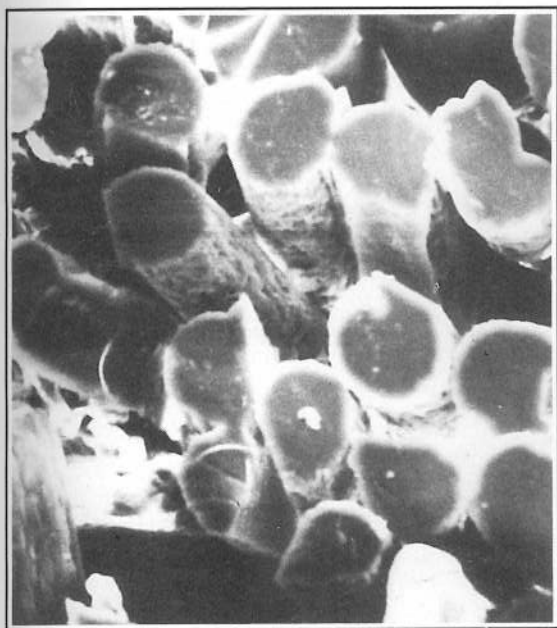


THE BRITISH SOCIETY OF RHEOLOGY



AUGUST
1998



Rheology

Bulletin

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THE BRITISH SOCIETY OF RHEOLOGY

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THE BRITISH SOCIETY OF RHEOLOGY



BSR BULLETIN

1998, Vol 41, No 2

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ISSN: 0045 3145

EDITORIAL

The sad news that Prof. Jim Ferguson has passed away is recorded in this Editorial. Jim, a past President of the BSR, was a well-liked rheologist whom I first met at Ross Priory during one of Strathclyde University's rheological training courses. Although I can not claim to know him very well, it is fair to say that he made quite an impression on a number of us on the course for his wit, patience, and guidance. His obituary appears in this edition of the *Bulletin*.

Notice of our AGM also appears in this edition, though you will have had separate notification. As in previous years, please come along and give your support to the constitutional processes that help us maintain this Society in good stead. There are a number of new resolutions that Council wish to seek the opinion of the members on (see Geoff's note inside). Challenge, debate, concurment, and hopefully advancement are hallmarks of any succesful AGM - please let this one be a success also.

I can also remind you that the Young Rheologists' Meeting is also being held (by the *strangest* of coincidences!) at the same venue. Malcolm Mackley, who is organising this event, says on the Web advert for this event (<http://www.ncl.ac.uk/rheology/bsr/index>) that there will be "sessions [which] will include oral presentations and posters on both experimental and modelling aspects of rheology, and a round-table discussion at which "older" rheologists will be available to assist!". Answers on a postcard as to the definition of "older" please...

Finally, observant readers may have noticed that the eMail address for your editor has changed. I will be leaving National Starch after 8½ years and joining Linx Printing Technologies in St Ives, Cambs. I'll actually be leaving National on 19 October, but, in the hope that people will continue to send in items for the *Bulletin*, I thought I'd pre-warn you all in advance.... It is always a mixture of sadness and excitement when changing jobs; sadness at leaving many old friends and colleagues but excitement at the challenge of a new job, new technology, and the prospect of meeting new people.

Paul Doody

COVER PHOTOGRAPH

The cover photograph shows a scanning electron microscope photograph of a bundle of hollow fibres. There are many applications for such fibres, which can have the same mechanical properties as solid fibres, but at a reduced weight.

Readers are reminded that any suggestions for colour or black and white illustrations for the covers of both the *Bulletin* or Rheology Abstracts are most welcome. These should be sent to either our Publications Manager (Dr Nick Hudson) or myself.

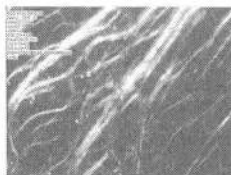
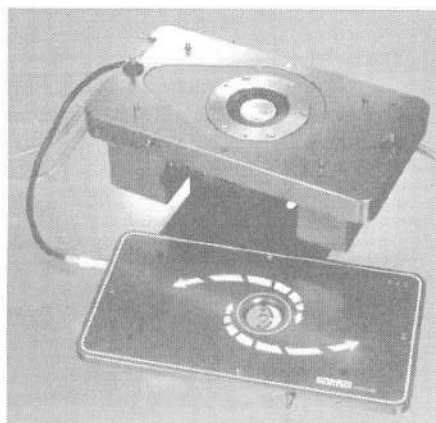
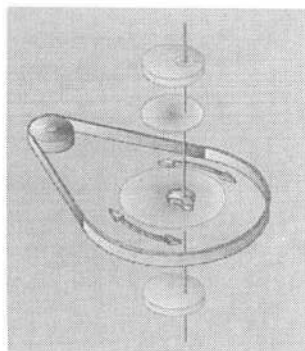
The Linkam CSS 450 Optical Shearing System

is a microscope mounted system which allows flowing liquids to be observed while they are under controlled temperature and flow conditions. The CSS 450 shear cell can be fitted to almost any standard optical microscope and can then be used to study the flow behaviour under different temperatures of a wide range of fluids for example suspensions, blood, polymer blends, emulsions, liquid crystals, cosmetics and some foods.

The system consists of two quartz windows where the separation of the windows can be controlled with micron precision between 10 and 2500 μ m, the speed of change of the gap setting can also be set by the user. The bottom window is attached to a disc which rotates against the fixed top window under the control of a stepper motor to give steady or sinusoidal oscillation.

Each window is in close thermal contact with a silver heating block and temperatures of up to 450°C can be achieved using any heating rate from 0.01°C/min to 30°C/min. with temperature stability and accuracy of $\pm 0.2^\circ\text{C}$. The entire system is PC controlled using LinkSys software, in addition to this an interfacing framegrabber package known as RTVMS allows temperature and shear data to be saved with the corresponding image is also available.

