THE LONDON MATHEMATICAL SOCIETY NEWSLETTER
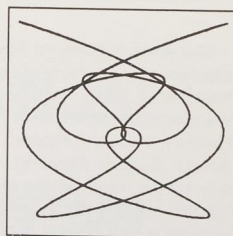
No. 133　　　　　　　　October 1986

Forthcoming Meetings

Friday 17 October 1986, Burlington House
(Meeting on Quasi-Crystals)

Friday 21 November 1986, Royal Society
(The President, J. R. Hubbuck)

COMBINATORIAL OPTIMIZATION

A conference on the theory and application of Combinatorial Optimization in Operational Research, Management Science, Computer Science and Statistics will be held at the University of Southampton from April 6 to April 8, 1987. Financial support for the conference is provided by the London Mathematical Society and the Royal Society.

Invited speakers are:

I. Barany, Mathematical Institute, Budapest, Hungary.
R. G. Jeroslow, Georgia institute of Technology, U.S.A.
D. S. Johnson, Bell Laboratories, New Jersey, U.S.A.
A. Schrijver, Tilburg University, The Netherlands.

L. A. Wolsey, CORE, Belgium.

Additionally, several industrial speakers will present invited papers.

The topics covered include integer programming, complexity theory, analysis of algorithms, polyhedral combinatorics, applications to coding theory and cryptography, parallel and sequential computing, and telecommincations.

Refereed papers from the conference will be published in a special issue of Discrete Applied Mathematics. Abstracts of contributed papers should be submitted before January 5, 1987.

For further details contact: Dr. C. N. Potts, Faculty of Mathematical Studies, University of Southampton, Southampton SO9 5NH, U.K.

ANNUAL GENERAL MEETING

The Annual General Meeting of the London Mathematical Society will be held on Friday, 21st November 1986, shortly after 3 p.m., in the Wellcome Lecture Hall of The Royal Society at 6 Carlton House Terrace, London S.W.1. The Annual General Meeting will be preceded at 3 p.m. by the reconvening of the General Meeting adjourned from Friday, 17th January 1986, concerning which Notice is given elsewhere in the Newsletter.

At the Annual General Meeting the report of the Treasurer will be read, the Council and Officers of the Society for the coming year will be elected, and Auditors appointed. The election of Council and Officers is governed by Article 9 of the Charter of the Society, by Articles 18,24 and 31 of the Statutes of the Society, and by By-Law I of the By-Laws of the Society.

A Ballot paper is enclosed which contains a list of those names recommended by the present Council in accordance with By-Law I,6 for election as the Officers and Members-at-Large of the Council for the coming year, when taken together with those Members-at-Large elected at the last AGM whose terms of office still have one year to run: namely, R. Penrose, R. Y. Sharp, and P. Vamos. The Ballot Paper also contains one nomination made by members of the Society in accordance with By-Law I,5.

A member of the Society is entitled to vote in the election by adding to and striking out names on the Ballot Paper in such a way that no more than 17 names in all appear on the completed list, of which no more than 6 may appear listed as members-at-Large (Two-year terms).

Members are asked to note particularly that at least one of the names listed under nominations of Members-at-Large (Two-year terms) must be deleted if the Ballot Paper is not to be held to be null and void.

The completed Ballot Paper should either be brought to the AGM or be received, duly signed and addressed to "The Scrutineers, The London Mathematical Society, Burlington House, Piccadilly, London W1V 0NL", not less than 36 hours before the time of the meeting.

C. J. Mulvey
Council and General Secretary

BACKLOG OF BRITISH JOURNALS

This information is published with the co-operations of the respective editorial boards. For the sake of uniformity, the same headings have been adopted as in the statement published biennially by the AMS Notices. The following explanatory statements are also copied:

Backlog. This is an estimate of the number of printed pages which have been accepted but not necessary to maintain copy editing and printing schedules.

Waiting times. The quartiles Q_1 and Q_3 are presented to give a measure of dispersion. They do not include misleading extremes, the result of unusual circumstances arising in part from the refereeing system.

Waiting times are measured in months from receipt of manuscript in final form to receipt of final publication at the library of Liverpool Unviersity. When a paper is revised, the waiting time between an editor's receipt of the final revision and its publication may be much shorter than is the case otherwise, so these figures are low to that extent.

