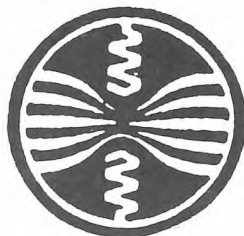


14 AUG 1987

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN



1987, Vol. 30 No. 2

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THE BRITISH SOCIETY OF RHEOLOGY
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1986/87

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EDITORIAL

This particular issue of the Bulletin is dominated by conference news with a call for papers for a host of future meetings. This must surely be a very healthy sign for the field we work in. I should point out that some conference notices arrive very late for the Bulletin for the deadlines they contain. To try to avoid this problem I have included in this issue information regarding deadlines for both Bulletin and Rheology Abstracts.

It is with some sadness that we note the recent retirement of Hanswalter Giesekeus although I am sure that he will continue to be active and pass on his very valuable experience. We wish him well for the future.

The secretary has asked me to remind members that the distinguished Society tie, with the BSR motif woven in silver and red on a navy background, is available from him at a price of only five pounds fifty pence, including postage.

Peter Townsend

Peter Townsend

RETIREMENT OF PROFESSOR H. GIESEKUS

One of the most respected international rheologists, Professor Hanswalter Giesekus, retired recently. In a distinguished industrial and academic career, he worked at 'Bayer' in Leverkusen before moving to the University of Dortmund. He is best known for his works on molecular modelling, flow visualization and drag reduction. He is the Executive Editor of Rheologica Acta.

In a ceremony to mark the retirement of Professor Giesekus, about 75 research collaborators and colleagues, past and present, met at the University of Dortmund on April 6th. The occasion was opened by speeches from the University Rector and the Dean. Scientific presentations were given by three friends of Professor Giesekus, Professor Jameschitz-Kriegl of Linz, Professor Ken Walters of Aberystwyth and Professor A.B. Metzner of Delaware. The formal meeting ended with a moving speech from Professor Giesekus summarizing his career and ending with an account of the importance of his Christian faith.

All the guests then enjoyed a lunch, in part prepared by members of Professor Giesekus' family.

We wish Professor Giesekus well in his retirement and the B.S.R. is happy to acknowledge his massive achievements in the field of Rheology.

The First European School of Rheology

- a notable experience in European cooperation

There is a considerable effort being expended by the EEC at present to foster European collaboration in teaching and research. One programme involves funding "European Conferences on Science and Technology". In 1986 a group of four academics obtained a grant under this scheme to hold the first European School of Rheology. They were Professor Claude Wolff (ENSITM) Mulhouse, France, Professor J M Piau (Grenoble), Professor Ken Walters (WCW Aberystwyth) and Dr Jim Ferguson (University of Strathclyde) - three of the four, it should be noted, being members of the BSR.

The main burden of the organisation fell on the shoulders of Professor Wolff and his group in Mulhouse. It should be stated right away that they did a superb job in arranging the School which took place in Gerardmer in the Vosges Mountains from 11th to 31st January this year.

Some sixty postgraduates from EEC countries and two from Sweden attended the meeting. The students came from as far west as Portugal and as far east as Greece, from Scotland in the North to Italy in the south. The only notable lack was in German students. One might speculate on why this was the case, but in future a special effort will be made to fill this gap.

The format of the course was designed to take advantage of the beautiful ski resort of Gerardmer. Lectures started at 8.30 am and continued until 12.00 when a (hurried) four course lunch was followed by a free afternoon, normally spent on the slopes. Lectures recommenced at 5.00 pm until 7.30 pm when dinner was held. From 9.15 to 10.15 (and frequently later) the students gave seminars in their own research. One of the great pleasures of taking part in the course was to see virtually every student still there at the end of the day! A summary of the course is given below. It was both comprehensive and intensive, demanding a considerable effort from the students who responded in a most gratifying way. Not only was their

enthusiasm for the subject infectious but they also mixed together in a way that can only be good for the future of the cooperative work in Europe. This correspondent would predict that many of the friendships forged during these three weeks will produce joint research in the future.

As part of the course a number of manufacturers of rheological instrumentation demonstrated and gave talks on their equipment. Carri-Med with their elongational and constant stress rheometers, Polymer Laboratories (dynamic mechanical analysis), Bohlein (rheometer and constant stress rheometer) and Rheametrics with a display, were all present.

It is probably fair to say that the success of the course exceeded the expectations of the organisers and lecturers in every way. There can be no doubt that future rheology courses must be held to build on what has been achieved so far. Indeed, organisers of future EEC courses in other subjects would do well to su the Gerardmer model. The organisers hope to repeat the exercise in 1989, given continued EEC funding.

Mention of the funding brings up what, to the organisers, was one of the most heartening aspects of the Course - namely the support given by the BSR. While the EEC grant was generous, it by no means covered all the cost incurred by the students. The decision of the BSR council to fund all eleven British students to the tune of £250.00 each was extremely generous. The members of the Society can rightly feel proud to have helped so many young people to attend. There can be no doubt that the money was well spent.

Dr.J. Ferguson

European School of Rheology

The programme of lectures given was as follows:-

Lecturer	Subject	Number of lectures
Prof. Giesekus Dr. Jongschaap	Tensors. Continuum Mechanics Viscoelasticity. Constitutive laws.	12
Prof. Krieger Prof. Mewis	Suspensions and emulsions physio-chemistry and rheology. Coating techniques.	12
Prof. Walters	Steady and oscillatory shear rheometry. Extensional flow rheometry. Flow visualization applied to rheometry.	6
Dr. Ferguson	Polymer structure and rheological properties. Experimental techniques for difficult materials. On-line rheometry.	7
Prof. Hassager Prof. Grizzuti	Molecular modelling applied to polymer solutions. Application to the interpretation of the general behaviour of polymer solutions. Molecular modelling of polymer melts.	12
Prof. Piau	Complex flows. Lubrication with polymer solutions.	6
Prof. Crochet	Numerical simulation.	6
Dr. Agassant	Polymer processing extruders, injection moulding, fibre spinning.	6