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- Heating rates 0.01°C/min. 30°C/min.
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- Fits most microscopes
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- Stepper motor allows 25,000 steps/rev.
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BSR ANNOUNCEMENTS

THE BRITISH SOCIETY OF RHEOLOGY



YOUNG RHEOLOGISTS' AND INK PROCESSING MEETINGS (Rheology & Processing I - Printing Inks)

Venue Department of Chemical Engineering
University of Cambridge
Pembroke Street

Accommodation Pembroke College
Pembroke Street

Monday 21 September

Young Rheologists' Workshop 10.30 - 4.30 pm

An opportunity for Young Rheologists to present and discuss their work in an informal environment. UK Young Rheologists are encouraged to come together with supervisors/experienced rheologists.

British Society of Rheology AGM 5 pm

Meeting Dinner in Pembroke College 7.30 for 8.00 pm (dress smart!)

Tuesday 22 September

Ink processing and rheology meeting 10.30 - 4.30 pm

A one day meeting with invited speakers on the topic of ink rheology and its connection with processing. This is the first in a series of BSR meetings around the theme of "Rheology & Processing". Poster presentations are invited.

Invited speakers

Professor Jan Mewis

Dr Austin Davey

Dr Mark Bohan

Mr Martin Thompson

Leuven University Rheology

Field Packaging

Swansea University Numerical modelling

Coates Lorilleux

Industrial practice

High shear ink processing

BSR YOUNG RHEOLOGIST / INK PROCESSING MEETING

REGISTRATION FORM

Name

Affiliation

Address

Telephone / E-mail

Monday 21 September *Young Rheologist's Meeting* Yes No

Registration and Lunch £ no cost! Yes No

Vegetarian Yes No

I would like to present a 15 min presentation Yes No

I would like to present a poster Yes No

Tuesday 22 September *Ink Processing Meeting* Yes No

Registration & Lunch £50.00 £ _____

I would like to present a poster Yes No

Accommodation and Dinner

Sunday 20 September	Bed and Breakfast	£34.00	£ _____
Monday 21 September	Dinner with wine	£21.00	£ _____
Monday 21 September	Bed and Breakfast	£34.00	£ _____
Tuesday 22 September	Bed and Breakfast	£34.00	£ _____

Please make cheque payable
to "The University of Cambridge" and send payment to:

Dr Malcolm Mackley,

Department of Chemical Engineering,

University of Cambridge,

Pembroke Street,

Cambridge, CB2 3RA, UK.

Grand Total £ _____



"PARTNERS IN RHEOLOGY"
UK CONFERENCE,
DECEMBER 16 - 18 1998
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WEST YORKSHIRE

Organiser: Professor T. C. B. McLeish
IRC in Polymer Science & Technology
University of Leeds, Leeds LS2 9JT

A two-day country meeting on some of the most exciting current areas of rheology in both industry and university. UK-based with some key overseas partners.

Sessions on:

- Structural probes (e.g. scattering) on rheology
- Extensional rheology
- Process flow visualisation and prediction
- Molecular/structural constitutive equations

Speakers will include:

- Professor Paul Callaghan (Massey, NZ)
- Professor Mike Cates (Edinburgh/Unilever)
- Dr. Richard Buscall (ICI)
- Dr. Malcolm Mackley (Cambridge)
- Professor Joachim Meissner (Zurich)

Costs

	Member	Student/retired	Non-member
Conference Fee	£80	£55	£110
	Day rate	24 hr Delegate	24 hr Delegate (shraing twin room)
Accomodation	£50	£180	£150

Note: a £20 surcharge will be applicable to all applications received after 30th September 1998

Application form

Photocopy and return to:

Prof. T. C. B. McLeish,
IRC in Polymer Science & Technology,
University of Leeds,
Leeds LS2 9JT.

Please send me registration details of "Partners in Rheology" ☐

I am interested in presenting a: Poster ☐ Paper ☐
(tick applicable box)

Title of poster / paper

Full Name (inc. title)

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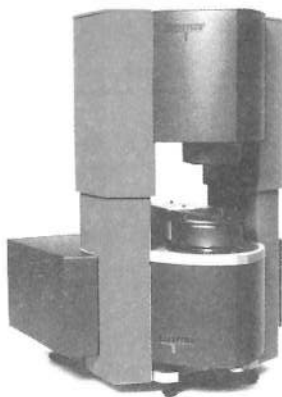
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Mind the gap!

For almost thirty years the “benchmark” commercial rheometers have fallen into two camps - concentric plate and extrusion. But, asks **Robert Marshall**, is that set to change?

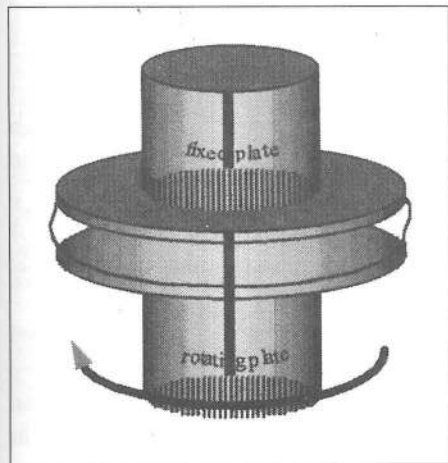
Conventional capillary rheometers give valuable steady flow data, but no information on the dynamic moduli for the material under test - for that you'll probably need a concentric plate rheometer, fitted with either parallel plates or a cone. The vast majority of the dynamic rheometers currently on sale, whether controlled stress or strain, are of this type.

But there's a distinctly “two-dimensional” feel to these machines, in that they fail to convincingly mimic real fluid flows.

Tried and trusted, but limited

Concentric plate rheometers have their limitations. To begin with, if you go too fast you won't be able to keep the sample between the plates - with a spinning disc, centrifugal forces will eventually throw the material out of the gap.

The exposed edge of the sample also means that it is vulnerable to contamination, evaporation or oxidation. These problems can be exacerbated if the material needs to be tested at elevated temperatures.