C. T. C. Wall

JOURNAL	No. of issues per year	Approx. no. of pages per year	Backlog	Estimated time for paper submitted currently to be published (in months)	Q₁	Observed waiting time in latest publ. issue (months) Median	Q₃
Math Proc. Camb.	6	1200	200	9-12	9	10	10
Edin. Math. Soc.	3	450	150	12-16	13	16	17
Glasgow Math. Journal	2	250	100	14-20	11	13	15
L.M.S. Bulletin	6	624	90	10-12	9	9	11
Journal	6	1152	200	11-13	14	15	15
Proceedings	6	1152	300	18	13	14	15
Mathematika	2	350	0	9-18	8	11	18
Oxford Q.J.M.	4	512	64	12-18	9	11	16
R.S. Edin. Proc. A.	6	1080	0	6-12	10	11	12

LONDON MATHEMATICAL SOCIETY

MEETING ON QUASI-CRYSTALS

FRIDAY 17 OCTOBER

2.00 P.A.B. Pleasants (Cardiff)

THE MATHEMATICAL CONSTRUCTION OF QUASI-CRYSTALS

2.45 A.L. Mackay (London)

WHAT HAS THE PENROSE TILING TO DO WITH THE ICOSAHEDRAL PHASE OF ALLOYS?

3.30 K. Knowles (Cambridge)

MATERIALS SCIENCE AND CRYSTALLOGRAPHY OF QUASICRYSTALLINE PHASES

An Ordinary Meeting will commence at 4.50
R. PENROSE (Oxford) will speak at 5.00 on

QUASI-PERIODIC TILINGS OF THE PLANE: WHAT IS THEIR RELEVANCE TO THE STRUCTURE OF QUASI-CRYSTALS?

Geological Society's Meeting Room
Burlington House
Piccadilly, London W1

All interested are very welcome
Tea will be served at 4.20 p.m.

PROFESSOR MENNICKE

Professor Jens Mennicke will be visiting some British Universities during the period October to November 1986. This has been made possible because of financial support from the London Mathematical Society. He will be giving a seminar talk entitled:

Discrete Subgroups of $SL_2(C)$

and his programme is as follows.

(1) 15th - 21st October
University of Kent
Seminar talk on 17th October at 2.30 p.m.
Confirm details with Dr. S. Moran

(2) 21st - 26th October
University of East Anglia
Seminar talk (time yet to be arranged)
Obtain details from Dr. I. J. Siemons

(3) 26th - 29th October
UMIST

Seminar talk on 29th October at 2.30 p.m.
Confirm details with Professor M. J. Taylor

(4) 29th October - 4th November
King's College, University of London
Seminar talk on 30th October
Confirm details with Dr. C. Bushnell

(5) 4th November - 9th November
University College Cardiff
Seminar talk on 7th November at 2.30 p.m.
Confirm details with Professor J. Wiegold

(6) 9th November - 13th November
University of Oxford
Seminar talk on 11th November
Confirm details with Professor B. Birch.

Members of the London mathematical Society are welcome to attend any of the above-mentioned talks. However, they are advised to confirm details beforehand.

SURVEY OF AMERICAN RESEARCH JOURNALS

Last month we published a survey of prices of European Mathematical journals. This month we publish a companion survey of American journals. This information is reprinted from the March 1986 issue of the AMS Notices which contains fuller details of the survey.

Selection and classification of journals. The list of journals surveyed consists of those published in the United States and reviewed in their entirety in *Mathematical Reviews*, (at the request of the publisher, the journals of Gordon and Breach have been omitted from this survey) with the exception of some of the translation journals, which may have been reviewed only in part or in the original. Journals are listed in three classes: primary typeset journals, primary journals published from author-prepared copy, and translation journals. Production costs vary considerably for these classes of journals, with the subscription prices varying accordingly.

Counting methods. First the number of pages published in the 1984 subscription was determined, excluding front and end matter. Extrapolation was required for some of the translation journals, since their nomimal 1984 volumes were incomplete at the time of the sampling (the fall of 1985).