**STUDENTS ASSISTED BY
THE BRITISH SOCIETY OF RHEOLOGY
- EUROPEAN SCHOOL OF RHEOLOGY.**

Dele Ajayi	Department of Chemical Engineering, University of Strathclyde
Lynn Beattie	Department of Pharmacy, University of Strathclyde
Philip Bowen	Department of Applied Mathematics, University College of Wales, Aberystwyth
H. Foster Evans	Department of Applied Mathematics, University College of Wales, Aberystwyth
Kevin Golden	Department of Mathematics and Statistics, Plymouth Polytechnic
Susan Pennington	Department of Applied Mathematics, University of Liverpool
Julian Roebuck	Department of Physics, University of Leeds
Owen Thomas	Department of Applied Mathematics, University College of Wales, Aberystwyth
Chun Nam Tsang	Department of Applied Physics, Sheffield City Polytechnic
Anthony Wheeler	Department of Mathematics, University College of Wales, Aberystwyth
Graham Wheeler	Department of Food Science, University of Nottingham

Each student was given a grant of £250 making a total of £2750

Rheology at ICI

ICI is one of the world's largest producers of chemical and allied products. It has interests in areas as diverse as pharmaceuticals and explosives, fertilisers and surface coatings, and advanced composites and biotechnology. Rheology in one form or another is of consequence in all areas of the Company's activities. In some areas the concern is with the processing behaviour of complex materials, in others the issue is the performance of a product such as a thermoplastic resin. There are thus many people in research and development who devote at least some of their time to rheological matters. In this article I can do no more than give an indication of just some of the work that is going on.

Rheology and Materials

Much of the work on polymeric and composite materials is carried out in the Technical Centres at Wilton on Teesside and Runcorn on Merseyside.

A team led by F N Cogswell at Wilton has been developing continuous fibre reinforced thermoplastics. Until recently the main rheological problem was to find out how to achieve good wetting of the surface of fine fibres by viscous resins under processing conditions. However, the team are now becoming increasingly involved in developing the process technology required to make shaped artifacts from long fibre composites. They are thus addressing the rheology of systems whose flow and deformation is highly constrained by the presence of reinforcing fibres. This work receives a theoretical input from research sponsored in the mathematics departments at UCW, Aberystwyth, and the University of Nottingham.

The rheological characterisation of these materials is carried out by a team led by D J Groves in the Polymer Science Group. Their function is to meet the rheological needs of Chemicals & Polymers Group, Films Group and Advanced Materials Group in the areas of materials development and melt fabrication.

Another area of interest is two-phase polymer blends. A wide range of effects and properties can be obtained by dispersing one polymer in another to form an immiscible blend (so-called polymer alloys), the most familiar of which perhaps is impact strength modification. In the Corporate Colloid Science Group at Runcorn J Richardson is continuing work started by I S Miles on the structure and properties of immiscible blends. Issues addressed include the identification of factors that control the size and structure of the internal phase and its adhesion to the

matrix. There is also work in the group on the mechanical properties of filled polymers.

Surface Coatings

Rheology impinges on all aspects of surface coatings production and performance. It influences the application properties of a coating, the process of film formation and the utility of the dried or cured film.

There has been within ICI Paints Division a history of developing ingenious methods of characterising particular aspects of coatings rheology. Two well-known examples in the ICI relaxation viscometer, which simulates the time-dependent stresses that arise during the flow-out of a freshly applied paint film, and the oscillating-can rheometer (OSCAR), which allows the consistency of a structured paint to be measured without opening the can. These devices are now available commercially. More recently T A Strivens has developed a simple but elegant method of following the rheology of a drying paint film. This involves measuring the recoil of a small ball dropped on the surface. Trevor has also been involved in the application of acoustic emission spectroscopy to the characterisation of the mechanical properties of coating films.

Once the rheological properties required of a surface coating have been established these have to be built into a formulation. In the case of application properties this often involves the use of "thickeners" of various types. At their simplest these may be soluble or dispersible materials that increase the viscosity of the liquid vehicle, but more often than not they exert their effect by interacting with other components in the system in a complex way. Fundamental work on rheology control at Paints Division includes a study by T Strivens of the mechanism and kinetics of gel formation in highly structured latex paints. There is also work at Runcorn on new ways of controlling the rheology of more fluid latex systems. This work is being performed by A J Morton-Jones who is also conducting a fundamental study of film formation in collaboration with the author.

The Processing of Suspensions and Dispersions

There has been much fundamental work at Runcorn on the rheology of suspended materials. A part of this work has been aimed at gaining a better understanding of the processing behaviour of dispersed solids. Particular attention has been paid to separation processes. A key feature of finely divided solids - suspension is that they are capable of forming strong cakes and sediments at quite low solids concentrations. The resistance to compaction of such structures is thus often the controlling factor in separation operations. The Corporate Colloid Science Group has developed new methods of defining and measuring the compactive strength of disperse structures, and has applied

these to a wide range of problems. In this area the group has benefited from collaboration with the universities of Bristol, Cambridge and Melbourne. The results of these collaborations include a new approach to the modelling of a separation process developed in conjunction with Prof L R White of Melbourne University, and new insights into why dispersed materials have the properties they do.

The Group is maintaining its interests in suspension processing. Current work includes a study of the rheology of fermentation broths and hence the relationships with fermenter hydraulics and subsequent downstream processing. Of particular interest are systems comprising filamentous fungi of very high aspect ratio. This work is led by P D A Mills who also has interests in agglomeration processes.

Other work on dispersions at Runcorn includes work on very concentrated dispersions in the guise of ceramic pastes; high strength cements and highly-filled polymers.

Rheology and the Formulation of Effect Chemicals

Rheology plays an important part in the formulation of effect-chemicals such as pharmaceuticals, plant protection chemicals, dyestuffs pigments and explosives.

Rheology research in a team in Pharmaceuticals Division led by R C Rowe is currently concentrated in two areas, the rheology of wet powder masses and the rheology of emulsions and creams. The former work is directed towards a better understanding the extrusion behaviour of wet solids as it relates to "spheronisation"; this being a way of producing dense spherical pellets for use as an oral drug delivery system. This work is being carried out in conjunction with the School of Pharmacy in London. Work on the rheology of creams is directed towards understanding and controlling the changes in consistency that can occur on storage.

Th F Tadros' Group in Plant Protection Division are concerned with formulation of plant protection products with good application and storage properties. Physical forms employed include dispersions, emulsions and mixed dispersions and emulsions. Rheological methods developed in collaboration with Bristol University and with colleagues at Runcorn have been of great benefit in understanding the storage stability of such products. Work has also been carried out on the flow properties of liquid formulations applied by electrostatic spraying.

