

LONDON MATHEMATICAL SOCIETY

TWO-DAY MEETING AT BIRMINGHAM 14-15 January 1977

Friday 14th January

- 2.00 p.m. Opening Session
- 2.15 p.m. Special sessions (in parallel)
- (a) *Fuchsian and Kleinian groups*
 - (b) *Graph theory*
 - (c) *Mathematical Education*
- 3.30 p.m. Tea
- 4.00 p.m. Professor R. Osserman: *The strange disappearance of existence, uniqueness and regularity for the minimal surface equation.*
- 5.30 p.m. Professor A. Douady: *New approaches to Teichmüller space.*
- 7.00 p.m. Buffet.

Saturday 15th January

- 9.30 a.m. Professor M. R. Herman: *Diffeomorphisms of the circle.*
- 11.30 a.m. Professor I. G. Macdonald: title to be announced.
- 2.00-5.00 p.m. Special sessions, informal discussion groups and film show.

**Lectures will take place in the
Watson Building
University of Birmingham**

The Watson Building will be signposted in the University grounds.

LMS NEWSLETTER

No. 35

January 1977

DATES OF SOCIETY MEETINGS 1976-77

Friday, 14 January and Saturday, 15 January, Birmingham, Experimental two-day meeting.

Friday, 11 March, Burlington House.

Friday, 20 May, University College, Bangor.

Friday, 17 June, Burlington House.

Hardy Lecturer (Professor J. K. Moser).

London meetings will be held in the Geological Society Rooms, Burlington House, Piccadilly. Council meetings will be held in conjunction with all the above meetings except those on 14-15 January and (possibly) 20 May. There will be a Council meeting on 21 January in Burlington House.

D. A. BRANNAN

TWO-DAY MEETING AT BIRMINGHAM

The programme for this meeting appears overleaf. Travel and accommodation information appeared in the December *Newsletter*. The buffet will cost £3, tickets for this must be paid for at least one week

in advance. Buffet tickets and other details can be obtained from B. J. Philp, Department of Pure Mathematics, University of Birmingham, P.O. Box 363, Birmingham, B15 2TT.

COUNCIL

At the Annual General Meeting of the Society on 19 November 1976, Council's nominations for Council for the next session were elected. In addition to the President, Professor M. F. Atiyah, Professor J. L. Britton (Meetings and Membership Secretary since 1973), Professor P. J. Higgins (Council member since 1971), Professor D. G. Larman (Librarian since 1969), Dr. A.

B. Tayler (Council member since 1974) and Dr. D. J. A. Welsh (Publications Officer since 1972) have retired from Council. Professor H. Halberstam has been appointed as the Society's representative on the I.M.A.-Royal Society Joint Mathematical Education Committee in succession to Professor D. B. Scott. Professor Scott has held this position for 3 years.

TREASURER'S REPORT

Contrary to expectations the Society has enjoyed a rather successful year on the financial side. This is partly due to favourable factors of a non-recurrent nature. It is also partly due to the cautious policy adopted last year on the basis of expectations about rising costs which have turned out to be over-pessimistic. However I must emphasise that the need for caution continues, since costs continue to rise steadily and no-one knows what will happen when the government restraints are eventually relaxed.

Turning to the audited accounts for the past session, I am glad to report a surplus

of no less than £41,180 on the year as compared with £9,152 for the previous session. Expenditure has risen from around £69,000 to £74,000, while income has risen from £78,000 to £125,000. This very large increase in income is due mainly to three factors, all relating to the Society's periodicals. First of all, subscription rates were raised last year; these rates are being held for the year ahead although costs are increasing all the time. Secondly, receipts from overseas have helped to protect the Society somewhat from the decline in the value of the pound. Thirdly, accounting arrangements have been altered so that the

Society receives subscription income from institutions at an earlier stage; this has undoubtedly swollen the income figures for the past year but will not, of course, recur. These institutional subscriptions dominate the income side, but members' subscriptions are also important. Here I can report an increase from around £8,000 to over £13,000, due to the new rates. The total number of members remains fairly steady at around 1,300; a small decrease in the Ordinary category has been offset by a small increase in the Reciprocity category and likewise in the Institutional category, as more University Departments come to appreciate the advantages of joining the Society. Other features on the income side include an increase in dividends and interest from £10,000 to £12,650, and an increase in receipts from Russian Mathematical Surveys from £5,000 to £6,500.