The next problem was to determine the amount of material on a page, a difficult task when dealing with mathematics journals. For this reason, readers are encouraged to examine actual copies of these journals when considering these figures. Variations in the amount of displayed material, additional spacing around displays and enunciations, and the typesetting specifications

of the particular journal all affect the amount of material per page. Also, character counts in journals printed from author-prepared copy vary considerably from article to article. Therefore, readers should keep in mind that the methods given below for estimating characters per page do not provide absolute figures, but rather suggest a systematic basis for comparison among journals.

At least two samples were taken for each journal. In the first sample ten pages were selected, spaced evenly throughout the journal; these pages were chosen so as to contain no figures, diagrams, or blocks of text set at a type size non-standard for that particular journal. The lines of text and display per page were counted. A characters-per-line figure was determined by averaging the character count for the first and last full lines of text on the first three pages of our sample. (Spaces between words were counted as one character; spaces in mathematical expressions were not counted.) Averages for the two figures were multiplied to obtain a figure for the characters per page.

A second sample was then taken of another ten pages, spaced midway between the pages chosen for the first sample. The cost calculation is based on the mean of these two samples. For the several journals in which the variation between the first and second samples was greater than 15 percent, a third sample of twenty pages was taken. When the third sample fell between the first two, the mean of the first and second samples has been reported in the table, otherwise no cost is reported.

JOURNAL SURVEY
Primary Typeset Journals

JOURNAL	PUBLISHER	1984 List price, $US	Pages in 1984	Char/ page	Cents/ 1000 char
Advances in Appl. Math	Academic Press	78	503	2190	7.1
Advances in Math	Academic Press	340	1275	2350	11.3
Amer. J. Math	Johns Hopkins U. Press	95	1512	2010	3.1
Ann. of Math, Ser. 2	Princeton Univ. Press	140	1223	2580	4.4
Ann. of Probability	Inst. of Math. Stat.	62	1227	2460	2.1
Ann. of Stat.	Inst. of Math. Stat.	66	1596	2760	1.5
Appl. Math & Computation	Elsevier	206	751	2270	12.1
Appl. Math & Optimization	Springer-Verlag	140	558	2230	11.3
AMS Bulletin, New Series	Amer. Math. Soc.	50	783	3090	2.1
Comm. on Pure and Appl. Math	Wiley & Sons	144	848	2290	7.4
Computers & Math w/Appl.	Pergamon Press	200	477		*