Rheology and the Pipeline Flow of Crude Oils

ICI Australia have long been involved in flow improvers for diesel fuel. More recently they have turned their attention to flow improvers for waxy crude oils. The evaluation of such materials is a non-trivial rheological exercise since the wax

crystals that occur in certain crudes can be of a size comparable to the sample dimensions in conventional rheometers. Rheometric data have thus to be used with care when evaluating potential flow improvers, and flow simulations on a larger scale are advisable. ICI Australia have recently been awarded a substantial contract to supply flow improvers to an Australian oil producer. Again, this work has benefitted from an academic input and Professor Boger of Melbourne has been a valuable consultant in this area.

Rheology and Modelling

Computer modelling is being used increasingly within the Company. An area of current interest is the mixing of non-Newtonian fluids. This area is the subject of a collaboration under the EEC BRITE Scheme between ICI, Unilever and UCW, Aberystwyth. The ICI work is led by J C Middleton of the Process and Materials Technology Group at Runcorn.

Computer methods (finite element methods) are also used to aid the design of structure components made from plastics and composites.

Concluding Remarks

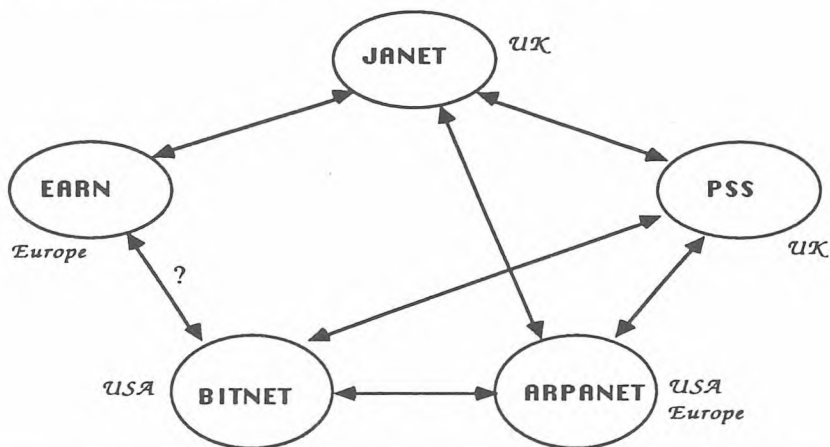
In preparing this article I have had to be selective and much worthy and interesting work has not been cited. However, the work I have covered does I think give an idea of the broad range of rheology that arises in the chemical industry, and it is probably fair to say that there is not an area of rheological science which is not important. I am grateful to my colleagues for providing the information on which this brief article is based.

R BUSCALL

Electronic Mail

In a recent letter to me from Bob Bird at the Rheology Research Centre at Wisconsin, U.S.A. he enthusiastically praised the virtues of electronic mail. He has been using such mail to communicate drafts of sections of a new book he is writing to and from his fellow authors. One is at MIT, about a 1,000 miles away and the other in Denmark. He claims, and I believe him, that such communication greatly improves productivity when groups of people at distant locations attempt to work together on a project. Bob has suggested that rheologists, as such forward thinking people, should get organised and make their electronic mail addresses known to one another.

Perhaps some background may help here. I'm no expert and what I tell you has been extracted from colleagues. Electronic mail is communicated over various networks of computers, and many of these networks are linked. The following diagram gives some of the major networks relevant to our members together with those links that we are aware of. I should emphasize that some of the links will have restricted access. Others will imply a charge for using them.



If you wish to use electronic mail you should first contact your local 'expert' to establish to which network you have access. Then you must determine a path to the person you wish to contact and this may involve the use of some old-fashioned 'steam-driven' mail initially. Finally your expert will show you how to compose messages, how to mail them, and how to read in-coming mail.

In addition to the above there is a very large world-wide network of computers which run the UNIX operating system. This network, called USENET, is not totally separate from the network described above and can in fact use some of the same links. In addition to mail, USENET also has a news service giving regular user contributed articles on a vast range of topics, perhaps even rheology? If you have access to a UNIX machine this network may be for you.

The big advantage of electronic mail is speed and flexibility. Trans-Atlantic mail takes hours not days. Text which is prepared on your word processor can be mailed, edited by the recipient on his/her word processor and mailed back to you to be printed on your printer. The disadvantages include the basic need for access to appropriate equipment, the possible network costs, and the need to check for incoming mail which involves logging-in to a computer system on a regular basis.

Bob has asked me if I would coordinate collection and distribution of mail addresses. I'm quite happy to do that so any enthusiasts out there get in touch. My address on JANET is peter@UK.AC.SWAN.CS

Editor.

NOTICE OF THE ANNUAL GENERAL MEETING

The 43rd Annual General Meeting of the British Society of Rheology will be held on Thursday, 3rd September, 1987 at 6.00 p.m. in the lecture theatre of Eliot College in the University of Kent, Canterbury.

Members are reminded that (under Rule 7(b)) the business of the meeting includes:

1. The election of Officers (other than the President) and Members of the Council for 1987-1988.
2. The receipt of a report and audited accounts from the Council.
3. Dealing with matters raised by the Council or by any Member, and receiving suggestions from Members for consideration by the Council.

Nominations received to date are as follows:

Honorary Secretary:	Mr. R.E. Carter
Honorary Treasurer:	Dr. A. Evans
Membership Secretary:	Mr. H. Schimanski
Editor (Abstracts):	Mr. S.T.E. Aldhouse
Editor (Bulletin):	Professor P. Townsend
Ordinary Members:	Mr. P.C. Anderson Dr. F.S. Baker Dr. G.J. Brownsey Dr. M.J. Folkes Dr. D.J. Hourston Mrs. C.A. Moules Dr. D.R. Oliver Mr. T.A. Strivens

Nominations for Council or for any of the offices are invited. Nominations should be sent to the Secretary or may be made at the Meeting (see Rule 5(b)).

Members attention is drawn to the following proposal which will be discussed at the AGM.

It is proposed that the membership subscription to the British Society of Rheology be raised from Five Pounds Sterling per annum to Six Pounds Sterling per annum (£6.00 p.a.) with effect from 1st of October 1988. To encourage members with Bank accounts in the British Isles to pay their subscriptions by Bankers standing order, the subscription for members paying by this method will remain unchanged at £5.00 p.a.

