THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 185 **July 1991**

FORTHCOMING SOCIETY MEETINGS

Friday 18 October 1991, Burlington House
Meeting on Group Theory
Friday 15 November 1991, Burlington House
Annual General Meeting

LMS COUNCIL NEWS

At the meeting of the Council of the Society on 10th May 1991, I was asked to inform members that the Chairman of SERC has replied to the President's letter expressing Council's concern over the recent reduction in the funding of mathematics by SERC (see the item entitled 'LMS Council News' in the May 1991 issue of the Newsletter).

In his reply, Sir Mark Richmond stated that the level of this year's PES Settlement means that SERC cannot maintain its current programmes, and that the consequent need for savings in the short term means that support for new research grants and studentships must be reduced. However, an attempt has been made to spread the burden of the cuts evenly across all disciplines, and the mathematical community should take heart from the relatively small reduction in new research studentships and the avoidance of cuts in the provision for advanced course studentships. Furthermore, substantial support for the Isaac Newton Institute in Cambridge has now been approved.

Sir Mark sympathised with the fears expressed by the mathematical community, but commented that he is satisfied that, within the severe constraints placed upon it at the present time, the SERC and its Science Board have made considerable efforts to protect mathematics. He looked forward to the publication (expected in June) of the report of the SERC Mathematics Committee Strategy Panel: it has been agreed that this report will be disseminated widely.

When thanking him for his letter, the President assured Sir Mark that Council will continue to watch the situation.

R.Y. Sharp
Council and General Secretary

PRESIDENT-DESIGNATE

In accordance with By-Law I,4, the Council of the Society is very pleased to announce that Professor J.R. Ringrose, FRS, is the next President-Designate of the Society: as members will note from the item entitled 'Nominations for Council' elsewhere in this Newsletter, Council has nominated Professor Ringrose for election to Council as Member-at-Large in November 1991, and the intention is that he will be nominated by Council for election as President one year later.

R.Y. Sharp
Council and General Secretary

LMS 1991 PRIZES

The Polya Prize is awarded to I.G. Macdonald in recognition of the excellence of his research in algebraic geometry, the theory of algebraic groups, number theory and combinatorial theory, and also of his outstanding gifts as a writer and lecturer.

The Senior Whitehead Prize is awarded to W.B.R. Lickorish for his fundamental work in geometric topology, especially in knot theory and the theory of 3- manifolds.

The Junior Berwick Prize is awarded to W.W. Crawley-Boevey for his papers 'On tame algebras and bocses', Proc. London Math. Soc. (3) 56 (1988) 451-483, 'Functorial filtrations and the problem of an idempotent and a squarezero matrix', J. London Math Soc. (2) 38 (1988) 385-402, 'Functorial filtrations II: clans and the Gelfand problem', J. London Math. Soc. (2) 40 (1989) 9-30, and 'Functorial filtrations III: semidihedral algebras', J. London Math. Soc. (2) 40 (1989) 31-39.

Junior Whitehead Prizes are awarded to N.S. Manton for his work in mathematical physics, and to A.J. Scholl for his work in arithmetical algebraic geometry.

R.Y. Sharp
Council and General Secretary

INVITED LECTURES SERIES

The Society's Invited Lectures series consists of meetings at which a single speaker gives a course of about ten expository lectures, examining some subject in depth, over a five day period (Monday to Friday) during a University vacation. The meetings are residential and open to all interested. It is intended that the texts of the lectures given in the series shall be published. In addition to full expenses, the lecturer is offered a fee of £1000 for giving the course and a further fee of £1500 on delivery of the text in a form suitable for publication. The series was inaugurated at Cambridge in March 1990 with lectures by Professor R. Melrose. The second meeting was held at Southampton in April 1991 when the lecturer was Professor J.E. Marsden.

For the 1993 meeting, proposals are now invited from any member who, in addition to suggesting a topic and lecturer, would be prepared to organize the meeting at the member's own institution or a suitable conference centre. Enquiries about this series should be sent to the Meetings and Membership Secretary, A.R. Pears, Department of Mathematics, Kings College London, Strand, London WC2R 2LS (telephone: 071-873-2852) to whom proposals should be sent no later than 31st August 1991.

JOURNAL OF NATURAL GEOMETRY

Mathematical Research Unit in London will start publication of a new quarterly *Journal of Natural Geometry* which will be dedicated to bringing unity through simplicity in the study of the mathematics of natural structures. It solicits papers on all branches of mathematics pure and applied from authors throughout the world who are genuinely and justifiably proud of the simplicity of their works. Those interested in more information should contact the Editor: Professor C.S. Sharma, Mathematical Research Unit, University of London, Birkbeck College, 43 Gordon Square, London WCIH OPD, England.