On the balance sheet, the Society's

reserves have risen from £164,710 to £211,901, largely due to the surplus of income over expenditure. However, these figures refer to book value, which generally means original cost. Apart from £39,000 in the bank and about £5,000 in other assets, the Society's reserves are held in the form of stocks and shares. Here the market value (including trust funds) amounted to £143,408 at the end of the Society's financial year. This compares with £130,568 for the previous year, but allowance must be made for £27,088 of cash added. Every effort is made to try and maintain the real value of the Society's investment but in these difficult and anxious times it seems impossible to succeed. Fortunately the Society's publishing activities help to make up for this, and the overall financial condition appears healthy and indeed flourishing.

I. M. JAMES

SUMMARY OF EXPENDITURE AND INCOME 1975-76 SESSION

	£		£
Management	2,431	Dividends and interest	12,713
General Printing	988	Basic subscriptions	3,881
Professional fees	636	Back numbers	2,642
Council expenses	1,535	Russian Mathematical Surveys	6,598
Editorial expenses	2,486	Royalties	1,702
Expenses of meetings	746	Proceedings (members)	3,190
Prizes	150	Journal (members)	4,030
Grant	1,611	Bulletin (members)	2,214
Newsletter	1,307	Proceedings (non-members)	39,060
Proceedings	31,355	Journal (non-members)	41,483
Journal	32,291	Bulletin (non-members)	7,272
Bulletin	8,015		

NAYLOR PRIZE

In memory of their father the sons of Dr. V. D. Naylor have endowed a fund to establish a Prize for outstanding work in the Applications of Mathematics. This award, to be known as the Naylor Prize,

will be made by Council every two years, beginning this year, and the name of the first prizewinner will be announced shortly.

I. M. JAMES

SUBSCRIPTIONS

Members are reminded that subscriptions for the 1976-77 session became due on 1 November 1976.

COMBINATORICS: ONE DAY COLLOQUIUM

A one day colloquium on Combinatorics will be held at the University of Reading on 26 January 1977. Speakers will be N. L. Biggs (Royal Holloway), B. J. Wilson (Chelsea), E. K. Lloyd (Southampton), A. D. Keedwell (Surrey), R. J. Wilson (Open

University), D. R. Woodall (Nottingham), D. J. A. Welsh (Oxford). Further details may be obtained from D. E. Daykin, Dept. of Mathematics, The University, Whiteknights, Reading RG6 2AH.

North-Holland Mathematical Library

This series of monographs presents work of the highest scientific quality and actuality. Studies in algebra, analysis, combinatorial mathematics and other subjects of intense current interest are included. Professional mathematicians and students will find many of these volumes invaluable as authoritative reference sources, textbooks and guides to fertile areas for future research.

Recently Published:

Nonarchimedean Fields and Asymptotic Expansions

by A.H. LIGHTSTONE, Canada, and
A. ROBINSON, U.S.A.

1975. $x + 204$ pages. US \$23.25/Dfl. 60.00.
ISBN 0-7204-3800-4.

The book opens with a self-contained discussion of nonarchimedean fields. Chapter 2 presents nonstandard analysis, the underlying notions and some recent developments including principles of permanence, the notion that \mathbb{R} is sequentially comprehensive, the field \mathbb{QR} and its relation to the nonarchimedean field \mathbb{F} , various notions of continuity in \mathbb{QR} . The Popken space of equivalence classes of asymptotically finite functions is treated in detail. The formal account of asymptotic expansions is preceded by a thorough discussion of the Euler-Maclaurin formula. Several examples are included to illustrate how this formula generates asymptotic expansions.