The Secretary would be pleased to receive notice of any matter that any Member wishes to raise.

R.E. Carter

Editor: for those who might wish to anticipate the outcome of the above proposal included in this Bulletin is a standing order subscription form.

STANDING ORDER

To: _____ Bank Ltd

Please pay to Lloyds Bank Ltd, 20 North Street, Leatherhead (Code 30-94-94), the sum of £ . (pounds pence) on receipt of this notice and the sum of £5.00 (five pounds) on the 1st October 198 and on the same date each year following until further notice.

These payments for the credit of the British Society of Rheology, Membership Dues account, No. 0180985.

Please cancel any earlier order in favour of the British Society of Rheology.

Date _____ Signed _____

Account No. _____

Name _____

Address _____

-----Detach here-----

Please return this notification to the Honorary Membership Secretary,

Mr P.C.Anderson,
32 Queensway,
Feltham,
Middlesex,
TW13 7NS

This is to confirm that I have requested my bank to pay my BSR subs by standing order starting with a first payment on:

Signed: _____

Date: _____

Member's Name and Address (Block capitals please)

Postal Code _____ Telephone number _____ (Bus)

_____ (Home)

MEMBERSHIP NEWS

The following applications for Membership of the British Society of Rheology have been received and were approved at the Council Meeting on the 27th of March 1987.

Dr. Kenneth ALLSFORD,
Warren Spring Laboratory,
Gunnels Wood Road,
Stevenage,
Herts. SG1 2BX

B.Sc., Ph.D.

feta FGHL

Dr. Edmund R.H. BAYLIS,
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B.Sc., Ph.D.

esa DG

Dr. Patrizia BORON-RETTORE,
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Dipl.Chem.ETH, Dr.Sc.Nat.

fetsa BDFGIJCLM

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DEST CNAM

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Ph.D. (Eng)

fets CDEH

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Skelmersdale,
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B.Eng (Elec)

feta DGL

Mr. Andrew GREEN,
Thorn/EMI Plc. C.R.L.,
Dawley Road,
Hayes, Middlesex.

HNC., LRSC., P.G.Dipl.Mat.

fets BCDEGHI

Mr. Stephen P. HAVARD,
Maths & Computer Science Department,
Polytechnic of Wales,
Treforest, Pontypridd,
Mid Glamorgan.

B.Sc. (Hons)

fts GN

Mr. Russell G. HOLLAMBY,
Kelco International,
Waterfield, Pitwood,
Tadworth,
Surrey, KT20 5HQ

Diploma of Geology (RMIT)

feta G

Mr. Vinod M. KAMATH,
Department of Chemical Engineering,
University of Cambridge,
Pembroke Street,
Cambridge, CB2 3RA

B.Eng.(Chem), M.Sc.(Chem.Eng)
fetsa DFG

Dr. C. Eugene McGUCKIN,
International Drilling Fluids,
c/o E.C.C. Research Labs,
Pentewan Road, St. Austell,
Cornwall, PL25 4DJ

B.Sc. (Hons), Ph.D.
feta CDFGHJ

Mr. T.J.P. PERKINS,
Department of Mathematics,
University College of Wales,
Aberystwyth, Dyfed,
Wales.

B.Sc.
fts N

Mr. Peter H. RANDALL,
Quality Assurance Department,
Beecham Pharmaceuticals,
Clarendon Road,
Worthing, BN14 8QH

LRSC. (Applied Chemistry)
peta FGJ

Mr. Peter ROBINSON,
Rheometrics,
Runnymede Malthouse,
Runnymede Road,
Egham, Surrey.

ONC, HNC
fetsa ABCDFGIJLMN

Mr. William A. SHORT,
Purpoise Viscosimeters Ltd.,
Peel House, Peel Road,
Skelmersdale,
Lancs. WN8 9PT

HNC (Mech)
fetsa ABCDEFGHIJKN

Mr. Stuart C. STEADMAN,
Department of Materials Technology,
Brunel University,
Kington Lane, Uxbridge,
Middlesex, UB8 3PH

B.Sc. (Materials Technology)
fetsa B

Dr. Leslie V. WOODCOCK,
Schools of Chemical Engineering,
University of Bradford,
Bradford,
West Yorkshire, BD7 1DP

M.A., Ph.D., C.Chem., F.R.S.C.
fetsa GHIMN

RESIGNATIONS

Dr. R.F. Ginn, Houghton, Michigan, USA.	Joined in 1968
Miss C.M. Smith, Unilever, The Wirral.	Joined in 1980
Dr. J.M. Wood, University of Manchester	Joined in 1984

MEMBERSHIPS DELETED UNDER RULE 40

The following members are at least a year in arrears with their subscription payments and have therefore had their names deleted from the Society's membership list under rule 4d.

	Joined Society in
Mr. H. Archer, Donald MacPherson, Bury, Lancs.	1964
Mr. D. Berrington, Newcastle-upon-Tyne.	1983
Dr. M. Block, Liverpool.	1984
Dr. A.S. Burbage, Riker Laboratories, Loughborough	1980
Dr. M. Carbonaro, Von Karman Inst.Fluid Dynamics, Belgium	1974
Dr. R.S. Charnock, Loctite (Ireland) Ltd. Dublin, Ireland.	1980
Dr. R.P. Chhabra, UCW, Swansea, Wales.	1978
Dr. P.E. Clark, University of Tulsa, Oklahoma, USA.	1984
Dr. P. Connor, Glaxo Research Ltd., Greenford, Middlesex.	1972
Dr. R.J. Crowson, Borg-Warner Chemicals, Warwickshire.	1976
Dr. J.D. Cutter, Bexhill-on-Sea, Sussex.	1959
Dr. B.P. Enoksson, Nitro Nobel AB, Sweden.	1951
Mr. L.R. Frost, Instrom Corp., Canton, Massachusetts, USA.	1976
Dr. A. Gavignet, Schlumberger, Cambridge.	1983
Dr. D. Grazziano, Hinsdale, Illinois, USA.	1980
Prof. M.A. Hayes, University College, Dublin, Ireland.	1980
Mr. D. Holme, Br. Ceramic Res.Ass., Stoke-on-Trent, Staffs.	1985
Prof. J. Klein, Inst. fur Tech.Chem., Braunschweig, W. Germany.	1974
Mr. S. Lansdell, Wellcome Foundation, Dartford, Kent.	1980
Mr. D.W. Mead, Dept. of Chem.Eng., University of Cambridge.	1985
Mr. M.C. Muir, University of Massachusetts, USA.	1984
Dr. E.H. Steiner, Br. Food Man.Ind.Res.Ass., Leatherhead, Surrey.	1961
Dr. N.A. Stevenson, Fisons Plc, Loughborough, Leics.	1983
Mr. D.G. Thomas, D.App.Maths, UCW, Aberystwyth, Wales.	1982
Dr. A.T.S. Walker, UKAEA, Winfrith, Dorset.	1980
Mr. P.A. Wilkinson, Pedigree Petfoods, Melton Mowbray, Leics.	1985
Dr. J.H. Williams, Schlumberger, Cambridge.	1984
Dr. A.J. Willson, Dept. of Maths, University of Leicester	1970

Deadlines

For the A.G.M.

