Mary & Westfield College. S. Doty, *Modular representations of algebraic groups.*

Donnelly, P.J., Queen Mary & Westfield College. T.G. Kurtz, *Genealogical structure of the Fleming-Voit measure valued diffusion.*

Dunwoody, M.J., Sussex. *Geometric group theory symposium, Sussex University.*

Erdmann, K., Oxford. G. Michler, *Modular representations of finite groups.*

Graham, I.G., Bath. G.A. Chandler, *Numerical analysis of boundary integral methods.*

Hartley, B., Manchester. A.E. Zalesskii, *Group rings of simple locally finite groups.*

Hayman, W.K., York. A. Baernstein, *Geometric function theory II.*

Higgins, P.J., Durham. *Probabilistic methods in combinatorics - LMS Durham Symposium.*

Hirschfeld, J.W.P., Sussex. *Finite geometries and designs.*

Hudson, R.L., Nottingham. S. Pulmannova, *Product structures in quantum theory.*

Hyland, J.M.E., Cambridge. A. Joyal, *Applications of category theory to topology, logic and theoretical computer science.*

Isham, C.J., Imperial College. A.V. Ashtekar, *Quantization of gravity using the Ashtekar variables.*

Isham, C.J., Imperial College. K. Kuchar, *The problem of time in quantum gravity.*

Jackson, W., Goldsmiths' College. H. Li, *Hamilton cycles in regular graphs.*

James, I.M., Oxford. D.M. Davis, *Homotopy theory.*

Jones, J.D.S., Warwick. E. Getzler, *Cyclic homology and loop spaces.*

Kent, J.T., Leeds. D.E. Tyler, *Local and global robust multivariate analysis.*

Larman, D.G., University College. J. Pach, *Geometric problems and computation.*

Leedham-Green, C.R., Queen Mary & Westfield College. A. Shalev, *The structure and representation theory of finite p-groups.*

Lewis, S.M., Southampton. A.M. Dean, *Mixture designs for q -components in orthogonal blocks.*

Lewis, S. & Prescott, P., Southampton. N.R. Draper, *Mixture designs for q -components in orthogonal blocks.*

Light, W.A., Lancaster. E.W. Cheney, *Approximation with radial basis functions.*

Lloyd, N.G., UCW Aberystwyth. *Fifth Gregynog symposium on differential equations.*

Majid, S.H., Cambridge. Y.A.S. Soibelman, *Quantum groups and applications.*

Manning, A.K., Warwick. A.V. Arhangel'ski, *Dependence of an invariant measure on a parameter.*

McGhee, D.F., Strathclyde. R.H. Picard, *A Frechet space approach to integral transforms on spaces of generalised functions.*

Mond, D.M.Q., Warwick. V.V. Goryunov, *Monodromy and Hodge theory of discriminants.*

Morton, H.R., Liverpool. V.G. Turaev, *Shadow link and related topology.*

Morton, K.W., Oxford. Kreis, H.O., *Numerical modelling of Navier-Stokes equations.*

Newstead, P.E. Liverpool. M.S. Narasimhan, *Vector bundles on algebraic curves.*

Potts, C.N., Southampton. J.N.D. Gupta, *Scheduling with batching and lot-sizing.*

Powell, M.J.D., Cambridge. C.A. Micchelli, *Radial basis functions and wavelet construction.*

Preiss, D., University College. J. Lindenstrauss, *Geometry of Banach spaces.*

Preiss, D., University College. M. Laczkovich, *Theory of real functions.*

Prest, M.Y., Manchester. I. Herzog. *Model-theoretic duality for modules and applications.*

Quillen, D.G., Oxford. E. Getzler, *Cyclic homology in mathematical physics and differential geometry.*

Rand, D.A., Warwick. Various visitors. *Nonlinear systems laboratory VI.*

Ranicki, A.A., Edinburgh. C.B. Hughes, *Controlled topology of manifolds.*

Rogers, L.C.G., Queen Mary & Westfield College. I. Karatzas, *Option pricing in incomplete markets and optimal investment and consumption.*

Scholl, A.J., Durham. *Non-commutative rings: new directions, LMS Durham Symposium.*

Scholl, A.J., Durham. *The geometry of operator algebras and Banach spaces, LMS Durham Symposium.*