Duke Math J.	Duke Univ. Press	110	1020	2470	4.4
Houston J. of Math.	Univ. of Houston	70	599	2320	5.0
Illinois J. Math	Univ. Illinois Press	50	702	2320	3.1
Indiana Univ. Math J.	Indiana Univ.	80	926	2390	3.6
Information & Control	Academic Press	300	910	2530	13.0
Information Sciences	Elsevier	222	748	2590	11.5
J. of Algebra	Academic Press	525	3384	2490	6.2
J. of Algorithms	Academic Press	96	609	2700	5.8
J. of Amer. Stat. Assoc.	Amer. Stat. Assoc.	55	965	5600	1.0
J. of Approx. Theory	Academic Press	258	1190	2050	10.6
J. of Assoc. for Computing Machinery	Assoc. for Computing Machinery	60	906	3390	2.0
J. of Comb. Theory. A.	Academic Press	174	750	2400	9.7
J. of Comb. Theory. B.	Academic Press	174	609	2400	11.9
J. of Computer & Systems Sciences	Academic Press	208	911	3060	7.5
J. of Diff. Equations	Academic Press	420	2192	2120	9.0
J. of Diff. Geometry	Lehigh University	160	1105	2460	5.9
J. of Functional Analysis	Academic Press	410	2106	2170	9.0
J. of Graph Theory	Wiley & Sons	88	532	2570	6.4
J. of Integral Equations	Elsevier	162	556	2070	14.1
J. of Logic Programming	Elsevier	85	356	3210	7.4
J. of Math Analysis & Appl.	Academic Press	693	4191		*
J. of Multivariate Analysis	Academic Press	150	802	2040	9.2
J. of Number Theory	Academic Press	180	846	2170	9.8
J. of Symbolic Logic	Assoc. for Symbolic Logic	65	1485	3180	1.4
Libertas Mathematica	Amer. Romanian Acad. of Arts & Sci. Publ.	40	196	2150	9.5
Linear Alg. & its Appl.	Elsevier	480	2343	1960	10.5*
Math of Comp.	Amer. Math. Soc.	100	1349	2700	2.7
Math of Operations Research	Inst. of Management Sciences	44	634	3040	2.3
Math Systems Theory	Springer-Verlag	94	356	2680	9.9*
Michigan Math. J.	Univ. of Michigan	30	379	2860	2.8
Notre Dame J. of Formal Logic	Univ. of Notre Dame	35	393	3160	2.8
Pacific J. Math.	Pacific J. Math.	132	2970	2230	2.0
Proc. Amer. Math Soc.	Amer. Math. Soc.	250	1934	2930	4.4
Quarterly Appl. Math.	Brown Univ.	40	512	2850	2.7
Rocky Mt. J. Math.	Rocky Mt. Math Consortium	95	995	2650	3.6
SIAM J. on Algebraic & Discrete Methods	Soc. for Indust. & Appl. Math.	43	632	3570	1.9
SIAM J. on Appl. Math.	Soc. for Indust. & Appl. Math.	95	1258	2950	2.6
SIAM J. on Computing	Soc. for Indust. & Appl. Math.	68	889	3580	2.1
SIAM J. on Control & Optimization	Soc. for Indust. & Appl. Math.	95	978	3140	3.1
SIAM J. on Math. Anal.	Soc. for Indust. & Appl. Math.	102	1237	2770	3.0
SIAM J. on Numerical Anal.	Soc. for Indust. & Appl. Math.	95	1207	3090	2.5
SIAM J. on Sicentific & Stat. Computing	Soc. for Indust. & Appl. Math.	48	997	3620	1.3
Studies in Appl. Math.	Elsevier	106	524	2370	8.5
Technometrics	Amer. Soc. for Qual. Control & Amer. Stat. Assoc.	23	419	4900	1.1
Trans. Amer. Math Soc.	Amer. Math. Soc.	445	4984	2990	3.0