Abstract Analytic Number Theory

by J. KNOPFMACHER, South Africa

1976. $x + 322$ pages. US \$29.50/Dfl. 75.00.
ISBN 0-7204-2462-3.

Based on very recent research results, many of which can be attributed to the author, this innovative study applies classical analytic number theory to a wide variety of mathematical subjects that are not usually treated in an arithmetical way. Abstract axiomatic methods are used to unify the treatment of certain mathematical

phenomena but for the sake of generalization alone. The monograph includes as special cases, various basic theorems of ordinary analytic number theory, which are in fact, by-products of the axiomatic development, and a selection of unsolved questions.

Markov Chains

by D. REVUZ, France.

1975. $x + 336$ pages. US \$29.95/Dfl. 85.00.
ISBN 0-7204-2460-7

Based on lectures given by the author at the University of Paris, this book provides an introduction to homogenous Markov chains with general state space, more accurately known as "sub-Markovian" kernels. The first part of the book, an expository text on the foundations of the subject, is intended for postgraduate students. A study of potential theory, the basic classification of chains according to their asymptotic behaviour and the celebrated Chacon-Ornstein theorem are examined in detail. The second part of the book is at a more advanced level. An up-to-date treatment of random walks on general locally compact abelian groups includes a number of new results. Further chapters go on to develop renewal theory, an introduction to Martin boundary and the study of chains recurrent in the Harris sense. Finally, the last chapter deals with the construction of chains starting from a kernel satisfying some kind of maximum principle.

Discrete-Parameter Martingales

by J. NEVEU, France.

1975. viii + 236 pages. US \$23.95/Dfl. 62.50.
ISBN 0-7204-2810-6

The aim of this book is to present the fundamental results of discrete martingale theory and a synthesis of the important theoretical results which have been recently obtained. Applications to measure theory, Markov chains, sequential decision and game theory are also considered at length. The first chapter defines conditional expectations and their various operator properties. The basic results of convergence and stopping of martingales are then proved. Chapter 3 is devoted to applications, while several useful extensions of the concept of martingales are taken up in Chapter 5. Next, an optimisation problem which has been of great interest in recent years is treated. The final chapters cover recent developments of martingale theory. Some Banach spaces of martingales connected with their quadratic variations and maximal functions are studied. The interplay between martingales and increasing processes provides a number of interesting theorems. Throughout the book, exercises are provided.

Comparison Theorems in Riemannian Geometry

by J. CHEEGER and D.G. EBIN, U.S.A.

1975. viii + 174 pages. US \$19.25/Dfl. 50.00.
ISBN 0-7204-2461-5

The central theme of this book is the interaction between the curvature of a complete riemannian manifold and its topology and geometry. The first five chapters are preparatory in nature. A concise and thorough introduction to riemannian geometry is followed by the first English treatment of Toponogov's theorem in book form. Homogeneous spaces, Morse theory and the injectivity radius of the exponential map are also included in this half of the book. Chapters 6-9 deal with most of the relevant contributions to this area of mathematics in the past twenty years: sphere theorem, Berger's theorem, the differential sphere theorem the structure of complex manifolds of non-negative curvature and compact manifolds of non-positive curvature. Emphasis is given to the pervasiveness of the phenomenon of rigidity.

This refers to the results which fail but only in a restricted (rigid) way when a strong inequality on curvature is relaxed to a weak inequality. A number of aptly chosen examples reinforce the main theorems. The greater part of the material presented here has not appeared before in book form and a number of the proofs are considerably simpler than what have previously appeared in the literature.

The Theory of Numbers

edited by S. IYANAGA, Japan

1975. xii + 542 pages. US \$49.95/Dfl. 130.00.
ISBN 0-7204-2458-5.