Scholl, A.J., Durham. *Evolutionary problems: continuous and discretized nonlinear systems.*

Silverman, B.W., Bath. *Various visitors. Minimax approaches to statistical inverse problems complex stochastic systems.*

Stelle, K.S., Imperial College. A. Galperin, *Super symmetric geometry and superstrings.*

Taylor, M.J., U.M.I.S.T. P.H. Cassounogue, *Arithmetic of class invariants and elliptic curves.*

Titterington, D.M. Glasgow. P.G. Hall, *Statistical smoothing and resampling methodology with application in curve estimation and inverse problems.*

Tong, H., Kent. M.C. Casdagli, *An interdisciplinary approach to nonlinear time series.*

Vaughan-Lee, M.R., Oxford. E.I. Zelmanov. *Restricted Burnside problem.*

Wassermann, A.J., Oxford. *Symposium on mathematical aspects of QFT.*

Wathen, A.J., Bristol. J.L. Barlow, *Numerical analysis of eigenvalue and least squares problems.*

Wigley, T.M.L., East Anglia. P. Bloomfield, *Development of statistical techniques directed towards the detection of greenhouse gas induced climatic change.*

EUROPEAN SCHOOL OF GROUP THEORY

The European School of Group Theory provides high level courses for young researchers on recent developments in Group Theory. Each year the School is organized in a different European country. The 1992 session will take place at the University of Twente, Enschede, The Netherlands, from 24th August to 4th September.

The scientific programme will consist of four main courses, some additional lectures by other specialists and a seminar in which the participants can present their own work. The main courses are Infinite dimensional Lie algebras, O. Mathieu (Paris, France); Semi-simple symmetric spaces, H. Schlichtkrull (Frederiksberg, Denmark); Representations of Weyl groups, T.A. Springer (Utrecht, The Netherlands) and Quantum groups, L. Takhtajan (Boulder, U.S.A.).

Participants will be accommodated on campus, in the Logica Building at a cost of Dfl.90.- a day, for full board and lodging. Participants requiring financial support to cover part of their travel and living expenses may apply. Further information can be obtained from Mrs N. Mitrovic, European School of Group Theory, CWI, PO Box 4079, 1009 AB Amsterdam, The Netherlands. Fax 31-20-592 4199, e-mail: nada@cwi.nl. Applications should be made by 15th February.

THEORETICAL AND APPLIED MECHANICS CONGRESS

The 18th International Congress of Theoretical and Applied Mechanics will be held from 22nd to 28th August 1992 at the Technion, Israel Institute of Technology in Haifa. The Congress will cover the entire field of theoretical and applied mechanics. The International Congress Committee of IUTAM has invited distinguished scientists to present the opening and closing lectures and fifteen sectional lectures. Three topics have been chosen for special attention in minisymposia organized by well known authorities in their fields. They are Instabilities in solid and structural mechanics, J.W. Hutchinson (U.S.A.) and S. Bodner (Israel); Sea surface mechanics and air-sea interaction, O.M. Phillips (U.S.A.) and Zheng Zhemin (PRC) and Biomechanics, T.J. Pedley (U.K.) and S. Weinbaum (U.S.A.). It is expected that about 450 contributed papers will be chosen for presentation either as lectures or as posters.

For further information write to Professor Alexander Solan, Secretary, ICTAM 1992, Faculty of Mechanical Engineering, Technion, Haifa 32000, Israel. Telephone 972-4-292079, fax: 972-4-324533, e-mail: ictam@technion.bitnet.

ORDER AND CHAOS

A residential study weekend on Order and Chaos will be given by Dr Philip Drazin and Dr Christopher Budd of Bristol University. The study weekend is being held at the Dartington Centre, Dartington Hall commencing with a reception on Friday evening 8th and concluding on Sunday afternoon 10th May 1992. The fees are £95.00 residential and £75.00 non-residential. For further information contact Brenda Blewitt, Programme Administrator, The Dartington Centre, Dartington Hall, Totnes, Devon TQ9 6EL.