PROCEEDINGS

The Proceedings of the London Mathematical Society was entered by its printer, Universities Press Belfast, in the Irish Print Awards 1990 in the category Scientific and Mathematical Typesetting. It was awarded First Prize in this category, and the Society has received a very fine framed Certificate as a memento.

On behalf of the Society it is a pleasure to thank the Press, the Editors and the Executive Editor for their contributions to the Proceedings.

D.A. Brannan
Publications Secretary

CHARLES AMICK

Charles Amick, Professor of Mathematics at the University of Chicago, died of cancer, aged 39, on 3rd June 1991. He had been a Research Fellow of St. John's College, Cambridge, 1977-79, and a frequent visitor to the United Kingdom; in particular, to Bath, Heriot-Watt, Oxford and Sussex Universities.

NOMINATIONS FOR COUNCIL

Members of the Society are reminded that nominations of members for election to the Council may be made by writing to the Council and General Secretary (Professor R.Y. Sharp, Department of Pure Mathematics, University of Sheffield, Hicks Building, Sheffield S3 7RH). Such nominations must arrive before noon on 01 September 1991, must be made in accordance with the Charter, Statutes and By-Laws of the Society, must state the Office or term of Membership-at-Large to which nomination is made, and must be signed by the member nominated, by the nominator and by a seconder who is also a member of the Society. The sample nomination form at the foot of this notice, which could be photocopied or imitated, may help members of the Society.

All valid nominations received are added to those made by the Council, and circulated to the Society on a Ballot Paper which is used for the Council Elections at the Annual General Meeting in November. **It should be noted that Council is making just enough nominations to fill the expected vacancies, so that, if this notice leads to no additional nomination, then the 1991 Council Elections will, like those of 1990, 1989 and 1988, be essentially a formality.**

Council's decisions about its nominations are indicated in the following list.

COUNCIL'S NOMINATIONS FOR THE 1991 ELECTIONS

OFFICERS (one-year terms)

President
J.F.C. Kingman

Vice-Presidents
J.M. Howie
P.M. Neumann

Treasurer
J.D.M. Wright

Council and General Secretary
R.Y. Sharp

Meetings and Membership Secretary
A.R. Pears

Publications Secretary
D.A. Brannan

Librarian
J.A. Erdos

MEMBERS-AT-LARGE (two-year terms)
*R.A. Bailey
N.J. Young

*N.J. Hitchin

MEMBERS-AT-LARGE (one-year terms)
*D.J. Collins
W.A. Hodges
R.L.E. Schwarzenberger

S.K. Donaldson
*J.R. Ringrose

Notes. (i) Council has agreed that it will co-opt to membership the Chairmen of Computer Science and Education Committees (currently W.A. Hodges and R.L.E. Schwarzenberger respectively) if they are not otherwise members of Council.
(ii) The persons whose names are marked with an asterisk are not on the retiring Council.
(iii) Members should note that the following four Members-at-Large of Council elected for two-year terms in November 1990 will have one remaining year to serve: D.G. Crighton, E.C. Lance, H.R. Morton, M.J. Taylor.

R.Y. Sharp
Council and General Secretary

We, the undersigned members of the London Mathematical Society, nominate

(block letters).....

for election as (delete as applicable) Member-at-Large of Council (one-year/two-year term)/Officer

(insert Office for which nominated).....
in the 1991 Council Elections of the Society.

Nominator's signature and printed name.....

Seconder's signature and printed name.....

I confirm that I am willing to stand for election as indicated above.

Nominee's signature.....

LONDON MATHEMATICAL SOCIETY
POPULAR LECTURES
VIDEOS AVAILABLE

CHAOLOGY by Professor M. Berry In Newtonian mechanics the present state of a system determines its future, but that future need not be predictable: there are simple systems for which the trajectories can be as random as coin tosses. In the lecture some concepts of the emerging science of chaology are illustrated by means of a simple machine. Prerequisites: none.

HOW MATHEMATICS GETS INTO KNOTS by Professor R. Brown The lecture starts from the oldest known knot, dating from 7,200 BC, and shows knotting and interlacing as a motif in art and sculpture, as well as a basic practical skill. The mathematics of knots deals with their classification; with the arithmetic properties of the operation of tying one knot after another; and with the remarkable algebra which models wrapping string around a knot. Prerequisites: none.

GEOMETRY AND COMPUTERS by Dr P. Giblin Modern geometry interacts with computers in several ways. Computers can draw pictures for geometers to look at, helping them to formulate new results and suggesting proofs. But also geometry provides vital tools for those developing computer vision. Various interactions are described and illustrated by still and moving pictures. Prerequisites: none.