Primary Author-Prepared Copy Journals

JOURNAL	PUBLISHER	1984 List price, $US	Pages in 1984	Char/ page	Cents/ 1000 char
Algebras, Groups & Geometries	Hadronic Press	150	509	1460	20.2
Comm. in Algebra	Marcel Dekker	425	3110	1390	9.8*
Comm. in Partial Diff. Eq.	Marcel Dekker	255	1494	1350	12.6
Comm. in Stat. A. Theory and Methods Comm. in Stat. B. Simulation & Computation	Marcel Dekker	490	4104	1900	6.3
Internat. J. of Math and Math Sciences	Univ. of Central Florida and Calcutta Math. Soc.	40	825	2660	1.8
Memoirs AMS	Amer. Math. Soc.	148	2722	1860	2.9
Numerical Functional Anal. & Optimization	Marcel Dekker	57	378	1610	10.6
Semigroup Forum	Springer-Verlag	216	1131	1800	10.6
Stochastic Anal. Appl.	Marcel Dekker	75	470	1430	11.2

Translations Journals

JOURNAL	PUBLISHER	1984 List price, $US	Pages in 1984	Char/ page	Cents/ 1000 char
Algebra & Logic	Plenum Publishing	360	418	3080	24.3
Differential Equations	Plenum Publishing	505	1525	3500	9.5
Fluid Dynamics	Plenum Publishing	500	1030	3740	13.0
Fluid Mech. - Soviet Research	Scripta Publ. Co.	319	863	3350	11.0
Functional Anal. Appl.	Plenum Publishing	410	349	4080	28.8
J. Soviet Math.	Plenum Publishing	1035	3315	3390	9.2
Lithuanian Math. J.	Plenum Publishing	255	399	3180	20.1
Magnetohydrodynamics	Plenum Publishing	415	440	3800	24.8
Math. Notes of the Acad. of Sci. of the USSR	Plenum Publishing	520	965	3750	14.4
Math. USSR - Izvestiya	Amer. Math. Soc.	330	1244	3170	8.4
Math. USSR - Sbornik	Amer. Math. Soc.	450	1738	3030	8.5
Moscow Univ. Math. Bull.	Allerton Press	260	503	2460	21.0
Proc. Steklov Inst. Math.	Amer. Math. Soc.	226	1096	2970	6.9
Selecta Mathematica Sovietica	Birkhauser Boston	98	408	2450	9.8
Siberian Math. J.	Plenum Publishing	625	985	3750	16.9*
Soviet Automat. Control	Scripta Publ. Co.	185	552		*
Soviet J. of Contemp. Math Anal.	Allerton Press	260	500	2020	25.7
Soviet Math. Dokl.	Amer. Math. Soc.	466	1555	3070	9.8
Soviet Math. (Iz. VUZ)	Allerton Press	335	1316	2550	10.0
Theoret. & Math. Phys.	Plenum Publishing	500	1269	4120	9.6
Theory Probab. Appl.	Soc. for Indust. & Appl. Math.	200	360	3090	7.5
Theory Prob. & Math. Stat.	Amer. Math. Soc.	194	324	2180	27.5*
Trans. Moscow Math. Soc.	Amer. Math. Soc.	150	558	2560	10.5
Ukrainian Math. J.	Plenum Publishing	500	618	3290	24.6
Vestnik Leningrad Univ. Math.	Amer. Math. Soc. (Allerton Press, as of 1985)	80	270	2370	12.5

* Variation between first and second sample exceeded 15%, see description of sampling method.

HISTORY OF MATHEMATICS

The next meeting of the British Society for the History of Mathematics will be the Annual General Meeting and will take place at King's College, London on Wednesday 17th December, 1986.

The speakers will include:- Dr. E. J. Aiton: *Polygons and parabolas: some problems concerning the representation of planetary orbits in the seventeenth century;* Dr. R. Gowing; *Pierre Varignon (1654-1722), La Nouveau Méchanique;* Miss D. Willment: *Complex Numbers: some aspects of their development during the 17th and 18th centuries.*

There will also be a joint meeting with the British Society for the History of Science at King's College London, Chelsea Campus, on Saturday 10th January 1987. The theme will be the history of mathematics education.

Further information on these meetings may be obtained from Dr. C. R. Fletcher, Department of Mathematics, The University College of Wales, Aberystwyth, Dyfed.

FIELDS MEDALISTS AND NEVALINNA PRIZE WINNER

On Sunday 3 August 1986, during the opening ceremony of the International Congress of Mathematicians at the University of California, Berkeley, it was announced that Fields Medals had been awarded to Professor Simon Donaldson (University of Oxford), Professor Gerd Faltings (Princeton University) and Professor Michael Freedman (University of California, San Diego); it was also announced that the Nevanlinna Prize had been awarded to Professor Leslie Valiant (Harvard University). Donaldson and Freedman received their awards for their exciting work on 4-manifolds, Faltings for his achievement in verifying the Mordell Conjecture. Professor Valiant has made a significant contribution to theoretic computer science.

UGC ASSESSMENT OF RESEARCH IN MATHEMATICS

In the recent UGC allocation of resources to mathematics approximately 80% was allocated purely on the basis of student numbers, and approximately 20% depended upon both student numbers and research assessment. Approximately 2% was allocated as overheads to Research Council grants, in accordance with the principle of the dual support system, whereby it is the UGC's responsibility to provide the basic accommodaion administration, library and laboratory facilities underlying the research supported by the Research Council.

For the research assessment the UGC Mathematical Sciences Sub-Committee set up three specialist panels covering pure mathematics, applied mathematics and statistics. Each university department was rated on a scale of 0-4 by each panel, and the scores were then weighted in proportion to the numbers of staff in the three subject areas. The panel used the following guidelines:

Score 4. Internationally recognised research covering several different parts of the subject.

Score 3. Research of international standing but not covering so many parts of the subjects as for score 4.

Score 2. *Either* some work of international standing; *or* noteworthy but not outstanding research.