You can only test samples at atmospheric pressure, although many materials show quite different flow characteristics if pressurised. In real engineering flows, materials are often subjected to elevated pressures either in use or during manufacture, transport or storage. Increasingly in industry, flow characteristics need to be measured under realistic conditions.

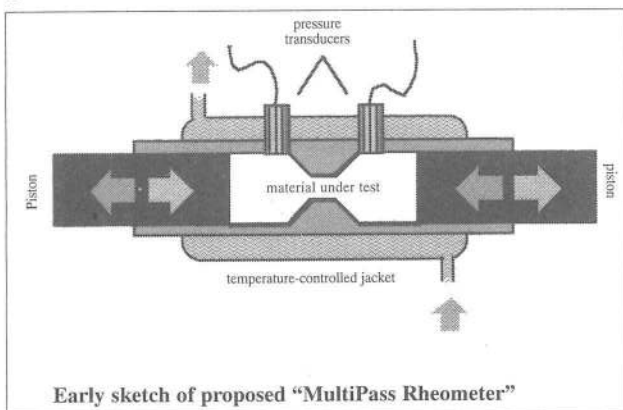
For quality control applications,

discrete samples must be taken from production for testing. This means that on-line process control - using a full set of dynamic rheological data to constantly fine-tune the manufacturing process - is not really practicable with conventional rheometers.

Challenging designs

Back in 1993, Malcolm Mackley's group at the University of Cambridge realised that - given the limitations of existing rheometers - we needed a new kind of instrument to help us to rheologically evaluate complex fluids under a broad range of flow conditions. Ideally such a machine would give steady shear, extensional flow and dynamic rheological data, at whatever static pressure we chose, using a small sample volume. The sample must be fully contained too, to effectively overcome the problems of oxidation, contamination and evaporation.

We started designing our proposed new instrument in the spring of 1993. It was a twin-piston device, enclosing our sample material in a tube - a concept that had been tested before by Westover in 1961, although at that time the precision of pressure-driven devices was limited.



Our tube had a flow constriction (a simple capillary) in it and a pressure transducer on each side of the capillary. By moving the pistons back and forth sinusoidally - with a motor and gears, we thought - the material would be driven through the capillary. We should be able to measure a pressure drop and a

phase angle - between the pressure and position waveforms - and so be able to calculate the elastic and viscous moduli for the material.

We quickly realised that a vertical tube would be easiest to fill, and that we'd need displacement transducers to accurately track the positions of the two pistons. A fluid jacket around the sample would control its temperature, and servo-hydraulic control for the pistons would give us 0.005mm resolution, far

superior to a complicated system of motors, gears and racks. The whole thing would be controlled from a computer and would, we felt, offer the versatility of both steady piston velocities and oscillatory displacement. We called the instrument our "MultiPass Rheometer" (MPR).

Sorry, can't be done

The Engineering and Physical Sciences Research Council (EPSRC) turned down our first funding application after the academic referees' reports said "it couldn't be done" and "it wouldn't work".

Fortunately, out of our involvement with the DTI colloid technology programme - headed by Professor Sir Sam Edwards with funding from Unilever, Schlumberger and ICI - the money was found to build our prototype MPR.

This was a low-temperature device for testing viscous and visco-elastic fluids. We had chosen Eland Test Plant, a specialist servo-hydraulic engineering company, to build the instrument for us and they proved invaluable in helping to overcome some serious engineering difficulties. We had - optimistically, perhaps - specified 250 Bar as a maximum working pressure; finding 12 mm diameter piston seals which could work at this pressure, cope with up to 200 mm per second piston velocity and seal effectively with a wide range of test materials, proved particularly challenging.

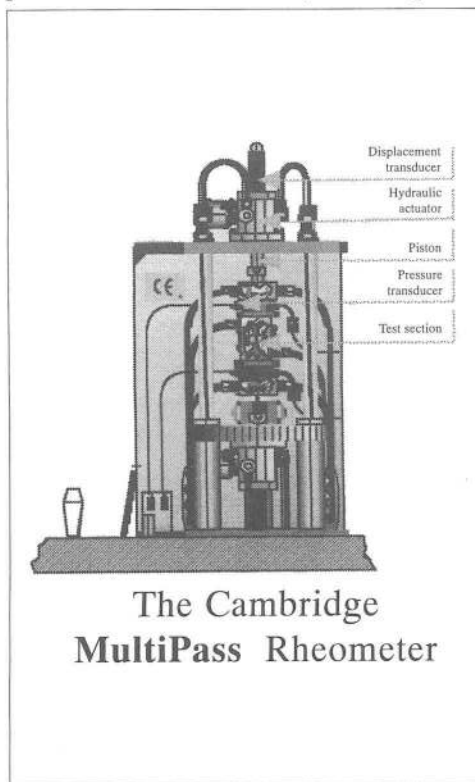
The prototype instrument was completed in January 1994, and our first test was on a medium viscosity silicon oil. We were able to measure a pressure drop, and calculate the viscosity. Straight away we were able to get fairly repeatable data, which allowed us to fine-tune the instrument, and in particular the displacement transducers which had initially been a bit non-linear and generally problematic.

Our idea of getting both steady flow data and dynamic rheological data from the same instrument also proved to be valid, and we were also able to set a static sample pressure for each test. By the summer of 1994 our data accurately matched that obtained from other commercial rheometers and we were able to usefully extend the existing data to significantly higher shear rates.

We were also rapidly discovering the limitations of miniature pressure transducers with wide operating temperature ranges. The transducers we'd specified suffered from baseline drift, so the pressure readings sometimes failed to return to "zero" at the end of a test.

With the basic concept of the MPR now proven, we re-applied to the EPSRC for the funding to build a higher-temperature instrument for testing molten polymers. No longer able to tell us that "it couldn't be done", they gave us the money and we were, of course, most grateful for their support!

We tried hard to use our experience with the prototype instrument to improve the design of this "mk.II" version. Visually, the most dramatic change was a lower platform which could be dropped down by 200 mm, under servo-hydraulic control. This greatly improved access for loading the test material into the barrel. We abandoned the miniature pressure transducers in favour of Dynisco remote-head transducers, used Positek's (very) linear displacement transducers, specified a more powerful heater/circulator, and many other small improvements.