GAMES THAT SOLVE PROBLEMS by Professor W. A. Hodges Mathematicians don't just solve problems. They also find methods for solving new kinds of problems. How can they do this? The lecture describes various attempts to answer this question during the last 150 years. One important recent approach is based on a kind of 'spot the difference' game; simple examples are given. Prerequisites: an interest in abstract ideas and patterns.

HOW SHOULD A MATHEMATICIAN THINK ABOUT SHAPE? by D.G. Kendall The short answer is - by creating a space in which each shape 'lives' as a point, in such a way that natural questions about shapes translate into geometrical questions concerning the new space. This subject is only about 10 years old, but is already leading to new insights and has interesting applications in archaeology and astronomy. Prerequisites: none.

THE RISE AND FALL OF MATRICES by W. Ledermann A description of the revolutionary paper of 1858 by Cayley and the change of emphasis of the teaching of linear algebra from determinants matrices and linear maps, with historical background. Prerequisites: some knowledge of matrices.

CODES AND CIPHERS by F.C. Piper An introduction to the art (or science!) of keeping information secret. One of the main themes is how the advent of fast computers has affected cryptography. There are virtually no prerequisites.

GAMES ANIMALS PLAY by J. Maynard Smith Game theory is applied by an eminent biologist to give an insight into animal contests (for instance, for mates), leading to an explanation of why there are an (almost) equal number of male and female births, the behaviour of the Hamadryas baboon, and the funnel web spider. Prerequisites: none, but a knowledge of pay-off matrix would be helpful and some idea of evolution.

STAMPING THROUGH MATHEMATICS by R.J. Wilson This video produced by the BBC for the Open University, presents an overview of the history of mathematics, from earliest times to the modern computer age. The talk is illustrated by slides of 70 postage stamps featuring mathematics and mathematicians. Prerequisites: none.

GEOMETRY AND PERSPECTIVE by E.C. Zeeman The vanishing points and observation points of perspective are explained, and the underlying theorems in 3-dimensional Euclidean geometry are proved. The results are illustrated with renaissance paintings and a reconstruction of Brunelleschi's original experiment demonstrating his discovery of perspective in 1420. Prerequisites: none.

The cost to hire these videos is £5.00 each. Send your order together with payment to: LMS Video Secretary, School of Mathematics, University of Leeds, Leeds LS2 9JT. Please make cheques payable to the **London Mathematical Society**.

PROGRAMME AND CONFERENCE FUND

The Society's Programme and Conference Fund is used to give financial support to various mathematical activities in the UK. This fund is administered by the Society's Programme Committee. Grants are made under three main headings.

1. Scheme 1 Visitors

Under this scheme, a speaker from abroad is invited to spend about two weeks in the UK, to address a Society Meeting and to give lectures in three or four separate institutions. The Society pays the cost of the visitor's travel to and from the UK and living expenses in London, and the host institutions are expected to share the cost of travel within the UK and local accommodation. LMS Council is anxious that greater use should be made of this scheme to enhance, by such visits, the benefit of LMS membership to those who are not easily able to attend London meetings. In planning the Society's future meetings, Programme Committee will have this scheme in mind, and suggestions from UK institutions for visitors they would like to receive but whose expenses they could not normally afford are strongly encouraged. Programme Committee tries to plan Society Meetings at least six months in advance. Thus a suggestion for a visitor under this scheme should best be made about one year before the proposed visit.

2. Scheme 2 Visitors

Under this scheme, some financial support is provided for visitors to the UK who do not address a Society Meeting but will give lectures in at least three separate institutions. Exceptionally, support under this scheme might be provided for a speaker addressing just one meeting which is regional in scope. The LMS contribution under this scheme would be for the visitor's travelling expenses to and from the UK. Host institutions are expected to share the cost of travel within the UK and local accommodation. All arrangements for a visit supported under this scheme are the responsibility of the member who makes the application. An application, in the form of a letter to the Meetings and Membership Secretary (address below), can be submitted at any time, but should normally be made at least three months before the starting date of the proposed visit, so that the lectures to be given can be publicized in the Society's Newsletter. Grants under this scheme do not normally exceed £300. In the past six months, grants have been made under Scheme 2 to support the following visits: Professor J.-M. Morvan (J. Bolton), Professor R. Silhol (W.J. Harvey), Professor K.S. Lau (C.-H. Chu), Professor J. Strooker (L. O'Carroll), Dr U.N. Bhosle (P.E. Newstead), Professor M.S. Narasimhan (P.E. Newstead), Professor R. Haggkvist (A.G. Chetwynd), Professor V.L. Popov (A.O. Morris), Professor E. Ghys (S. Bullett), Dr E. Lesaffre (S.M. Rudolfer), Professor T. Shioda (J.H. Coates), Professor D. Stoyan (P.J. Diggle), Professor I. Chavel (E.B. Davies), Professor A.E. Eremenko (I.N. Baker), Dr W. Willinger (P.E. Kopp), Professor Yu.V. Kuz'min (B. Hartley), Professor M. Bestvina (W.B.R. Lickorish), Professor M. Putinar (H.G. Dales), Dr K. Zietack (K.-K. Lau), Professor B. Bongiorno (J.D.M. Wright), Professor M. Bendersky (I.M. James), Professor L.A. Lambe (R. Brown).