MATHEMATICA MONTISNIGRI

The Department of Mathematics, University of Titograd, Yugoslavia and the Society of Mathematicians and Physicists of Montenegro are starting a journal called Mathematica Montisnigri. The journal will be publishing research papers in all areas of mathematics. The first issue will appear in mid 1992. There will be two issues a year. For further information write to Professor Zarko Pavicevic, Editor, Faculty of Mathematics, University of Titograd, 81000 Titograd, Post. fah 176, Yugoslavia.

THEODOR ESTERMANN

Theodor Estermann who was elected a member of the London Mathematical Society on 14th November 1929 died on 29th November 1991 at the age of 89. He was a member of Council from 1937 to 1939.

1992 INVITED LECTURES

The next meeting in the LMS Invited Lectures series will be held at the University of Bath, with Professor Peter J. Olver of the University of Minnesota speaking on the topic *Symmetry and Equivalence of Differential Equations*. Professor Olver will deliver about ten hours of lectures from Monday 13th to Thursday 16th April 1992, beginning at a level accessible to postgraduate students, and will write up his lecture notes for publication by the Society as a book.

The 1992 SERC Nonlinear Systems Spring School will be organised around Professor Olver's lectures at Bath, supplementing them with a further ten hours of introductory lectures for postgraduates on various topics in nonlinear mathematics. SERC support for this meeting will be available to a substantial number of students holding SERC studentships.

Accommodation will be available at the University for the Monday, Tuesday and Wednesday nights.

Those wishing to attend, or wishing to nominate their postgraduate students (whether or not they hold SERC studentships), may obtain full details from Dr G.R. Burton, School of Mathematical Sciences, University of Bath, Claverton Down, Bath BA2 7AY (0225 826218, grb@uk.ac.bath.maths).

OPERATOR ALGEBRAS AND APPLICATIONS

With the impending appointment of Ian Halliday and David Olive to chairs in physics and mathematics respectively at Swansea, a two day meeting is being organised with LMS support by D.E. Evans, I.G. Halliday and D.I. Olive on 5th and 6th March on Operator Algebras and Applications at the University of Wales, Swansea. Invited speakers include Arthur Jaffe (Harvard), Werner Nahm (Bonn), Sorin Popa (UCLA), Jean-Bernard Zuber (Saclay). A limited amount of support is available for UK participants. For further details contact David Evans at the Department of Mathematics and Computer Science, University College of Swansea, Singleton Park, Swansea SA2 8PP, E-mail: madai@uk.ac.swansea.pyramid.

HOMOTOPY THEORY CONFERENCE
Change of Venue and Date

The International Conference on Homotopy Theory announced in the December issue of the LMS Newsletter will be held at Gargnano on Lake Garda from 4th to 9th September 1992, instead of Positano in June. Further details are available from Professor R. Piccinini, Dipartimento di Matematica, Universita di Milano, Via C. Saldini 50, 20133 Milano, Italy.

Discount Maths Books

New books at 25% discount!

LMS members are entitled to 25% off the retail prices shown below. To order, return this form to Cambridge University Press, Science Publicity Department, The Edinburgh Building, Cambridge CB2 2RU. **Please remember to enclose a sterling cheque payable to Cambridge University Press.** Alternatively, ring 0223 325970 or Fax 0223 315052 at any time to order on your credit card.

Qty	1st Author	Title	ISBN	Price	Total	
	ABLOWITZ	Solitons, Nonlinear Evolution Equations	38730 2	£27.95		NEW
	BARLOW	Stochastic Analysis	42533 6	£24.95		
	CAMERON	Designs, Graphs, Codes & their Links	42385 6	£12.95		
	CAMPBELL	Groups St Andrews 1989, Volume 1	39849 5	£22.95		
	CAMPBELL	Groups St Andrews 1989, Volume 2	40669 2	£22.95		
	CASSELS	Elliptic Curves	42530 1	£12.95		NEW
	DIGNE	Representations of Finite Groups	40648 X	£9.95		
	DIXON	Analytic Pro-p Groups	39580 1	£22.95		
	FULLING	Quantum Field Theory in Curved Spacetime	37768 4	£12.95		
	GOLDIE	Communication Theory	40606 4	£10.95		NEW
	GRAHAM	Van der Corput's Method	33927 8	£12.95		
	FIGA-TALAMANCA	Harmonic Analysis	42444 5	£15.95		
	HUGHSTON	Introduction to General Relativity	33943 X	£9.95		
	JOHNSON	Presentations of Groups	37824 9	£10.95		
	KEEDWELL	Surveys in Combinatorics, 1991	40766 4	£22.50		
	KIRWAN	Complex Algebraic Curves	42353 8	£13.95		NEW
	KÜLSHAMMER	Lectures on Block Theory	40565 3	£10.95		
	NABER	Spacetime and Singularities	33612 0	£9.95		
	REID	Undergraduate Algebraic Geometry	35662 8	£9.95		
	SHRIKHANDE	Quasi-symmetric Designs	41407 5	£17.95		NEW
	VOVSI	Varieties of Group Representations	42410 0	£19.95		NEW
				Subtotal		
				Deduct 25% (LMS discount)		
				GRAND TOTAL		