We are now using this mk.II MPR to study high-temperature systems and, using a test section with Pyrex viewing windows, to make optical observations of materials under a wide range of shearing conditions. We have continued to develop the instrument, and are, for instance, now using a new type of seal on the piston rods, which allow us to seal low viscosity solvents and molten polyethylene with the same type of seal.

Where next?

We have just taken delivery of the mk.III version of our instrument which has been specifically designed to allow us to use x-ray techniques to study the crystallinity of opaque materials under shear. With a commercial example of the instrument already operating successfully, the

MultiPass Rheometer has great further potential as a mixer, a reactor, and an on-line device for quality control, allowing rheological data to be used to automatically control or modify a manufacturing process.

Concentric plate rheometers will doubtless continue to have their place as vital research tools - but, as the powerful science of rheology continues to become more widely accepted, valued and used in industry, so rheometers must increasingly be adapted and developed to cope with the challenge of accurately mimicking real engineering flows. We believe that the Cambridge MultiPass Rheometer can help to close the gap between rheology and engineering processing.

Robert Marshall is a Technical Officer at the University of Cambridge, and is a co-inventor of the Cambridge MultiPass Rheometer.

References:

R F Westover, Effect of hydrostatic pressure on polyethylene melt rheology, SPE transactions, pp14-20, January 1961

M R Mackley, R T J Marshall, J B A F Smeulders, The MultiPass Rheometer, Journal of Rheology. 39(6), pp. 1293-1309, 1994

M R Mackley, P Spitteler, Viscoelastic characterisation of polyethylene using a MultiPass Rheometer, Rheologica Acta. 35, pp. 202-209, 1996

For more information about the Cambridge MultiPass Rheometer contact: University of Cambridge, Department of Chemical Engineering, Pembroke Street, Cambridge, CB2 3RA, phone +44-(0)1223 334766, fax +44-(0)1223 334796, email robert_marshall@cheng.cam.ac.uk

NOTICE OF THE 58th ANNUAL GENERAL MEETING

The 58th Annual General Meeting of the British Society of Rheology will be held on Monday 21st September at the Department of Chemical Engineering, University of Cambridge starting at 17.00hrs. The AGM will follow the Young Rheologists Workshop.

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

- a) Election of President, Officers and Council Members for 1998-99.
- b) Receipt of a report and 'audited' accounts from Council.
- c) Dealing with matters raised by Council or by any Member, and receiving suggestions from Members for consideration by Council.

Matters raised by Council

A) Proposal for changes to the Constitution.

Summary

- i) Council proposes that the concession of a reduced subscription that is available dependent on the method of payment, be removed, and that the entrance fee be increased from one pound sterling to five pounds sterling.
- ii) Council proposes that changes are made to the wording of the section relating to auditors to reflect the current position that the audit commission require that our accounts undergo expert scrutiny.

Proposals:

- 1) Change section 4a to read:

4a) An Entrance Fee of £5 (five pounds sterling) shall be paid by anyone applying for membership.

- 2) Annual subscription to be £15 (fifteen pounds sterling). The concession of a reduced fee of £10 when payment was by standing order/credit card was initiated in 1991 and this is to be withdrawn.

- 3) Changes to section 6 and 7b(ii) to read:

6) The accounts of the Society shall be subject to expert scrutiny. The appointment of the expert scrutineer and the fixing of their remuneration shall be made at the Annual

General Meeting.

7b(ii) To receive a report and externally examined accounts from Council.

4) Change section 8h to read:

8h) The Editor (Abstracts) shall be responsible for the Society's publication of Rheology Abstracts and the Editor(Bulletin) shall be responsible for the Society Bulletin for circulation.

B) Councils nominations are as follows

President: Dr Richard Buscall

Hon. Secretary: Prof. Phil Banfill

Hon. Treasurer: Dr Mike Webster

Membership Secretary: Prof Russell Davies

Bulletin Editor: Dr Paul Doody

Abstracts Editor: Dr Nick Hudson

Ordinary Members of Council:

Mr Derek Bell

Dr Geoff Brownsey

Mr Tom Dovey

Mr John Gearing

Dr Malcolm Mackley

Mr Steve Robinson

Further 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 (rule 5b)

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

Geoff Brownsey

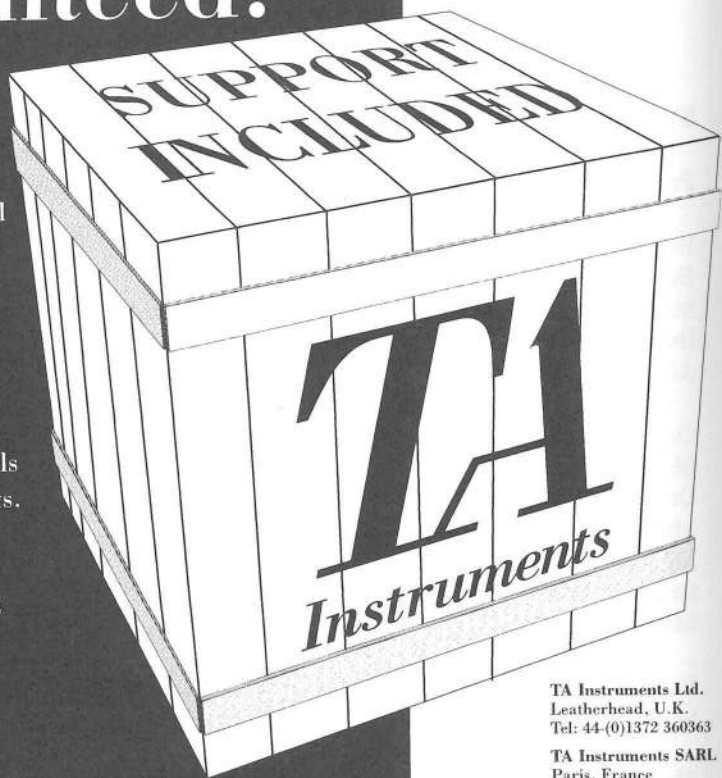
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Thursday 1st and Friday 2nd October 1998 at Rapra Technology Limited

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Every process for conversion of polymers needs to monitor the flow of materials, whether plastics or rubbers. Injection moulding, extrusion, blown film, compression moulding or blow moulding processors will all have an interest in learning about new methods and equipment for rheological monitoring and control. Technologists, Production Managers and QC Controllers will all benefit from this two day conference which brings together the latest information and techniques, relevant to both plastics and rubber processing.