3. Financial Support for Conferences

Grants are made from the Conference Fund to the organizers of conferences to be held in the United Kingdom. Programme Committee tends to give priority to the support of small meetings where an LMS grant can be expected to make a significant contribution to the viablility and success of the meeting. Support of larger meetings of high quality is not ruled out but for such meetings an LMS grant would normally cover only part of the total cost. An Application Form, obtainable from the Meetings and Membership Secretary (address below), sets out conditions under which grants are normally made and requests the information Programme Committee usually requires when considering an application.

The following grants for support of conferences have been made within the past six months: £620 to K.A. Brown for the 'Scottish Algebra Day' held at Glasgow in March 1991: £230 to A.J.W. Hilton for the 'One-Day Combinatorics Colloquium' held at Reading in May 1991; £283 to D.A. Lavis for the 'One-Day Conference in Statistical Mechanics' held at King's College London in May 1991; £594 to R.G. Flood for 'History of Mathematics in Oxford' held at Oxford in May 1991; £500 to I. Grattan-Guinness for the 'Babbage-Faraday Bicentenary Conference' to be held at Cambridge in July 1991; £1000 to M.J.D. Powell for the 'Radial Basis Function Workshop' to be held at Cambridge in July 1991; £1000 to G.R. Allan for the 'Cambridge Banach Algebras Symposium' to be held at Cambridge in July 1991; £500 to F.M. Leslie for the 'Euromech Colloquium: Mathematical Models for Liquid Crystals and Allied Systems' to be held at Strathclyde in July 1991; £2626 to C.A. Whitehead for the 'Thirteenth British Combinatorial Conference' to be held at Surrey in July 1991; £500 to M. Crampin for the 'Workshop on Differential Geometric Methods in Lagrangian Dynamics' to be held at Stirling in August 1991; £1100 to J.R. Hubbuck for the '6th British Topology Meeting' to be held at Aberdeen in September 1991; £190 to D. Kershaw for the 'One-Day Function Theory Meeting' to be held at Lancaster in September 1991; £1500 to D.E. Evans for 'Operator Algebras and Applications' to be held at Swansea in October 1991; £900 to R.A. d'Inverno for 'Approaches to Numerical Relativity' to be held at Southampton in December 1991; £500 to A.K. Common for 'Clifford's Geometric Algebra: Recent Developments and Applications in Mathematical Physics' to be held at Kent in January 1991.

Further information about these functions of Programme Committee can be obtained from the Meetings and Membership Secretary. A.R. Pears, Department of Mathematics, King's College London, Strand, London WC2R 2LS, telephone 071- 873-2852, who will be pleased to discuss proposals informally with potential applicants and to give advice on submission of an application to the Society. The next meeting of Programme Committee will be held in October and it would be a great help if suggestions and applications to be considered at that meeting could be submitted no later than 31st August 1991.

CHAOS DAY

The Royal Statistical Society will be holding a one-day meeting on Chaos at the Royal Commonwealth Society, London on Wednesday 16th October 1991, starting at 11.00 am. The programme is organised by the Research Section of the Royal Statistical Society and will focus on the statistical issues of chaos, which include the detection of low dimensional deterministic chaos in experimental data, the estimation of the dimension of the attractor and that of its embedding space, applications to epidemics and other areas. The speakers will include D. Broomhead, M. Casdagli, B.T. Grenfell, D. Nychka, R.L. Smith and H. Tong.

In order to defray the cost of organising the meeting, a registration fee will be levied, which includes morning coffee, afternoon tea and preprints of the papers.

For further information write to the Executive Secretary, The Royal Statistical Society, 25 Enford Street, London W1H 2BH.

LMS PUBLICATIONS

Harmonic Analysis and Representation Theory for Groups Acting on Homogenous Trees
by A. Figá-Talamanca and C. Nebbia. pp 220. ISBN 0 521 42444 5. LMS Lecture Note Series 162. £15.95. LMS members' price £11.95.