The main purpose of this book is to give a systematic exposition of the classical field theory, with complete proofs, utilizing cohomology theory. Chapter 1 deals with cohomology theory, which is later used for the proofs of the classical field theory, while Chapter 2 covers the valuation theory. For both these chapters only a basic knowledge of algebra is assumed. Before moving on to examine the adèle and idele, the third chapter first summarizes the prerequisite knowledge of locally compact topological groups. In Chapters 4 and 5 classical field theory is expounded. Further explanations of some specific fields, though to be essential for understanding this theory, are to be found in Chapter 6. They include cyclotomic fields and Kummer fields. For the description of the class field theory the authors utilize the valuation theory and the notion of divisors. The classical notion of ideals, which appears more often in the traditional writings on number theory than its equivalent, the divisors, is treated in Appendix 1. Appendix 2 contains a survey of the history of number theory and the history of development of class field theory, particularly the post-1920's period in which the theory gradually changed its appearance.

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AMERICAN AND CANADIAN MATHEMATICIANS VISITING EUROPE

The following information is reproduced from the A.M.S. *Notices*.

<i>Name</i>	<i>Visiting</i>	<i>Period of Visit</i>
W. Abikoff	I.H.E.S.	Sept. 76-June 77
R. Beals	Paris-Sud	Sept. 76-June 77
J. E. Brennan	Institut Mittag-Leffler	Jan. 77-June 77
S. S. Cairns	University of Ulm	Oct. 76-March 77
H. Cohn	University of Copenhagen	Sept. 76-Aug. 77
R. M. Fossum	University of Copenhagen	Sept. 76-June 77
R. G. Jeroslow	Louvain	Jan. 77-June 77
J. Kahane	Weizmann Institute, Israel	July 76-July 77
J.-I. Nagata	Univ. of Amsterdam	Sept. 76-Dec. 76
J. Pearl	Weizmann Inst., Israel	Aug. 76-Aug. 77
E. M. Reingold	Weizmann Inst., Israel	Aug. 76-Aug. 77
H. Rosenthal	Hebrew Univ., Israel	Jan. 77-June 77
N. J. Rothman	Hebrew Univ., Israel	Sept. 76-June 77
R. Vaillancourt	Université de Paris	Sept. 76-June 77

ROYAL SOCIETY OF EDINBURGH PROCEEDINGS A (MATHEMATICS)

The Council of the Society decided a few years ago that Proceedings A, one of the Society's publications, was to become a periodical publishing papers only in mathematics. The Council also set up an Editorial Board for Proceedings A, and appointed a number of Consulting Editors; details of these appointments may be found in the inside cover of a recent issue.

Since 1974 volumes 72 to 75 of Proceedings A (Mathematics) have been published; volume 76 is in page proof, volume 77 is in galley proof and both these volumes will appear before June 1977. Each volume consists of about 360 pages.

The material for volume 78 is nearly complete and the Society is about to consider papers for publication in volume 79. At the present time there is virtually no backlog of accepted papers awaiting printing.

Papers published to date and those accepted for publication cover a wide field in analysis; but there are also contributions from algebra and functional analysis, two areas from which we hope to receive an increasing number of papers in the future.

Contributions for consideration of publication in Proceedings A (Mathematics) may be communicated to the Society by any member of the Editorial Board, or by one of the Consulting Editors, or sent to Professor W. N. Everitt at the University of Dundee, Dundee DD1 4HN.

General information about Proceedings A (Mathematics), including subscription details, may be obtained from W. H. Rutherford Esq., Executive Secretary, Royal Society of Edinburgh, 22-24 George Street, Edinburgh EH2 2PQ, Scotland, U.K.