***Special Delegate Registration Fee for readers of RHEOLOGY BULLETIN (£40 discount)
£395 plus VAT @ 17.5% (£89.13) = £484.13 per delegate***

Thursday 1st October 1998

- **A New Approach to Polymer Rheology for Process and Quality Control**, Steve Houlston, Dynisco UK Limited, UK
- **The Use of Maximum Information Procedures in Quality Control and Assurance**, Bernard Costello, TA Instruments Limited, UK
- **Extensional Flow Properties of Polymers : Their Measurement and Affect on Processing Performance**, Martin Rides, NPL, UK
- **On Line/In Line Rheometry**, Michael Rose, University of Bradford, UK
- **On-Line Rheometry and it's Application to Polymer Processing**, Frank Baker, Rheometric Scientific, UK
- **Multiple Die Capillary Rheometry in Off and On Line Applications and It's Benefits for QC**, Burke Nelson, Goettfert, USA
- **Non-Conventional Rheological Monitoring of Polymer Processing**, Joao Maia, University of Minho, Portugal

Friday 2nd October 1998

- **Low Strain, High Resolution Rheology**, Graham Thomas, Rheologica Instruments, UK
- **A New Simple Method for Determining the Pressure Coefficient of Viscosity Using a Modified Capillary Extrusion Rheometer**, Roy Carter, Magna Projects and Instruments Ltd, UK
- **Photons in Manufacturing - Analysing Polymer Processes at the Speed of Light**, Henryk Herman, Actinic Technology, UK
- **Wall Slip: Implications for Flow Modelling and Polymer Processing**, Don Fleming, Rosand Precision Limited, UK
- **Re-melting Polymers and Making Rheological Measurements for QC**, Alan George, Porpoise Viscometers Limited, UK
- **QC of Polyolefin Manufacturing by Dynamic Spectroscopy and Multivorick Analysis**, Svein Eggen, Borealis, Norway
- **Blending and Rheological Measurement Combined**, Werner Morio, Gebr Haake GmbH, Germany

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Simply complete the registration form and post, fax or e-mail the details to : Janine Kitson, Conference Organiser, Rapra Technology Limited, Shawbury, Shrewsbury, Shropshire, SY4 4NR, UK. Telephone : 44 (0) 1939 250383
Fax : 44 (0) 1939 251118 <http://www.rapra.net>
E-mail conferences@rapra.net

Full joining instructions, together with hotel information and location maps will be sent on receipt of the completed form.

Registration Form - Rheology Conference

Full name _____ (Prof/Dr/Mr/Mrs/Ms)

Company _____

Mailing Address _____

Phone _____ Fax _____ E-mail _____

- ☐ Delegate Registration Fee
£445 plus VAT @ 17.5% (£77.88) = £522.88 per delegate

Fee includes buffet lunch, mid-session refreshments on both days, and a copy of the conference book of papers (Please photocopy form for additional delegates)

- ☐ Table Top Exhibition Space
£650 plus VAT @ 17.5% (£113.75) = £763.75

Fee includes registration of one delegate, buffet lunch, mid-session refreshments on both days, and a copy of the conference book of papers

Power required Yes/No (Please delete as applicable)

- ☐ Wallet Service
£150 plus VAT @ 17.5% (£26.25) = £176.25

A wallet service is provided for companies wishing to have their literature inserted into the delegate wallets used throughout the conference. Please ensure that your leaflets reach Rapra Technology Limited by 21st September 1998.

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Cancellation :

Substitutions can be made at any time. If you wish to cancel your registration, please do so in writing. A full refund less 20% administration fee will be applicable before 3rd September 1998. Cancellations received after this time will be liable for the full registration fee.

Please return this form to :

Janine Kitson, Conference Organiser, Rapra Technology Limited, Shawbury, Shrewsbury, Shropshire, SY4 4NR, UK. Tel : 44 (0) 1939 250383 Fax : 44 (0) 1939 251118 E-mail : conferences@rapra.net
<http://www.rapra.net>

** Rheol Bull

XIIIth International Congress of Rheology: "Rheology 2000"

Visit the Web Site:

<http://abbey4.swan.ac.uk/rheology2000/>

for more information on:



**XIIIth International
Congress of
Rheology**

**20-25th August 2000
Cambridge, U. K.**

Rheology 2000

Rheology 2000 will be held in the city of Cambridge, one of the most beautiful cities in the United Kingdom. It is a city with magnificent historic buildings, elegant bridges and a wealth of open parkland, spread along the banks of the River Cam.

The Congress will be organised by the British Society of Rheology on behalf of the European Society of Rheology. The Congress will be held at the University, the first college of which, Peterhouse, was founded in 1284 by the Bishop of Ely. The Conference Office will be based at Robinson College, a much more recent addition to the University. Her Majesty the Queen officially opened the College in May 1981.

Accommodation will also be available in Newnham College and St John's College (Founded in 1511). The range and standard of accommodation in the University is excellent, but for those who would prefer conventional hotels there many to choose from.

Lectures will be held in the Lady Mitchell Hall Complex on the Sidgwick Site, with a Plenary Session planned to be held in the Corn Exchange.

M. H. Wagner

ABSTRACT REFLECTIONS

Until recently I was Honorary Editor of Rheology Abstracts. This required attention to many practical matters, but the four-year tenure also made me think about the function of the abstract in scientific papers.