These notes treat in full detail the theory of representations of the group of automorphisms of a homogenous tree. The unitary irreducible representations are classified in three series: a continuous series of spherical, two special representations and a countable series of cuspidal representations as defined by G.I. Ol'shiankii. Several notable subgroups of the full automorphism group are also considered. The theory of spherical functions as eigenvalues of a Laplace (or Hecke) operator on the tree is used to introduce spherical representations and their restrictions to discrete compact subgroups. This will be an excellent companion for all researchers into harmonic analysis or representation theory.

An Introduction to General Relativity
by L.P. Hughston and K.P. Tod. pp 194. ISBN 0 521 32705 9 (hb) 0 521 33943 X (pb). LMS Student Texts 5. £25.00/£8.95. LMS members' price £18.75/£6.70.

General relativity is Einstein's remarkable theory of gravitation and the structure of space-time. This long awaited textbook offers a concise one-semester introduction to basic general relativity suitable for mathematics and physics undergraduates. Emphasis is placed on the student's development of both a solid physical grasp of the subject and a sophisticated calculational facility. The text is supplemented by numerous geometrical diagrams and by a large selection of challenging exercises and university-level examination problems.

Steps in Commutative Algebra
by R.Y. Sharp. pp 332. ISBN 0 521 39338 8 (hb) 0 521 39732 4 (pb). LMS Student Texts 19. £30.00/£10.95. LMS members' price £22.50/£8.20.

This book meets the need for an introductory account of commutative algebra, which is aimed at students with a background only in basic abstract algebra. It is thus suitable for typical mathematics M.Sc. students or even advanced undergraduates in certain cases.

Professor Sharp's intention is to provide a good foundation from which the reader can progress to more advanced works in commutative algebra or algebraic geometry. The style throughout is rigorous but concrete, with exercises and examples given within chapters at appropriate points. The book will be welcomed by teachers and students of algebra.

Representations of Finite Groups of Lie Type
by F. Digne and J. Michel. pp. 150. ISBN 0 521 40117 8 (hb) 0 521 40648 X (pb). LMS Student Texts 21. £27.50/9.95. LMS members' price £20.60/£7.50.

This book is based on a graduate course taught at the University of Paris. The authors aim to treat the basic theory of representations of finite groups of Lie type, such as linear, unitary, orthogonal and symplectic groups. They emphasise the Curtis-Alvis duality map and Mackey's theorem and the results that can be deduced from it. They also discuss Deligne-Lusztig induction.

This will be the first elementary treatment of this material in book form and will be welcomed by beginning graduate students in algebra.

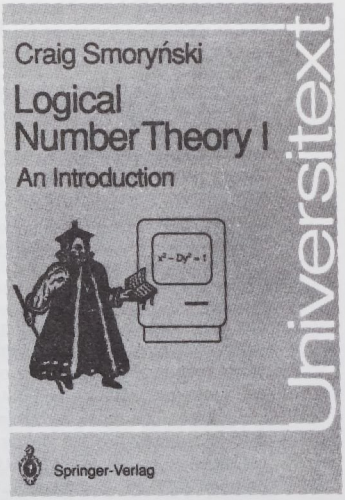
These books have recently been published and are available from Cambridge University Press, Customer Services, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU. Payment should be sent with your order, quoting account no 089 4900 001.

C. Smoryński

Logical Number Theory I

An Introduction

1991. X, 405 pp. 13 figs. (Universitext) Softcover
£24.50 ISBN 3-540-52236-0



Number theory as studied by the logician is the subject matter of the book. This first volume can stand on its own as a somewhat unorthodox introduction to mathematical logic for undergraduates, dealing with the usual introductory material: recursion theory, firstorder logic, completeness, incompleteness, and undecidability. In addition, its second chapter contains the most complete logical discussion of Diophantine Decision Problems available anywhere, taking the reader right up to the frontiers of research (yet remaining accessible to the undergraduate). The first and third chapters also offer greater depth and breadth in logico-arithmetical matters than can be found in existing logic texts. Each chapter contains numerous exercises, historical and other comments aimed at developing the student's perspective on the subject, and a partially annotated bibliography.

W. Pohlers

Proof Theory

An Introduction

1989. VI, 213 pp. (Lecture Notes in Mathematics Vol. 1407) Softcover £13.00
ISBN 3-540-51842-8

D. van Dalen

Logic and Structure

1st ed. 1988. Corr. 2nd printing 1989. X, 207 pp.
Softcover £15.00 ISBN 3-540-12831-X

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Symbolic Software for Mathematical Research

I attended the DIMACS Workshop on this subject at Rutgers University, New Jersey, during March of this year. It consisted of descriptions and demonstrations of symbolic software and its mathematical applications, and discussion sessions about various related issues, including strategies for applying for funding for software development. In this report, I shall concentrate on those issues which might be of interest to the mathematical community as a whole.