NAME

ADDRESS

POSTCODE

Cambridge
University Press

MATHEMATICS DEPARTMENTS SURVEY 1991

1. In 1990 the Council, concerned about the level of funding in Mathematics Departments, set up a small Committee with a remit to examine all aspects of the funding of Mathematics departments. The Committee (consisting of J.M. Howie (Chairman), J.B. Copas, H.G. Dales, M.J. Sewell, B.D. Sleeman and P. Vámos) has met regularly since its inception, and has conducted a survey of UK Mathematics departments. The model for this survey was the survey carried out by Christopher Zeeman some years ago, and reported on in the LMS Newsletter in June 1988; we have been interested to discover how departments have fared since then.

2. We confined our survey to Universities, partly because it made our problems more manageable. The group of Universities is near enough to being homogeneous for averages to make some sense, and we felt that we had more understanding of the kind of issues that currently face these institutions. With the intended abolition of the binary line it seems clear that any future surveys will have to cast a wider net. We could not reasonably expect a 100% return, and we did not get it. Some departmental chairmen clearly felt that they already had more than plenty forms to fill in; others gave us partial information. Eventually, however, after some reminders we reached 90+% for the most important parts of the data, and we hope that the non-replies do not have too dire an effect on most of the figures.

3. Overall Student/Staff ratios. The national average, based on the returns received, was 14.0 This compares with the figure of 11.5 reported by Zeeman in 1986/87.

4. Undergraduate Students. It is well known that service teaching (to engineers and others) plays a large part in the teaching effort of Mathematics departments. There is of course wide variation, but the national teaching effort of Mathematical Sciences Departments is divided in the ratio

Mathematics UG : Service Teaching : PG = 63: 30 : 7.

In service teaching for another department or faculty there is a common device called a load factor, defined as

$$\frac{\text{FTEs allocated to mathematics department}}{\text{number of students on the course.}}$$

The following table shows the distribution of effort nationally among the main user subjects, with the relevant load factor.

	Load Factor	% of Total FTE
Computer Science	0.15	3
Other Science	0.16	9
Engineering	0.13	11.2
Social Science	0.11	2.5
Other	0.18	1.7
Total	0.15	29.8

There had been a feeling within the Committee that the entrepreneurial spirit now abroad in universities might cause the credit received by mathematicians for service teaching to be squeezed by means of a downward revision of load factors. Although 11 departments did report 'redefinition of load factor' as a reason for changes in Service FTEs, such changes seem on the whole to be due to changes in student numbers or to the introduction or removal of courses.

5. Recent UFC bidding. Overall, departments had been allocated 87% of the undergraduates they bid for, and 58% of the postgraduates. A letter has been written to the UFC expressing concern at the postgraduate figure, and urging the new funding Council in conjunction with the Research Councils to develop a coherent plan for postgraduate numbers. The data below on the age profile of university staff are relevant in this context.

6. Admissions. 23 departments expected an increase in Cost Centre 17 UG student numbers, and only 5 expected a decrease. The remainder either expected no change or did not know. No-body expected an increase in the entry qualifications of their 1991/92 students. 30 expected no change, 10 expected a decrease; the others did not know. The expected proportion of fees only UG students was 10.6%.

7. Postgraduate Students. As has been pointed out with admirable force and clarity by the Kingman Report, the throughput of postgraduate students, especially of PhD students, is vital for the future of mathematical research. It has a particular bearing on the supply of Higher Education teaching staff, which is the subject of Paragraph 9. In the following summary tables (which relate to Session 1990/91) the categories are disjoint. Thus EC here means EC but not UK, and RoW means the world outside the EC. The figures are FTEs.