The secretary would be pleased to receive, **as soon as possible**, notice of any matter that any Member wishes to raise at the next A.G.M. to be held on Thursday, 3rd September, 1987.

For Rheology Abstracts

The Abstracts editor reminds contributors that abstracts should be sent to him as early as possible and certainly before the following dates :-

for the next issue **July 24th**

for the following issue **October 9th**

For the Bulletin

Copy for the Bulletin should be sent to the editor on or before the following dates :-

March 15th

June 15th

September 15th

December 15th

Advertisers and conference organisers may wish to know that the Bulletin usually reaches members approximately one month after the above dates.

OLDROYD MEMORIAL LECTURES

**The rheology of fluids: a modern view
by**

**Professor Ken Walters
Department of Mathematics
University College of Wales
Aberystwyth**

**5.30 p.m. on Wednesday,
21st October 1987**

**in
Lecture Theatre 'A'
University Lecture Rooms Building
University of Liverpool**

**4.30 p.m. on Friday
6th November 1987**

**in
Seminar Room 'A'
Department of Applied Mathematics
and Theoretical Physics
Silver Street, Cambridge**

All Welcome

Admission Free

Conference Diary

Date	Place	Details
16-21/8/87	Jerusalem,	'Polymers for Advanced Technologies', Israel. IUPAC international symposium: contact Ortra Ltd, 2, Kaufman St., PO Box 50432, Tel Aviv, Israel 61500.
30/8/87 - 4/89/87	San Sebastian Spain.	'International Symposium on Polymer Materials' contact: Facultad de Ciencias Quimicas, Universidad del Pais Vasco, Apartado 1072, San Sebastian, Spain.
1-4/9/87	Canterbury, U.K.	'Entrance and Exit Effects' and 'General Rheology' Belgian and British societies of rheology: contact Dr C.J.S.Petrie, Dept. Engineering Maths, University of Newcastle upon Tyne or Dr J.L.Lebanc, Monsanto Europe SA, Avenue de Tervuren 270-272, Letter Box No 1, B-115 , Brussels, Belgium .
27-30/9/87	Buffalo, N.Y., U.S.A.	'North American Meeting' Polymer Processing Society: contact Dr J.L.Throne, Research and Development, Amoco Chemicals Corporation, PO Box 400-EL, Naperville, Illinois 60540, U.S.A.
6-9/10/87	Smolenice, Czecho- slovakia.	'Constitutive Equations in Viscoelasticity' Euromech 231: contact Professor J.Brilla, Institute of Applied Mathematics and Computing Techniques, Comenius University, Mlynska dolina, 852 15 Bratislava, Czechoslovakia (or Dr C.J.S.Petrie - address above).
14-16/10/87	Osaka, Japan.	'35th Rheology Symposium' Society of Rheology, Japan: contact Dr T Masuda, Dept of Polymer Chemistry, Kyoto University, Kyoto 606, Japan.
18-22/10/87	Atlanta, Georgia, U.S.A.	'59th Annual Meeting' Society of Rheology (contact Society of Rheology secretary, D.G.Baird, V.P.I., Blacksburg, Virginia).
16-18/11/87	Toulouse, France.	'Rheologie des fluides industriels' Groupe francais de Rheologie: contact M. Remi Gaudu, Institut de Mecanique des Fluides de Toulouse, 2, rue Charles-Camichel, 31071 Toulouse Cedex, France.

- | | | |
|----------------------|---------------------------------|---|
| 16-19/11/87 | Chengdu,
China. | 'Second Chinese National Congress on Rheology'
Contact: Professor Han Shifang, Institute of
Mathematical Sciences, Chengdu branch, Academia
Sinica, Chengdu, P.R. China. |
| 18-22/1/88 | Chamonix,
France. | 'International Conference on Extensional Flow'
Sponsored by the European Economic Community:
contact Professor K. Walters, Dept of Mathematics,
University College of Wales, Penglais, Aberystwyth,
Dyfed, SY23 3BZ, U.K. |
| 11-14/4/88 | Cambridge,
U.K. | 'Deformation, Yield and Fracture of Polymers'
(Seventh international conference) Plastics and
Rubber Institute and other organisations
- contact Conference Office, P.R.I., 11 Hobart Place,
London SW1W 0HL, U.K. |
| Spring/88 | Canada. | 'Rheology and Processing of Polymers'
planned by the Canadian Rheology Group - contact
C.R.G. secretary. |
| 16-18/5/88 | Uxbridge,
Middlesex,
U.K. | 'Flow processes in composite materials'
British Society of Rheology - contact F.N.Cogswell,
ICI plc, The Materials Centre, PO Box 90, Wilton
Centre, Middlesborough, Cleveland TS6 8JE, U.K. |
| 14-20/8/88 | Sydney,
Australia. | 'Xth International Congress on Rheology '
contact Professor R.I.Tanner, Dept of Mechanical
Engineering, University of Sydney, Sydney, N.S.W.
2006, Australia. |
| 21-27/8/88 | Grenoble,
France. | '17th International Congress of Theoretical
and Applied Mechanics' IUTAM:
contact Professor D. Caillerie, Secretary ICTAM
1988, Institut de Mecanique de Grenoble, Domaine
Universitaire - B.P.68, 38402 Saint-Martin-d'Heres
CEDEX, France. |
| 7-9/9/88 | Egham,
Surrey,
U.K. | 'Conundra Rheologica'
British Society of Rheology
- contact P.C.Anderson,BP Research Centre,
Chertsey Road, Sunbury-on-Thames,Middlesex,
TW16 7LN, U.K. |
| 29/9/88
- 1/10/88 | Drouzhba-
Varna.
Bulgaria | 'Mechanics and Technology of Composite Materials'
Bulgarian Academy of Sciences:
contact Professor Y. Simeonov, Central Laboratory
of Physico-Chemical Mechanics, Acad G Bontchev
Street, IV km, Bl.I, Sofia 1113, Bulgaria. |

ENTRANCE AND EXIT EFFECTS

Practical, theoretical and computational aspects of flow into and out of ducts organised by the Belgian Group of Rheology and the British Society of Rheology to be held at

Eliot College, University of Kent in Canterbury

from Tuesday, 1st September, to Friday, 4th September, 1987.