It is an indisputable fact that more and more mathematicians are using symbolic software of some kind as an integral part of their mathematical research, with or without expert technical assistance. The most convenient software tools for the majority are the larger general purpose packages such as MAPLE, MATHEMATICA and perhaps CAYLEY, but these all have the disadvantage that they are marketed as commercial products, and their cost may be prohibitive for an individual or academic institution. Many other more specialized systems and individual programs are available, usually either free of charge or very cheaply, but applying these to best advantage is likely to demand more effort, investment of time, and general technical expertise from the user.

One underlying reason why this situation has arisen is that software development is not always accepted amongst fellow mathematicians as a legitimate research activity on a par with publishing papers. Suppose, for example, that a talented well-motivated graduate student has a good idea for a new mathematical algorithm and wishes to implement it and produce a user-friendly product of benefit to the general community. Bearing in mind that this project could well take a year or more, and would often result at most in one short paper giving a brief description of the algorithm, many supervisors would hesitate before recommending going ahead with it. The result is that software is written either by tenured academics, who will often not have the time (or inclination) to produce a satisfactory finished product, or by programmers employed for the purpose, in which case the resulting product might have to be paid for. (In some countries the situation is admittedly not quite as bad. In Germany, for example, software development is often undertaken by students for their Diplomarbeit, who will later seek employment in industry.)

Personally, I should like to see two changes to this situation. Firstly, the authors of mathematical computer programs should write longer papers describing their work more explicitly, and providing more information on tricks employed to save time and space, data structures used, complexity analyses and correctness proofs. This would of course require the cooperation of journal referees and editors but, after attending this conference, I feel convinced that there would be enough interested readers to justify this step. Secondly, I and many others who attended the conference, believe that the activity of spending a year developing and implementing a new general purpose mathematical algorithm, even when there are no immediate spectacular applications, is as worthwhile an activity as spending the same year writing two or three average research papers, and it should be recognized as such by assessors for research degrees and tenured positions. (Of course, the choice of what software to develop should always be guided by potential applications.) There is a further suggestion inherent here that funding agencies should look favourably on applications for essential resources for developing mathematical software.

Other issues addressed at the conference will be mainly of interest to those who are directly involved in the production of software tools. There were of course differences of opinion, but it is nevertheless possible to summarize a consensus. Regarding choice of programming language, portability seems to be the single most important criterion, although one should move on to a more modern language as soon as it becomes compatible with portability. Thus, C has replaced FORTRAN as the current most popular choice, but one hopes that it will in turn be replaced soon. Certainly where group theory and number theory are concerned, applications can be expected to fill all of the space and to run for several days even on the largest and most powerful computers. It is therefore always strongly advisable to use the most efficient algorithms and data structures. It was observed that there is a marked tendency for people to reimplement existing algorithms, rather than attempting to re-use other people's code. While this is necessary up to a point in order to achieve independent verification of results, it would surely be more desirable if everybody could use the most efficient implementations available. Of course, this will demand greater cooperation on conventions for interprogram and subroutine communication.

I hope that LMS members will communicate (preferably via e-mail) their reactions and opinions on these and related matters to the author. They will be reported on in this column in a month or two.

Derek Holt (dfh@uk.ac.warwick.maths)

Some further comments by David Epstein:

A computer program can advance mathematical understanding as much as an average paper in a mathematics journal, though admittedly not as much as one of the rare papers containing a major mathematical advance. There are several ways in which this can happen. Firstly, the effort of writing down an algorithm precisely enough for the computer often shows up weaknesses in the algorithm. Getting to grips with this can give

deeper understanding of the underlying mathematics, leading to further mathematical discoveries. Secondly, improvements in the algorithms, making them faster or take less space, occur while it is being written. Seeing how a program runs will often suggest better algorithms. Thirdly, use of the program in the manner originally intended can lead to better methods of exploring examples, leading to better insight.

Recently Klaus Peters, a well-known figure in mathematical publishing, and I started a new journal called "Experimental Mathematics", one of whose objectives is to make it academically respectable to publish such material; several eminent mathematicians have agreed to help by being editors.

The recognition currently given by the mathematical community for a computer program leading to valuable mathematical advances is less than the recognition given for a theoretical paper which makes only insignificant points and has no impact on the development of mathematics. It should be possible for an original computer program to be the basis of a Ph.D. Accompanying documentation, commentary, discussion of mathematical points and an analysis of algorithms would form the formal dissertation.