W. N. EVERITT

COURSE ON THE THEORY OF ROTATING FLUIDS

A course on the theory of rotating fluids with applications to geophysics, meteorology and oceanography will be held at the University of Newcastle upon Tyne on 3-23 July 1977. The course is sponsored by the Science Research Council and intended primarily for postgraduate students from the U.K. It will provide 4 short basic lecture courses of about 12 lectures each

and a colloquium programme. The organising committee is R. Hide (Met. Office), P. H. Roberts (Newcastle) and K. Stewartson (U.C. London). Information sheets and application forms (to be returned by 31 March 1977) are available from A. M. Soward, School of Mathematics, The University, Newcastle upon Tyne NE1 7RU

WORKSHOP ON DIFFERENTIAL GAMES

A workshop on differential games and applications will be held at TH Twente Enschede, Netherlands on 16-25 March 1977. It is intended both for specialists and for engineers and mathematicians with some knowledge of optimal control theory. There will be a series of main lectures and a number of short communications. Main speakers are expected to include: P. Bern-

hard (Paris), A. Blaquiere (Paris), J. Breakwell (Stanford), J. Case (Baltimore), R. J. Elliot (Hull), O. Håjek (Cleveland), G. Leitmann (Berkeley), G. J. Olsder (Enschede), E. Roxin (Kingston) and T. L. Vincent (Tucson). Further details can be obtained from P. Hagedorn, Institut für Mechanik, Technische Hochschule Darmstadt, 6100 Darmstadt, Germany.

INTERNATIONAL CONFERENCE ON DYNAMIC PROGRAMMING

An International Conference on Dynamic Programming and its Applications will be held at the University of British Columbia in Vancouver, 14-16 April 1977. It is sponsored by the Management Science Research Centre and is partially funded by the National Research Council of Canada. There will be six sessions of invited papers and a concluding panel discussion on the

state of the art of dynamic programming. Acceptances to speak have been received from Denardo, Derman, Doshi, Flynn, Fox, Hordijk, Lembersky, Pliska, Puterman, Rishel, Tijms and Veinott. For further information contact: Martin L. Puterman, Faculty of Commerce, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada.

AUSTRALIAN MATHEMATICAL SOCIETY: ANNUAL MEETING

The 21st Annual Meeting of the Australian Mathematical Society will be held at La Trobe University, Melbourne on 16-20 May 1977. Professor K. Hoffman (Tulane) is the invited overseas visitor at this meeting.

Further details may be obtained from the Organizing Committee, A.M.S. 1977 Meeting, Dept. of Mathematics, La Trobe University, Bundoora, 3083 Victoria, Australia.

CONFERENCE ON VECTOR SPACE MEASURES

A conference on Vector Space Measures and Applications will be held at Trinity College, Dublin on 26 June-2 July 1977. The programme will consider applications to distribution theory, approximation theory, partial differential equations, potential theory, probability theory and quantum

mechanics. Some financial support may be available. Further information can be obtained from R. M. Aron, Conference on Vector Space Measures and Applications, School of Mathematics, Trinity College, Dublin 2, Ireland.

SIXTH BRITISH COMBINATORIAL CONFERENCE

The Sixth British Combinatorial Conference will be held at Royal Holloway College (University of London), 11-15 July, 1977. Principal lectures will be given by: F. BUEKENHOUT (Brussels), P. J. CAMERON (Oxford), J. H. CONWAY (Cambridge), P. W. KASTELEYN (Leiden), L. LOVÁSZ (Szeged), G. K. RAY-CHAUDHURI (Ohio), N. J. A. SLOANE (Bell Labs.), D. R. WOODALL (Nottingham), A. T. WHITE (Kalamazoo), and others to be announced. In addition, there will be special sessions for contributed talks

of 20 minutes duration. These sessions will cover a wide range of combinatorial topics, including: Enumeration, Combinatorial Set Theory, Graph Theory, Matroids and Hypergraphs, Finite Geometries and Designs, Coding Theory, Combinatorial aspects of Group Theory, Applications to physical sciences.

Further details are available from: Peter Rado, Department of Mathematics, Royal Holloway College, Egham, Surrey, TW20 0EX, England.

London Mathematical Society Monographs

Series editors: P. M. Cohn and G. E. H. Reuter

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