The annual meeting of the British Society of Rheology, with a session on

GENERAL RHEOLOGY

is included in the programme

ENTRANCE AND EXIT EFFECTS

Tuesday, 1st September:

16:30-18:30 Registration -

19:00 Dinner

20:30 Informal gathering in bar (JCR) of Eliot College -

Wednesday, 2nd September:

9:15-10:15 Registration -

10:00 Coffee

10:30 Opening of conference -

Review lectures

10:40-11:35 D V Boger (Melbourne) "Viscoelastic flows through contractions"

11:35-12:30 L Choplin and P Carreau (Quebec) "End effects for polymeric fluids: historical and critical review"

12:30 Lunch

Computational fluid dynamics

14:00-14:30 J Collier, S M Sargand and J S Gunasekera (Ohio) "FEM analysis of polymer flow in converging streamlined dies"

14:30-15:00 P Townsend and M F Webster (Swansea) "Simulating transient three-dimensional flows through contractions using finite element techniques"

15:00-15:30 J M Marchal, B Debbaut and M Crochet (Louvain) "Highly viscoelastic flow through an abrupt contraction"

15:30 Tea

16:00-16:30 V Delvaux and M Crochet (Louvain) "Extrudate swell of viscoelastic fluids"

16:30-17:00 H Maders, Y Demay and J F Agassant (Valbonne) "A numerical study of flow singularities at die exit"

17:00 Discussion of computational fluid dynamics -

18:30 Dinner

20:00 Tour of Canterbury Cathedral -

Thursday, 3rd September:

Experiments, polymeric liquids

- 9:00- 9:30 R van de Griend, S Musarra, M M Denn and R Keunings {Berkeley} "Co-flow through an expansion"
- 9:00-10:00 D G Baird and S A White {Blacksburg} "Flow birefringence analysis of planar entry and exit flows"
- 10:00-10:30 H Kramer and J Meissner {Zurich} "LDPE melt flow into a slit die: velocity field and deformation"
- 10:30 Coffee
- 11:00-11:30 F N Cogswell {Wilton} "Entrance and exit effects with the new generation of thermoplastic injection moulding resins"
- 11:30-12:00 J P Villemare and J L Leblanc {Valbonne and Brussels} "Importance of wall slippage on pressure drop in converging geometries"
- 12:00-12:30 J J Benbow {Birmingham} "Extrusion defects: another look at some practical results of die entrance and exit effects"
- 12:30 Lunch
- 14:00-14:30 W van der Bruggen and R Fernandez Luque {Rijswijk} "Flow behaviour of aqueous polyacrylamide solutions in micro flow models"
- 14:30-15:00 T C B McLeish {Cambridge} "Molecular rheology of branched systems"
- 15:00-15:30 M Rides, B J Dishman and K Thomas {Teddington} "Comments on Cogswell analysis of converging flow"
- 15:30 Tea
- 16:00-16:30 R E Evans and K Walters {Aberystwyth} "The mechanism of vortex enhancement"
- 16:30-17:00 D M Binding and K Walters {Aberystwyth} "Contraction flows and the measurement of extensional viscosity"
- 17:00 General discussion on entrance and exit effects -
- 18:00 A G M of British Society of Rheology -
- 19:30 Reception in the Cloister Court of Eliot College
- 20:00 Conference Dinner in Eliot College

Friday, 4th September:

GENERAL RHEOLOGY

- 9:00- 9:30 D C-H Cheng {Stevenage} "Wall effect in viscometry"
- 9:30-10:00 D V Boger, Y K Leong, D E Mainwaring and G B Christie {Melbourne} "Exploitation of the rheology of brown coal water suspensions"
- 10:00-10:30 J Collier, B Collier and R Rabe {Ohio} "Rheological and system aspects of a fibre coating process"
- 10:30 Coffee
- 11:00-11:30 H A Barnes and D K Barns {Port Sunlight} "A simple automated extension rheometer"
- 11:30-12:00 D R Oliver {Birmingham} "Load and friction in 'thin' bearings lubricated by polymer solutions and oils"
- 12:30 Lunch

- Close of conference -

Completed registration forms should be sent as soon as possible, together with the indicated fee to

**Dr C J S Petrie, Department of Engineering Mathematics, University of
Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, U.K.**

to whom any enquiries may be addressed. Details of how to get to the University of Kent, concessionary rail fares and other information will be sent to delegates who register. In order to be sure of accommodation in the University, delegates' registration forms **must** reach Dr Petrie by **11th August**.

The organising committee also includes

Professor M Crochet, Universite Catholique de Louvain, Unite de Mecanique Appliquee, 2 Place du Levant, B-1348 Louvain-la-Neuve, Belgium.

Dr J L Leblanc, Montedison Coordination Center S A, Rue de l'Industrie 8, B-1400 Nivelles, Belgium.

Mr H Schimanski, 50 Cromwell Avenue, Thame, Oxfordshire OX9 3TD, U.K.

The fee of £100 (£90 to members of the participating Societies) covers accommodation for three nights and all meals from the evening meal (at 7pm) on Tuesday, 1st September to lunch on Friday, 4th September, in addition to registration for the conference. For participants wishing to arrive on the morning of Wednesday 2nd September a reduced fee of £95 (£80 to members) is offered.

Accommodation is in student rooms in Eliot College on the University campus, and the meeting will be held in the lecture room of Eliot College. A reduced fee (subsidized by the organizing societies) is available to bona fide students, namely £70 (£60 from Wednesday morning).