Another issue which Derek's report raises is the funding of software development. One solution offered is the German one, where students write software as part of their course work. Of course, the student has to be pretty good for the work to be usable. One problem here is that the interests of the professor in getting research done could be in opposition to the interests of the student in getting an education. Some programs are interesting and instructive to write, and some are drudgery. We should avoid using students as a source of cheap labour. What about SERC grants? Normally SERC does not pay to provide research infrastructure, such as most mathematical programming. You can get a grant if you promise to find a new algorithm to do something, but if you want to implement an existing algorithm, for which no implementation currently exists, you are unlikely to be successful. As an analogy, could a student in a laboratory science get a Ph.D. for building an apparatus to test a previously untested theory? The answer is a resounding "Yes"---of course the analogy is not perfect. I know of no country where this issue has been properly faced and dealt with. Of course, if you don't think mathematical programming should be funded, there is no problem.

As far as computer languages are concerned, Derek does not mention Lisp and its derivatives. Neither Derek nor I have experience in Lisp, but it is quite widely used by mathematicians. Several people at the Rutgers meeting use Lisp, in particular AKCL, Austin Kyoto Common Lisp, which is the product of a long chain of development, whose final links have been put in place by Bill Schelter at the University of Texas. He and Mike Artin have made some interesting discoveries in non-commutative algebra using AKCL. The advantages of AKCL, as compared with C or C++, include the provision of a very large library of mathematical functions, the ability to program without specifically declaring type information (that is, without specifying what set the arguments of a function can vary over) and the fact that the language can be either compiled or interpreted (that is, run a line at a time). Mathematica enjoys similar advantages, except that Mathematica cannot (at present) be compiled and it costs money. Optimization of AKCL code can be done by taking the least efficient parts of the code and rewriting them in C. However, I will stick with C++ myself, for the time being, partly to avoid making the investment in learning yet another system, and partly because I believe that it is easier to get the last ounce out of a standard workstation by using C or C++ than by using Lisp.

C++ is much less portable than C; in the short term, this difference will be accentuated as ANSI standard C is more and more widely adopted, and as C++ continues to evolve. In contrast, C will evolve only slowly because researchers into computer languages are not very interested in it. There is a draft ANSI C++ standard which will improve portability a year or two along the road, though evolution will continue to create portability problems for C++ for the forseeable future.

Derek Holt (dfh@uk.ac.warwick.maths)

ST ANDREWS COLLOQUIUM 1992

The St Andrews Colloquium will be held from 11th to 18th July 1992. It is organised at the University of St Andrews under the auspices of the Edinburgh Mathematical Society and has taken place (almost) every four years since 1926. In the mornings there will be short lecture courses, aimed at a general audience, to be given by A.M. Davie (Edinburgh University), R.L. Graham (Bell Laboratories) and V.F.R. Jones (Berkeley). In the afternoons there will be seminars in Algebra (organised by J. Howie) and Analysis (organised by A. Sinclair) at which participants may present papers. A full programme of social events will be arranged and families of participants are welcome.

The Colloquium will take place after the joint LMS/AMS meeting in Cambridge (29th June to 1st July) and the European Mathematical Congress in Paris (2nd July to 11th July). It is organised 'back to back' with the meeting of the Fibonacci Association also to be held in St Andrews from 18th to 25th July 1992.

Further details are available from J.M. Howie or J.J. O'Connor, St Andrews Colloquium 1992, Mathematical Institute, North Haugh, St Andrews KY16 9SS, Scotland.

UNIVERSITY OF GRENOBLE I

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LONDON MATHEMATICAL SOCIETY - EDUCATION COMMITTEE

At the October 1989 meeting of Council it was decided to form a new Education Committee to cover the areas formerly dealt with by its predecessor and the Popular Lectures Committee. Its terms of reference were set out as follows.

'The Education Committee acts on behalf of Council to promote activities in the area of mathematical education and the popularisation of mathematics. It disburses grants within a budget allocated by Council. It keeps members of the Society informed of developments in mathematical education which may affect university and polytehnic mathematics departments. It reports annually to Council on further action which should be taken by the Society, and assists the President in making representations on behalf of the Society to government or other agencies'.

Grant Applications

Activities currently envisaged for promotion and support include popular lectures, exhibitions, master classes, mathematical competitions and similar joint ventures between higher education institutions and schools, the development and dissemination of curriculum initiatives in higher education, and liaison between the Society and other bodies concerned with mathematical education. The committee would welcome any request for grants, which should be sent to Dr T. Porter, School of Mathematics, University College of North Wales, Bangor, Gwynedd LL57 1UT.

The Committee meets three times a year, usually in September, January and April and applications will be considered at the next meeting after receipt. If you are intending to submit an application, please allow enough time between the application and the event!

34th BRITISH THEORETICAL MECHANICS COLLOQUIUM

The 34th British Theoretical Mechanics Colloquium (British Applied Mathematics Colloquium) will be held at the University of Keele, England, between Monday 30th March and Thursday 2nd April 1992. Further details can be obtained from: Conference Secretary, B.T.M.C., Department of Mathematics, University of Keele, Keele, Staffordshire ST5 5BG. Telephone 0782 621111 ext 3792, e-mail btmc34@uk.ac.keele.