M.Sc. students

Advanced Course			By Research		
UK	EC	RoW	UK	EC	RoW
311	34.5	62.5	21	0	12

Ph.D. students

	Pure			Applied			Statistics		
	UK	EC	RoW	UK	EC	RoW	UK	EC	RoW
Year 1	61.7	12.2	11.3	67.5	7	25	38.7	7	19
Year 2	66.5	12	24	68	2	12.5	30.8	2	12.5
Year 3	55	9	24.4	61.5	1	20.5	23.8	0	22.5
Year 4	23.5	6	13	13.5	0	9.5	17	0	10
Awards	53	3	25	48.5	2	22	21	0	16

Nationally the reported proportion of postgraduate FTEs within the total FTEs in mathematical sciences was 6.8%.

8. Departmental Funds. Comparisons in this area are notoriously hard, since the departmental grants in different universities may be expected to cover quite different heads of expenditure. The trend at the moment appears to be towards 'Full formula funding', a system in which all expenditure, including salaries and space, is charged to departments. At the other extreme is 'Historical funding', where grants are given to departments in earmarked categories. Departments were asked to estimate their position on a scale of 1 (Historical funding) to 5 (Full formula funding). On the basis of 41 replies, the average was 2.85, and there was a considerable spread:

Funding Regime	1	2	3	4	5
Departments	10	7	9	14	5

Comments indicated an upward shift in 1991/92.

Funding formulae of some sort appear to be in use universally. Only 29 departments felt able to respond to the question as to whether the money they actually received was more or less than the figure determined by the formula. Of the departments who replied, 8 claimed to do better than the formula, 7 claimed to do worse, and the remaining 14 felt that the formula matched the actual funding reasonably well.

A reasonable definition of the *Unit of Resource* for a department is

$$\frac{\text{Total income of Department}}{\text{Total FTEs in Department.}}$$

23 departments expected this to decrease in 1991/92, and 4 expected an increase; the remainder either expected no change or did not know.

Of the 39 departments who replied to the question concerning the effect of their research rating on funding, 13 reported that no account had been taken of the rating. Of the remainder, 6 reported no change, 3 reported a decrease, and 17 an increase.

9. Staff. Post 1981 data on staff are complicated by the presence of retired and re-engaged colleagues. In the following figures such people, and other part-time staff, are counted in proportion to the fraction of full-time salary being paid. The reported changes in staff numbers from 1987/88 to 1990/91 were

Pure: - 6.5%   Applied: - 3.2%   Statistics: + 1%   Total: - 3.6%

From the known total of staff in 1987/88 it is possible to estimate the 1990/91 total as 1471. The loss in terms of bodies is 55.

The age distribution of staff is well known to be a cause of concern. Surprisingly, some departmental chairmen appeared to regard information on this subject, even information to be used in the preparation of general statistics, as confidential. There were 38 returns. Age was defined as age on 1 October 1990. Data on average ages do not themselves give cause for enormous concern.

If one had a uniform distribution covering the ages 25 to 65 then the average would be 45:

	Pure	Applied	Statistics	All
% of all	36.6	40.0	23.4	100
Average age	46.7	46.3	42.5	45.5

It is when one looks at the actual distribution of ages that the real problem emerges:

Age Distribution of UFC funded Permanent Staff (as % of group)

Age	*Pure*	*Applied*	*Statistics*	*All*
< 30	*4.1*	*4.4*	*10.1*	*5.6*
30-34	*5.5*	*11.5*	*11.8*	*9.4*
35-39	*8.2*	*7.2*	*12.8*	*8.9*
40-44	*12.2*	*10.9*	*21.8*	*13.9*
45-49	*32.2*	*24.6*	*23.1*	*27.0*
50-54	*26.9*	*25.9*	*13.7*	*23.4*
55-59	*6.3*	*9.8*	*3.8*	*7.1*
60-64	*3.5*	*5.3*	*2.1*	*3.9*
> 65	*1.1*	*0.5*	*0.9*	*0.8*

It is evident that there will be a recruitment crisis when the people in the bulge reach retirement age in the decade 2000-2010, and it ought to be possible to plan so as to soften the effects of the crisis.