Broadly speaking the scores 4,3 and 2 corresponded to ratings of outstanding, above average and about average. Since, however, the Sub-Committee had set such a demanding standard for the attainment of a score of 4, and given the perceived high standards of mathematics research nationally, it was decided by the UGC Main Committee that, in order to maintain compatibility with other subjects, some universities that had scored 3 in particular areas of mathematics should also be starred as outstanding in those areas. Recently the chairman of the UGC, Sir Peter Swinnerton-Dyer, has sent a letter to Vice-Chancellors saying that the UGC wishes to commend to universities as worthy of their strong support and encouragement *all* those departments/subject areas in mathematics that scored 3 or above, whether or not they were starred as outstanding. He attached the following list giving scores of 2 and above. Details of scores below 2 were not given, because they have not been given in any other subject.

Pure maths	Applied maths	Stats
SCORE 4		
Cambridge	Cambridge	None
Liverpool	Imperial	
Oxford	Oxford	
Warwick		
SCORE 3		
Cardiff	Dundee	Bath
Edinburgh	East Anglia	Cambridge
Heriot-Watt	Heriot-watt	Durham
Imperial	Leeds	Imperial
Leeds	Manchester	LSE
Manchester	Newcastle *	Southampton
QMC	QMC	UC
Sussex	UC	Warwick
UC		
SCORE 2		
Aberystwyth	Aberystwyth	Birmingham
Bangor	Bath	Glasgow
Bath	Bristol	Heriot-Watt
Birmingham	Brunel	Kent
Bristol	Cardiff	Lancaster
Durham	Durham	Leeds
Exeter	Exeter	Liverpool
Glasgow	Hull	Manchester
Hull	King's	Newcastle
King's	Liverpool	Nottingham
Newcastle	Loughborough*	Oxford
Nottingham	Nottingham	Reading
Reading	Reading	St. Andrews
RH & Bedford	St. Andrews	Sheffield
Sheffield	Sheffield	Strathclyde
Southampton	Southampton	Surrey
Swansea	UMIST	Sussex
UMIST	Warwick	UMIST
York		

* These scores apply only to maths, not to engineering maths.

LONDON MATHEMATICAL SOCIETY

Notice of General Meeting

The General Meeting of the Society adjourned from Friday, 17th January 1986 will reconvene in the Wellcome Lecture Hall of The Royal Society, 6 Carlton House Terrace, London, S.W.1 at 3 p.m. on Friday, 21st November 1986 immediately before the Annual General Meeting to reconsider the proposal made by the Council of the Society to delete the existing By-Law I,2 and to substitute that printed below.

Text of the Proposed By Law I,2

No President or Vice-President shall hold the same office for more than such consecutive period as shall be determined by these By-Laws. In the case of a President, this period shall be of three years, and, in the case of a Vice-President, it shall be of two years. Each shall, however, be eligible for re-election to that office after the lapse of a period of one year.

The new By-Law, if accepted, would have made it possible for a President of the Society to be elected to a third year of office. However, it is now the intention of Council, following further discussion of the views expressed at the General Meeting, to propose that no change be made to the existing By-Law I,2, of which the text would remain the following.

Text of the Existing By-Law I,2

No President or Vice-President shall hold the same office for more than two years. He shall, however, be eligible for re-election after the lapse of one year.

C. J. MULVEY,
Council and General Secretary

Ergebnisse der Mathematik und ihrer Grenzgebiete, 3. Folge

A Series of Modern Surveys in Mathematics

in 1983, the first volumes in the new, third sequence of the **Ergebnisse der Mathematik und ihrer Grenzgebiete** were published. This new sequence is edited by **E. Bombieri**, Princeton; **S. Feferman**, Stanford; **N. H. Kuiper**, Bures-Sur-Yvette; **P. Lax,** New York; **R. Remmert (**Managing Editor), Münster; **W. Schmid,** Havard; **J-P. Serre,** Paris; **J. Tits,** Paris

When the **Ergebnisse der Mathematik und ihrer Grenzgebiete** was first started in 1932, a strong need was felt for summary reports, on a high level, on important topics of mathematical research. This philosophy was the guiding spirit of the sequence and of the sequence which was started after the war and which is now completed. The need for such summary reports may be felt today even more strongly than in the past.

The overall aims of the series have remained unchanged for five decades. Each book is designed as a reliable reference covering a significant area of advanced mathematics, guiding the reader through the main developments and trends in current research, indicating in historical notes the source of the ideas and their relationship to other parts of mathematics, spelling out related open questions, and incorporating a comprehensive, up-to-date bibliography.