On Wednesday, 2nd September there is the unusual possibility of an evening visit to Canterbury Cathedral with a guided tour. There will be a sherry reception and conference dinner on Thursday, 3rd September. There will be a bar in Eliot College each day (at lunchtime and in the evening).

It is intended to organise an exhibition of rheometers and viscometers, and so far three manufacturers have expressed the intention of participating. The programme includes two review lectures and discussion sessions on entry and exit effects.

NOTE (TO AUTHORS) - the time (30 or 55 minutes) allocated in the programme for each paper includes time for any discussion, so presentations should last 20-25 and 40-50 minutes. It is possible to include further short contributions, (at 12:00 on Friday, 4th September) and any potential contributor should contact Dr Petrie (by letter to the address given, by telex 53654 - answer back UNINEW G, by telephone (091-232-8511 ext 2230), by Fax (telephone 091-261-1182) or by computer mail - address "EMA4@NCL.MTS" from JANET (within the UK), "EMA4%NCL.MTS@UKACRL" from the EARN European network or "EMA4%UK.AC.NEWCASTLE.MTS@UK.AC.UCL.CS" from BITNET) or any other member of the organising committee.

ENTRANCE AND EXIT EFFECTS

REGISTRATION FORM - please detach and send, with your fee, to

**Dr C J S Petrie,
Department of Engineering Mathematics,
University of Newcastle upon Tyne,
Newcastle upon Tyne, NE1 7RU,
U.K.**

NAME ...

ADDRESS (for correspondence) ...

...

...

AFFILIATION (e.g. university or company) ...

DATE ...

SIGNATURE ...

FEE - Member of the British Society of Rheology (£90) - please tick ____

Member of the Belgian Group of Rheology (£90) - please tick ____

Member of other society of rheology

(Please indicate which society)

...

(£90) - please tick ____

Student member of a society of rheology

(Please enclose a note from your tutor,

supervisor, or Head of Department.) (£70) - please tick ____

Non-member

(£100) - please tick ____

Accompanying persons may register at the same

cost as the person accompanied. - please tick ____

Reduced fee (excluding accomodation and meals

before coffee on Wednesday 2nd September) - please tick ____

A rheologist belonging to more than one society need not pay more than one registration fee.

Please make cheques payable to the **British Society of Rheology**.

Direct credit transfers to the British Society of Rheology Conference Account may be made (in Sterling). The bank is the **National Westminster Bank, Civic Centre Branch, 38 St Mary's Place, Newcastle upon Tyne, NE1 7PQ** (Bank Sort Code 60-15-51) and the account number is **01-01457438**. Please ensure that the name of the conference delegate is quoted in any credit transfer.

TRAVEL TO AUSTRALIA 1988

Xth International Congress in Rheology
University of Sydney, August 14th - 20th

A price of £850 return has been negotiated by Ray Smith Travel for the air fare from London Heathrow to Sydney in August, 1988. This flexible package, which is subject to a price review at the end of August 1987, offers the following features:

- * The price quoted is dependent upon the participants flying out as one party.
- * Delegates may return on any date and can travel as individuals, and not with the group.
- * The price includes up to one internal flight, from Sydney to Melbourne, Adelaide or Perth. The return flight to Heathrow would then start from that city.
- * The price of £850 can be guaranteed provided that a deposit of £100 is received by Ray Smith Travel by 25th August, 1987.
- * Other arrangements for hotels, tours etc can be quoted on request by Ray Smith Travel.

Ray Smith Travel will be sending out a brochure soon to all interested Members of whom I am aware. Ray Smith Travel are at 535, Hertford Road, Enfield, Middlesex (Telephone 01 - 804 - 4326; Telex 8954272).

Roy Carter
Honorary Secretary

CALL FOR PAPERS

"Flow Processes in Composite Materials"

*Conference to be held at Brunel University, 16th-18th May 1988
in collaboration with the British Computer Society*

The objective of this conference is to explore the flow processes observed in the whole range of composite materials in order to identify common underlying themes where those themes differ from the rheology of single phase materials, and how they can be exploited in order to achieve novel effects. Both theoretical and practical papers would be welcomed particularly in the fields of:

	densely packed particulate systems
	pastes
and	fibre reinforced plastics
including	structural composite materials

Offers of papers should be addressed to:-

F.N. Cogswell,
ICI plc
The Materials Centre
P.O. Box No.90
Wilton Centre
Middlesbrough
Cleveland TS6 8JE

Early notification of intention to submit a paper would be appreciated. Abstracts will be required by 1st November 1987.

This conference will be followed by a meeting of The Plastics and Rubber Institute in the subject of Short Fibre Reinforced Plastics.

CALL FOR PAPERS

SECOND INTERNATIONAL CONFERENCE ON SHORT FIBRE REINFORCED THERMOPLASTICS

Brunel University, West London, UK: 18th - 19th May 1988

A highly successful conference concerned with the science, technology and applications of short fibre reinforced thermoplastics was held at Brunel University in 1985 and attracted wide support from both industry and academy. In view of the rapid developments taking place with these materials, it is intended that a second conference be held on this topic in 1988.

The Conference will review developments in materials, machinery, processing technology and application areas. A blend of industrial and academic contributions will be chosen so as to provide a solid background for an understanding and realisation of the current state of development as well as that of potential growth areas in SF RTP. Offers of papers are now invited and topics to be covered will include:

Effect of compounding and processing variables on residual fibre length and orientation distributions in moulded artefacts

Newly emerging strategies for compounding and moulding so as to give specific microstructures and properties in moulded parts

Liquid crystal polymers versus SF RTP

Conductive polymer composites eg for EMI shielding applications

Developments in surface treatment and polymer modification to give enhanced fibre-matrix interfacial bond strengths

Design and quality assurance techniques

The Conference will be suited to the needs of design engineers, material suppliers and moulders concerned with engineering thermoplastics.

The date of this meeting has been arranged to follow a British Society of Rheology Conference entitled Flow Processes in Composite Materials, to be held at Brunel University from 16-18 May 1988, thus enabling participants to attend both meetings if so desired.

The venue for the conference has been chosen to provide the best possible access from many parts of Britain, and being closely situated to Heathrow, is easily accessible from Europe.