Each issue of Rheology Abstracts was drafted as follows. An Abstractor would find a paper and send me the front page showing the title, abstract, and authorship. My task was to order many such received abstracts into the categories of Rheology Abstracts. Some abstracts were models of their kind and these I left unaltered. Others were poor and these I had to edit, sometimes drastically. I feared to alter the abstract's sense and did not wish to treat authors unfairly, so I edited reluctantly and probably over-cautiously. It interested me that the difficult features of the poor abstracts were few in kind and unhappily quite common, but it irked me that the journal editor or the referees of the original manuscript had not taken remedial action prior to publication.

Many poor abstracts were simply too long and detailed, often so that reading the abstract made it unnecessary to read the full paper. Some were difficult to read easily, partly owing to clumsy language and often because of complicated mathematical symbols and equations. I felt that an abstract should be readable without recourse to the full paper so that undefined symbols in an abstract were unacceptable, even if defined later in the paper. Similarly, references to literature in the paper's abbreviated style, such as [59] or Bloggs *et al.* (1987), were also unacceptable. Abbreviated or not, too many references made an Abstract resemble the paper's Introduction. During my tenure I read several thousand abstracts and I began to appreciate the art of abstracting. The following remarks are intended as comments. Rules in this area are difficult to formulate and are anyway generally undesirable.

The title, as the paper's name or a label, is necessarily a very brief description of the paper. It is curious that longer titles are not proportionately descriptive, a short sentence being usually sufficient. I am unsure that subtitles are useful; they function neither as title nor as abstract and are anyway mostly deleted in reference compilations. Because the title initially may be vague, the abstract should say most clearly to the reader what the paper is about. The abstract should let the reader decide whether or not to read the paper. Thus the abstract is a description of the *paper*. It should not describe the details of the *work*, which is the job of the paper proper. The abstract is like the aroma of food before a feast; it is not a short version of the paper!

Apart from the afflictions of poor abstracts, excessive length was probably the greatest plague. An imposed length restriction might help authors to focus on the abstract's vital function. Today, word-processing allows us to polish our initial thoughts into models of terse descriptive prose. Terseness differs from brevity or conciseness. It is easy to be brief or concise simply by frugality with words and information; indeed, G. K. Batchelor (1981) warns against aiming at conciseness above all else in scientific reportage. Terse means neat or polished and free from redundancy. Aiming at terseness will usually achieve clarity, brevity, and precision.

To engage a reader's interest is likely to stimulate his mind and in science this should be no less important than in other literature. G. K. Batchelor dwells on this aspect in another recommended article (Batchelor 1997). He wonders why authors do not assist scientific progress and their own reputation by trying to make their papers "... a literary and intellectual gem". He suggests that scientific creativity is so rewarding that to report it carefully for the reader is relatively tedious: the creative process itself is essentially more fun.

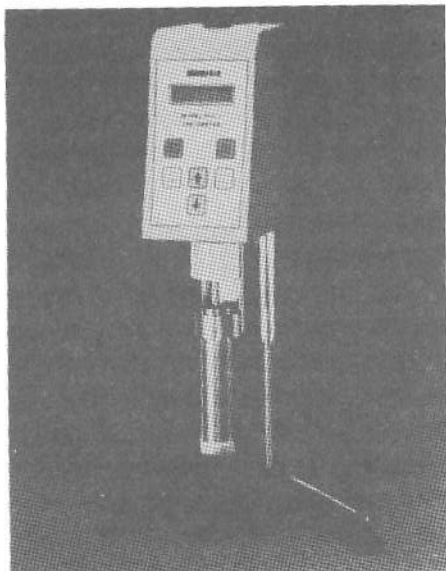
Abstracting is not an easy art, but as the initial connection between the mind of the author and the mind of the reader the abstract is vitally important. I finish by noting the comments of Batchelor (1997) about scientific papers, which are equally true of abstracts. He says, "A scientific paper is easier to understand and more pleasing to read if it is written with clarity, precision, and elegance ...", but he then sadly concludes that "... relatively few are written in this way".

G. K. Batchelor (1981). Preoccupations of a Journal Editor. *J. Fluid Mech.* (1981) **106**, 1-25. As a long-time Editor of the *Journal of Fluid Mechanics*, Batchelor's views should interest all who write, edit or publish scientific literature.

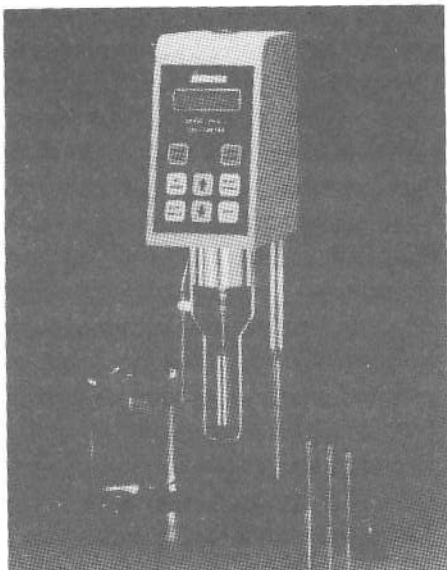
George Batchelor (1997). Research as a lifestyle. *Appl. Mech. Rev.* (1997) **50**, R11-R20. In this retrospective, partly illustrated using G. I. Taylor's life and work, Batchelor reviews the processes in research of starting, being hooked, aging, originality, inspiration, institutions, journals, and the preparation of papers.