DENNIS BABBAGE

Dennis William Babbage who was elected a member of the London Mathematical Society on 15th March 1934 died on 9th June 1991.

EDWARD THOMPSON

Edward C. Thompson who was elected a member of the London Mathematical Society on 13 December 1945 died on 7 May 1991 at the age of 72. From 1951-57 he was a member of London Mathematical Society Council and assistant editor of the LMS Proceedings.

WARWICK WORKSHOPS

A Workshop on Algebraic Geometry will be held from 2nd to 6th September, organised by Dr M. Reid. An Introductory Workshop for the Symposium on Gauge Theory, Geometry and Topology will be held from 9th to 13th September organised by Professor N.J. Hitchin, Dr J.D.S. Jones, Dr J. Rawnsley and Dr D. Salamon.

VIDEO LINK

The Hardy Lecture at Bangor by Professor Blaine Lawson on 31st May was given over the University of Wales Video Link, and so was received simultaneously and interactively at Aberystwyth, Cardiff and Swansea. This was a suitably prestigious occasion for an inauguration of the Mathematics use of the Video Link, and we give congratulations to Professor Lawson on handling it so well.

John Edensor Littlewood (1885-1977) was educated at St Pauls's School, London, where F.S. Macaulay was head of mathematics. Thus prepared, he went to Trinity College, Cambridge, where he graduated Senior Wrangler in 1905 and commenced research under Barnes who, seeing Littlewood's ability, suggested he tackle the Riemann hypothesis. In 1910 he became a fellow of Trinity and shortly thereafter began his 35-year collaboration with Hardy. Hardy regarded him as the finest mathematician he had ever known, and a formidable solver of problems; together they worked on Diophantine analysis and the theory of functions, Littlewood also worked often with others, on differential equations. A great walker who enjoyed a vigorous old age, he was awarded the Royal Society's Royal (1929), Sylvester (1943) and Copley (1958) medals, and the Society's De Morgan medal (1938), Senior Berwick prize (1960). He was the Society's 39th president from 1941-1943.

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.

1991

JULY	
1-5	The Mathematics of Nonlinear Systems, Bath (168)(175)(177)
1-12	Cambridge Banach Algebras Symposium, Cambridge (182)
1-19	Geometric Group Theory Symposium, Sussex (179)
5-7	Babbage-Faraday Bicentenary Conference, Cambridge (183)
7-12	Gregynog Symposium on Differential Equations, Gregynog (176)
8-12	British Combinatorial Conference, Surrey (165)(180)
8-12	Australian Mathematical Society Annual Conference, Australia (177)
8-14	Radicals, Hungary (172)
9-19	Conformal Field Theory, Durham (178)
13-16	British Congress of Mathematics Education, Loughborough (170)
15-19	Radial Basis Function Workshop, Cambridge (182)
16-19	Euromech Colloquium on Mathematical Models for Liquid Crystals, Strathclyde (182)
20-30	Application of Categories in Computer Science, Durham (178)
22-26	Computational and Applied Mathematics Congress, Ireland (167)(180)
23-4 Aug	Logic and Algebra of Specifications, Germany (181)
29-9 Aug	Algebras and Orders, Canada (179)
30-9 Aug	International Congress on Mathematical Physics, Lepzig, German (183)
AUGUST	
5-9	Differential Geometric Methods in Lagrangian Dynamics Workshop, Stirling (184)
18-24	Canadian Number Theory Association Conference, Ontario, Canada (177) (182)
SEPTEMBER	
16-20	Minimal Models, Lie Groups and Differential Geometry, Spain (179)
23	Function Theory Meeting, Lancaster (182)
25-26	British Topology Meeting, Aberdeen (184)
25-27	Numerical Methods in Fluid Mechanics, Switzerland (174)
27-28	Symposium on Arithmetic in Honour of Bryan Birch, Oxford (178)(183)
OCTOBER	
18	LMS Meeting, London
NOVEMBER	
15	LMS Meeting, London
DECEMBER	
9-13	European Women in Mathematics, France (180)

1992

JUNE	
29-1 July	Joint AMS/LMS Meeting, Cambridge (155)
JULY	
4-14	Evolutionary Problems, Durham (178)
6-10	European Congress of Mathematics, France (180)
14-24	Non-commutative Rings, Durham (178)
21-31	The Geometry of Operator Algebras and Banach Spaces, Durham (178)
AUGUST	
16-23	7th International Congress on Mathematical Education, Quebec, Canada (175)(184)

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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