Further information is available from **The Conference Office, The Plastics and Rubber Institute, 11 Hobart Place, London SW1W 0HL, Telephone 01-245-9555, Telex 915719 (PRIUK-G).**

FORTHCOMING CONFERENCE
- FIRST CALL FOR PAPERS



CONUNDRA RHEOLOGICA

The **BRITISH SOCIETY OF RHEOLOGY** is now organising its 1988 annual Autumn Conference, which will be held at the

*Royal Holloway and
New Bedford College,
Egham, Surrey*

*on September
7th to 9th 1988*

This meeting will include a series of invited review papers, both objective and some light-hearted, which explore the status of some rheological problems which have so far defied a rigorous solution.



Offers of papers and suggestions for topics, titles and speakers will be most welcomed and should be sent to the conference organiser:

**Mr. P.C. Anderson,
32 Queensway,
Feltham,
Middlesex,
TW13 7NS**

Bus. Phone No. 0932 76 3351

or to any other member of the BSR Council.

Those wishing to attend this meeting are also welcome to contact us at this stage and further notification will be sent in due course.

In the tradition of the BSR, the costs of this 3 day meeting will be kept low, probably of the order of £80, including accommodation with private facilities and the Conference dinner.

PREMIER APPEL A COMMUNICATIONS

Groupe Francais de Rheologie 22EME COLLOQUE NATIONAL ANNUEL Rhéologie des fluides industriels

TOULOUSE
16-17-18 Novembre 1987

Le 22ème Colloque National sera consacré à la Rhéologie des Fluides Industriels. Le Comité d'Organisation prendra en considération toutes les propositions de communications à caractère théorique, expérimental, numérique ou technique en rapport avec ce thème général.

Néanmoins, dans ce thème général, les communications ayant rapport aux aspects rhéologiques rencontrés lors de l'élaboration ou de la transformation de ces matériaux seront tout particulièrement appréciées, comme par exemple:

- *modélisation des écoulements en situation réelle*
- *étude des lois de comportement dans des conditions variées de charges ou de températures*
- *méthodes et techniques d'analyse des échanges de masse et de chaleur dans les procédés industriels mettant en oeuvre des fluides non newtoniens (en particulier, fluides viscoélastiques, à seuil ou thixotropes)*

Le Comité d'Organisation souhaite une forte participation des professionnels des secteurs économiques intéressés (fluides agroalimentaires, industrie chimique, matières plastiques, industrie pétrolière, etc.)

Des communications présentées par le milieu industriel et traitant des problèmes rencontrés et des besoins en recherche de ces industries seront les bienvenues.

CALENDRIER DU COLLOQUE

1er juin	date limite d'envoi des résumés (le Comité Scientifique se réunira courant juin)
1er juillet	avis d'acceptation des communications retenues
1er septembre	envoi du programme définitif comportant la liste des communications
1er octobre	date limite d'inscription
1er novembre	date limite d'envoi du texte définitif des communications pour publication dans les actes du colloque
16-18 novembre	Colloque à Toulouse

INFORMATIONS GENERALES

Le Colloque se déroulera à TOULOUSE, à l'Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique et d'Hydraulique de Toulouse (ENSEEHT), située au centre de la ville.

Le Colloque sera organisé en six sessions d'une demi-journée, chaque session étant axée sur un thème particulier. Le nombre de communications, de même que leur durée (environ 15 minutes), sont limités de façon à permettre une large discussion sur chaque thème.

Pour tous renseignements complémentaires

M. Rémi GAUDU
Tel. 61 58 82 19

ou

Mme Dominique ANNE-ARCHARD
Tel. 61 58 83 60

INSTITUT DE MECANIQUE DES FLUIDES
DE TOULOUSE
2, rue Charles - Camichel
31071 TOULOUSE CEDEX

CALL FOR PAPERS

National Congress on Rheology

Chengdu, China

16 - 19 November, 1987

The second National Congress on Rheology will be held in Chengdu, China, which is organised by Chinese Society of Rheology under CCS & CSTAM. It is hoped that this Congress will provide an opportunity for scientists and engineers in rheology to meet one another and to exchange recent advances and ideas in various branches of interest.

Contributions are welcome in the following areas:

1. Non-Newtonian fluid mechanics
2. Rheological measurements
3. Theory of viscoelastic fluids
4. Rheology on polymer processing
5. Rheology of suspension
6. Biorheology
7. Engineering rheology
8. Solid rheology
9. Food rheology
10. Others

SUBMISSION OF PAPERS

Submission of communications (oral or poster) is invited. Two copies of about 300 words English abstracts should be submitted in double spacing to the following address by 30th June 1987:

Professor Han Shifang
The 2nd National Congress on Rheology
Chengdu Branch, Academia Sinica, Chengdu
Sichuan, CHINA

The abstracts should include title, authors, institutional affiliations, the complete mailing address.

FEES

The congress fee including lunches during period of the congress will be \$160.

LANGUAGE

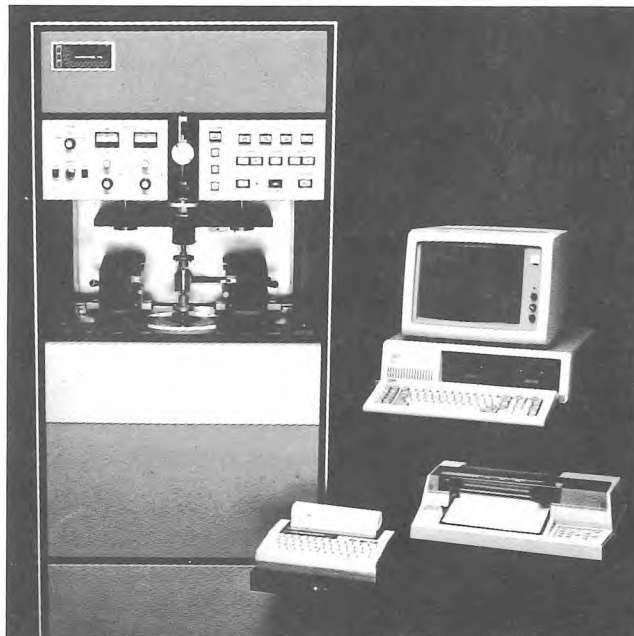
The Congress language will be English and Chinese.

ACCOMMODATION

The accommodation for foreign participants will be in the "Jinjian Hotel" or "Chengdu Hotel" which are best in Chengdu.

Editors note: Unfortunately this item arrived rather late for this Bulletin

Instruments for Material Evaluation



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