Some UFC funded academic staff (being part-time or temporary) fall outside the categories described in the last table. As percentages of the total these are:

Pure: 2.6% Applied: 4.3% Statistics: 2.4%

The impact of research staff on outside contracts on total staff numbers is considerable: overall they account for 24% of the total academic-related staff in departments.

In mathematical departments it takes, on average, 89 FTE students to justify a secretary. On the same measure, it takes 545 FTEs to justify a technician. The proliferation of sophisticated machinery in departments has not yet resulted in any very noticable policy to provide technical support.

10 Resources.

(a) *Library.* The reported average expenditure per FTE student is £51, of which 78% is spent on journals. The percentages of libraries taking the various reviewing/abstracting journals are:

Mathematical Reviews	86
Zentralblatt	23
Referativnyi Zhurnal	5
Current Math. Publications	51
Applied Mechanics Reviews	47
Stats. Theory & Methods Abs	46

As yet, the On-line and CD-Rom versions of Mathematical Reviews and Zentralblatt seem to be quite a small scale phenomenon in UK universities.

It was difficult to get a reliable quantitative overall picture of journal cancellations. The cancellations seemed to be almost in balance with the new orders, but it was harder to get any impression of how many desirable new titles had been turned down (or perhaps not even formally recommended) because of financial stringency.

(b) *Computers.* On the basis of returns received, approximately 78% of academic staff now have a BBC or better in their offices, and 63% of staff are connected to the national (JANET) network. No attempt was made to assess the adequacy of the available equipment.

The average number of FTE students per computer terminal is 19.7.

11. Changes in major indicators. The following table shows changes in major indicators since 1984/85. No attempt has been made to allow for inflation, and so the pounds in 1989/90 are worth less than those in 1984/85. Notice that the tables show how the subject has become more equipment-intensive: an increase of only 31% in total expenditure per FTE is in sharp contrast to an increase of 117% in equipment expenditure.

Major Indicators 1984/85 - 1989/90

	84/85	85/86	86/87	87/88	88/89	89/90	90/91
Staff	1620	1588	1558	1526	1471	1458	1471
S/S ratio	11.7	11.8	11.8	12.0	12.9	13.6	14.3
Exp./FTE(£)	1890	2090	2230	2410	2410	2490	
Equip./FTE(£)	59	63	70	92.5	100	128	
Supp. Staff/FTE(£)	103	110	119	150	163	176	

The next table shows the change in the position of Mathematics *relative to other subject groups.* It shows for each indicator the percentage change in the ratio (indicator in subject) / (indicator in Mathematics) from 1984/1985 to 1989/90. Thus a positive entry signifies that the position of Mathematics has *deteriorated* relative to that subject; a negative entry indicates an improvement. The striking features are first, that Mathematics has fared worst of all in terms of loss of staff; secondly, that its position with regard to equipment has improved very sharply.

Comparison with other subjects 1984/85 - 1989/90

	Physics	Comp.Sci.	Humanities	Languages	Accountancy
Staff	5	65	4	8	24
S/S Ratio	- 12	- 16	8	1	10
Exp./FTE	5	29	- 8	0	2
Equip./FTE	- 45	- 59	- 12	- 34	- 23
Supp. Staff./FTE	- 26	40	0	0	- 7

Comments

1. The Kingman Report estimates the need of the University system for PhD graduates on the basis of a steady state model. As the age distribution table makes clear, the steady state model is not very close to reality. If one pursues the Kingman argument in a way that takes account of the age bulge and the consequent retirement bulge, then a very rough argument indicates that recruitment in the first decade of next century will have to be at approximately twice the 'normal' rate. A more precise set of predictions would be very useful, but might be difficult to get right: how soon the need for increased recruitment will begin depends on how much early retirement takes place over the next few years, and this is hard to predict.

2. A further, related point concerns the abolition of the binary line, which could have a significant, but not very easily calculable positive effect on the demand for PhD mathematicians, and could happen sooner than the surge due to retirement.