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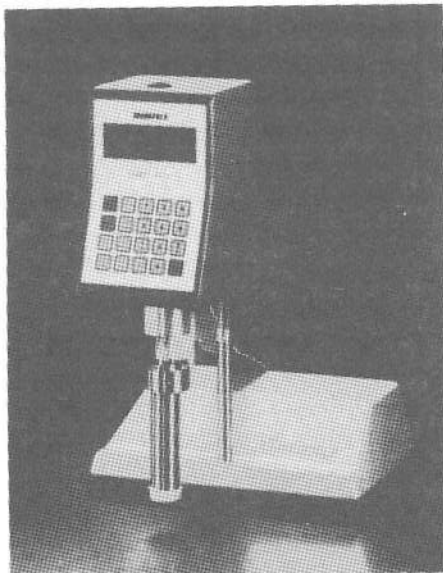
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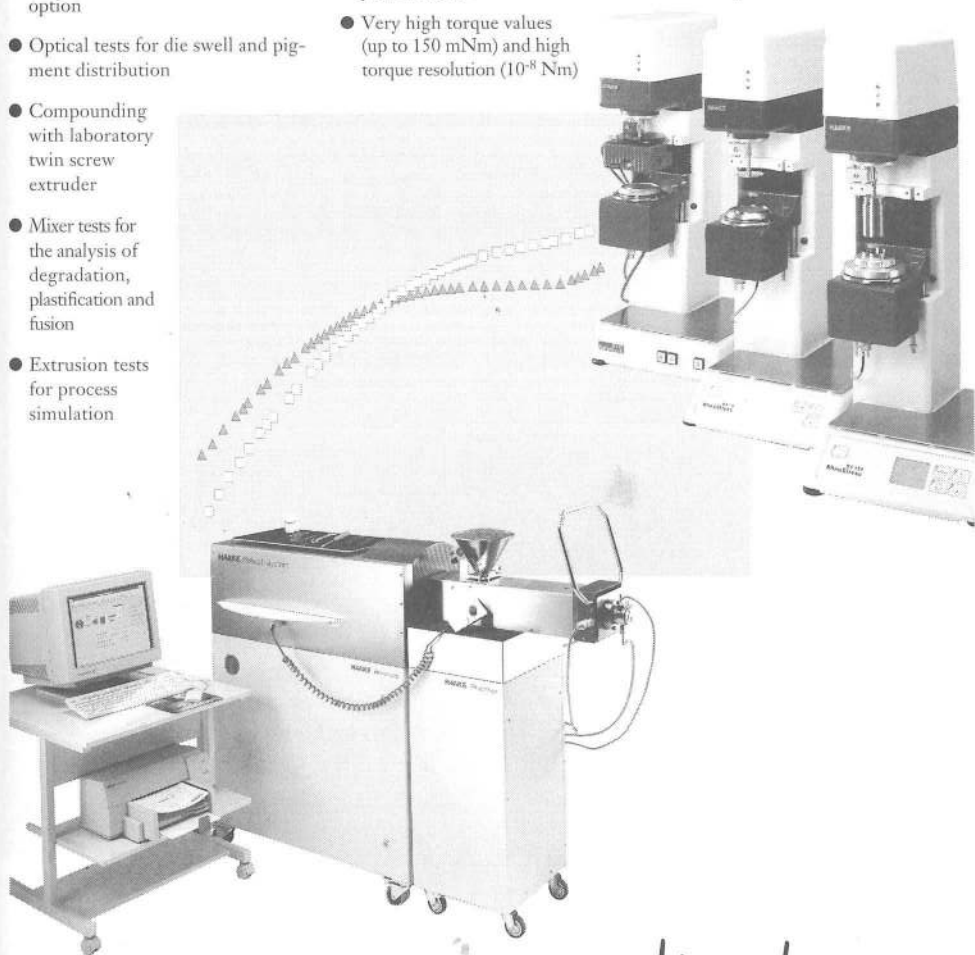
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Professor James (Jim) Ferguson
Born March 30, 1935, died July 10, 1998

The world of Rheology will be saddened to learn of the recent death of one of the most eminent of European rheologists. Jim Ferguson passed away, peacefully, at his home in Glasgow on 10th July, after a short illness.

I personally knew Jim for over 25 years, and worked with him for most of those years. As well as being my boss and colleague, he was also a good friend, and in many ways an elder 'brother'. Most of what follows has been taken from his obituary as it appeared in his local newspaper.

Professor Jim Ferguson graduated from the Royal College of Science and Technology in Glasgow with an Honours Degree in Chemical Technology in 1957 and was awarded a PhD for his study of polymer kinetics under Dr Ivor Bengough in 1961. His first appointment was with Shell in Manchester in 1960, where he published a number of seminal papers on polymer fluid flow properties which are still cited today for their originality. This work was the birth of his life-long interest in the rheological properties of molten and solid polymers. He returned to Glasgow and the "Tech" in 1963 as a Lecturer in the Department of Textile and Fibre Science, and progressed his career through the ranks of Senior Lecturer in 1975, Reader in 1982 and Full Professor in 1991 by his enthusiastic and dedicated teaching and through an increasingly enhanced international research reputation in polymer rheology. He always gave of himself unstintingly to his teaching activities and many students will look back with gratitude on having been taught by Jim Ferguson.

His research activities concentrated on a number of related areas. His studies of the rheology of polymers were built around the influence of the chemical structure of polymers and their conformation on flow characteristics, particularly in respect to the spinning of man made fibres. A major outcome from this work was the development of two novel rheometers, one of which has been commercially developed. Another important area of research was on template polymerisation. This involves the use of one macromolecule to control the synthesis of a second, and the work has attracted considerable interest world-wide, because of its relation to DNA production in biological systems. A third major area of research was on the development of hollow



fibres for gas separation and constructional engineering which have important environmental and industrial applications and this work again brought international, industrial and academic interest, examples of which are shown on the front cover.

Jim's prolific and innovative work led to international recognition and honours. He received the Rheology Award of the Royal Society of Medicine in 1986 and the Polish Minister of Education's Award in 1991. He was President of the British Society of Rheology from 1998 to 1999 and was a founding member of the European Society of Rheology, being the representative of the BSR. He was one of a small group of European academics who instigated the European Schools of Rheology, ensuring that they always had an industrial input. He was a Visiting Professor at Ohio University, USA, and at Zagazig University in Egypt, and he held consultancies nationally and internationally, collaborating extensively with many industrial organisations. Locally, his contributions to fibre and textile science were recognised by his role in the Incorporation of Weavers. He was Deacon from 1988 to 1999, had just completed his term of office as Treasurer of the Association of Deacons, Trades House, and was looking forward to being President of that Association from 1999 through 2000.