Like the previous ones the third sequence in **Ergebnisse der Mathematik und ihrer Grenzgebiete** is directed towards graduate students and research mathematicians.

Late Summer additions to the series:

Partial Differential Relations

by **M. Gromov,** Bures-Sur-Yvette, France
1986. IX, 363 pages. Hard cover £ 49.50
ISBN 3-540-12177-3

The subject of this book originated in the work of Nash, Smale, Hirsch and Kuiper on differential and isometric immersions in the 1950's. It provides a unified and systematic account of these topics and covers the development in the last 25 years which to a large extent is due to the author himself and has not been published before. The basic results like Nash's implicit function theorem and the immersion theorem of Smale/Hirsch are given with complete proofs.
The book contains a wealth of new ideas and exciting results as well as problems, explicit of implicit, for future research. Certain chapters may be used for graduate courses on differential geometry and global analysis. There is no doubt that this volume will be soon one of the highlights in the third sequence of the **"Ergebnisse der Mathematik und ihrer Grenzgebiete"** which has been so successful since it started in the early eighties.

Einstein Manifolds

by **A. L. Besse,** Paris, France
1986. 22 figures. Approx. 510 pages. Hard cover £ 66.50
ISBN 3-540-15279-2

Einstein's equations stem from General Relativity. In the context of Riemannian manifolds, an independent mathematical theory has developed around them. Recently, it has produced several striking results, which have been of great interest also to physicists. This Ergebnisse volume is the first book which presents an up-to-date overview of the state-of-the-art in this field. **Einstein Manifolds** is a successful attempt to organize the abundant literature, with emphasis on examples. Parts of it can be used separately as an introduction to modern Riemannian geometry through topics like homogeneous spaces, submersions, or Riemannian functionals. The book is addressed both to research mathematicians, and to graduate students.

Field Arithmetic

by **M. D. Fried,** University of California, Irvine, CA, USA; **M. Jarden,** University of Tel Aviv, Israel

1986. Approx. 470 pages. Hard cover £ 66.50.
ISBN 3-540-16640-8

From the introduction:
Our topic is the use of algebraic tools – coming mainly from algebraic geometry, number theory, and the theory of profinite groups – in the study of the elementary properties of classes of fields, and related algorithmic problems. (We take the precise definition of "elementary" from first order logic.) This subject has its more distant roots in Tarski's observation that, as a consequence of elimination theory, the full elementary theory of the class of all algebraically closed fields is decidable; this relies on the Euklid algorithm of findings the greatest common divisor of two polynomials in one variable over a field. In its first phase this line of thought led to similar results on real closed fields and p-adic fields.
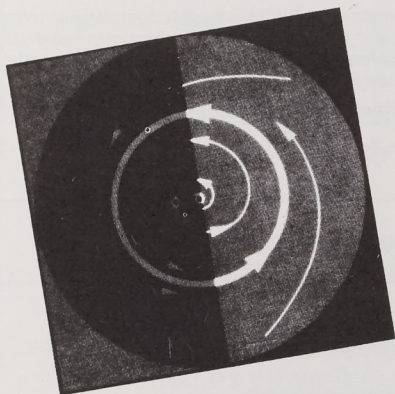
V. I. Arnold

Catastrophe Theory

Second, Revised and Expanded Edition

Springer-Verlag
Berlin Heidelberg New York Tokyo

Contents: Singularities, Bifurcations, and Catastrophes. – Whitney's Singularity Theory. – Applications of Whitney's Theory. – A Catastrophe Machine. – Bifurcations of Equilibrium States. – Loss of Stability of Equlibrium and of Self-Oscillating Modes of Behaviour. – Singularities of the Stability Boundary and the Principle of the Fragility of Good Things. – Caustics, Wave Fronts, and Their Metamorphoses. – The Large-Scale Distribution of Matter in the Universe. – Singularities in Optimization Problems: the Maximum Function. – Singularities of the Boundary of Attainability. – Smooth Surfaces and Their Projections. – The Problem of Bypassing an Obstacle. – Symplectic and Contact Geometry. – Complex Singularities. – The Mysticism of Catastrophe Theory. – Bibliographical Comments.

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