3. It is clear that computers are making their presence felt in all Mathematics departments, but that few departments have the support staff needed to make as effective a use of their equipment as they might. *The appointment of technicians and of (academic-related) computing officers is a priority of growing urgency. The funding level for Mathematics must increase to make this possible.*

4. There is little sign of a realisation by the UFC that they will adequately plan for the demographic 'time bomb' created by the coming mass retirements of university staff. Because of the time lag involved, and because one must assume that some early retirement will continue, *a decision NOW by the SERC to make a substantial increase in the number of Research Studentships by October 1993 would not be premature. And funding for these students must be provided by the UFC.*

5. Mathematics departments, living as they usually do next door to much more generously funded neighbours, and fighting for funds from the same pool as those neighbours, can get a bit paranoid about their financial position. Nothing in this survey suggests that there is any ganging up on mathematicians to ensure that they remain underfunded. But maybe we did not ask the right questions. *Comments from readers on the planning of the next survey will be gratefully received. Remember, however, that there is a limit to what chairmen will stand: we got a few unfriendly letters, and would get more if the questionnaire became more complicated.* General comments should come to John Howie in St Andrews; comments on the fine detail of the figures to Peter Vámos in Exeter.

John Henry Constantine Whitehead (1904-1960), a nephew of the philosopher A.N. Whitehead, studied mathematics at Balliol College, Oxford. In 1928 he visited Princeton and studied differential geometry with Veblen. On his return to a Fellowship at Balliol College he began to work on topology. His topological interests were wide and his influence on the subject has been enormous. The notions of a CW-complex and of simple homotopy type are two of many contributions of great originality. He was elected to Fellowship of the Royal Society in 1944 and appointed Wayneflete Professor at Oxford in 1947. He was a prime mover in the creation of the Oxford Mathematical Institute. The London Mathematical Society awarded him the Senior Berwick Prize in 1948 and he was the Society's 45th President from 1953-1955.

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

FEBRUARY	
2-6	Australian Applied Mathematics Conference, NSW, Australia (186)
14	Edinburgh Mathematical Society Meeting, Edinburgh (186)
21	LMS Meeting, Bristol
MARCH	
13	Edinburgh Mathematical Society Meeting, Dundee (186)
20	LMS Meeting, London
21-22	Conference in Honour of John Shepherdson, Bristol (190)
24-26	8th British Colloquium for Theoretical Computer Science, Newcastle-upon-Tyne (190)
30-2 April	34th British Theoretical Mechanics Colloquium, Keele (185)
APRIL	
6-10	British Mathematical Colloquium, Strathclyde (188)
7-10	Annual Iranian Mathematics Conference, Bakhtaran, Iran (188)
10-12	The Uses of History in Mathematics Education Conference, Nottingham (186)
10-12	HIMED 92, Nottingham (189)
12-16	Diophantine Approximation and Abelian Varieties Conference, Soesterberg, Netherlands (187)
13-16	LMS Invited Lectures, Professor P.J. Olver, Bath University (187) (189)
MAY	
1	Edinburgh Mathematical Society Meeting, Stirling (186)
15	LMS Meeting, London
18-22	Nascode VIII, Dublin, Ireland (188)
26-31	Engineering Mathematics and Applications Symposium, Shenzhen, China (188)
29	Edinburgh Mathematical Society Meeting, Aberdeen (186)
JUNE	
9-12	Analysis and Optimization of Systems Conference, Sophia-Antipolis, France (190)
19	LMS Meeting, London
22-26	Dundee Conference on Ordinary and Partial Differential Equations, Dundee (188)
27-3 July	The Penrose Transform and Analytic Cohomology in Representation Theory Conference, Massachusetts, U.S.A. (186)
29-30	The Development of Mathematics from 1900 to 1950 Colloquium, Luxembourg (189)
29-1 July	Joint AMS/LMS Meeting, Cambridge (155)(188)
JULY	
4-14	Evolutionary Problems, LMS Durham Symposia, Durham (178) (189)
6-10	Mathematical Conferences in Perth, Australia (186)
6-10	European Congress of Mathematics, Paris, France (180) (188)
11-18	St Andrews Colloquium, St Andrews (185)
13-24	Séminaire de Mathématiques Supérieures, Bifurcations and Periodic Orbits of Vector Fields, Montréal, Canada (189)

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.

Printed by Boyatt Wood Press, Southampton (0703) 333132