He met his wife, Jean, during their first year at University. They were married in 1959 when he was still a research student. As a young piper, he attended many summer camps as a boy, and this was an enjoyment he continued with his family (two sons and two daughters) when they were young, mainly in France, a country for which he had a great love. After his four children had left home, he and his wife, together with five other couples who were good friends, bought a chalet in the Vosges where they enjoyed many holidays. Latterly, he and his wife had many happy weekends in Arran, where they had a cottage. He had a great love of golf, and was a member of East Renfrewshire and Whiting Bay golf clubs.

Jim will be greatly missed by the international rheology and polymer community in which he was a well-known and eminent figure. However, he will also be missed by many as a good friend and a gentleman who, in a quiet way, gained the respect of all those who interacted with him. He travelled frequently through his research interests, and it can truly be said that he had friends and professional colleagues who admired him all over the world.

Nick Hudson

MEMBERSHIP NEWS

The following new members were agreed at the British Society of Rheology Council Meeting on 26 March 1998

Mr N Cunningham

Rheometric Scientific, 2 Weston
Road, Epsom, Surrey
fetsa BCD FGJKLMN

Miss M Morey

Dept of Chemical Engineering,
University of Birmingham,
Edgbaston, Birmingham *fetsa GLM*

Mr S J Pitman

Velsicol Chemical Ltd, 8
Cedarwood, Chineham Business
Park, Basingstoke, Hants
fe a DFGK

Dr M C Forbes

PO Box 30-485, Lower Hutt, New
Zealand *fetsa K*

Dr N Sombatsompop

Division of Materials Technology,
School of Energy & Materials,
King Mongkut's Institute of
Technology, Bangmod, Bangkok
10140, Thailand *fetsa CDO*

Dr Ó H Wallevik

The Icelandic Building Research
Institute, Rb-Keldnaholt, IS-112
Reykjavik, Iceland *fetsa HIKN*

Mr D O'Callaghan

Dairy Products Research Centre,
Teagasc, Moorepark, Fermoy, Co
Cork, Ireland *fetsa FGHL*

Dr S Rossi

Intevap S.A., EPPR Urb. Santa
Rosa, Sector El Tambor, Los
teques, Venezuela 1201 *fetsa FG*

Dr H Soenen

AB Nynäs Petroleum, GCC, S-
149 82 Nynäshamn, Sweden
fetsa DFGJK

Membership is open to anyone concerned with rheology. You should apply by contacting the Membership Secretary for an application form. There is an entrance fee of £1 and the present annual subscription is £15 *per annum*. Subsequent annual fees are reduced to £10 if paid by Banker's standing order or by credit card (Visa or Mastercard only). The subscription is due, in advance, on 1st October each year.

Bona fide students pay no entrance fee. Benefits of membership include the *BSR Bulletin* with its list of conferences, courses, rheological articles, *etc.* and *Rheology Abstracts* which collates thousands of abstracts each year from hundreds of journals. Both of these are published quarterly.

Classification of abbreviations for Members' rheological interests are as follows:

- | | | | |
|---|---|---|---------------------------|
| f | Member's main interest is rheology (<i>i.e.</i> full-time) | | |
| p | rheology is secondary interest (<i>i.e.</i> part-time) | | |
| e | approach is experimental | | |
| t | approach is theoretical | | |
| s | area of work is pure science | | |
| a | area of work is technology | | |
| | | | |
| A | metals | I | glasses, ceramics |
| B | composites | J | oils, greases |
| C | solid polymers | K | building & road materials |
| D | molten or dissolved polymers | L | foodstuffs |
| E | natural fibres | M | biological materials |
| F | liquid-liquid systems | N | theoretical models |
| G | liquid-solid systems | O | other systems |
| H | particulate systems | | |

CONFERENCE & EXHIBITION DIARY

Readers are reminded that inclusion of an event in the Diary section is free of charge. Submissions should be sent to the Editor, either by post or electronically.

1998

**31 Aug -
2 Sept**
Heraklion
Crete

2nd Scientific Meeting of the Hellenic Society of Rheology (HSR)
Ms E Karali, Foundation for Research & technology - Hellas Institute of Electronic Structure and Laser, PO Box 1527, 711 10 Heraklion, Crete, Greece
T: +30 81 391 469 F: +30 81 391 305 E: dvlasso@iesl.forth.gr

6-11 Sept
Garmisch-
Partenkirchen
Germany

EURADH 98

B Thilenius / C Mitter, Dechema e V, Congress Office, PO Box 15 01 04, D-60061 Frankfurt am Main, Germany
T: +49(0)69 7564 152/280 F: +49(0)69 7564 201

6-11 Sept
Portoroz
Slovenia

5th European Rheology Conference

Scientific Information: Prof Igor Emri, Centre for Experimental Mechanics, University of Ljubljana, Cesta na Brdo 49, SI-1125 Ljubljana, Slovenia
T: +386 (0)61 123 2247 F: +386 (0)61 123 2471 E: Rheo.98@ki.si
<http://www.fs.uni-lj.si/cem/RHEO.html>
General Information: Teja Alic, Cankarjev dom Presernova 10, SI-1000 Ljubljana, Slovenia
T: +386 (0)61 210956 F: +386 (0)61 217 431 E: cankarjev.dom@k2.net

9-11 Sept
Brighton
UK

POLYMER 98

The Institute of Physics, Conferences Department, 76 Portland Place, London W1N 4AA, UK
T: 0171 470 4800 F: 0171 470 4900

14-16 Sept
Prague
Czech
Republic

International Conference on Flow and Deformation in Biology & Environment

Dr Jiri Blahovec, Conference FDBE, Czech University of Agriculture, 16 521 Prague 6 - Suchbát, Czech Republic
T: +4202 2438 4281 E: blahovec@tf.czu.cz

21 Sept
Cambridge
UK

The British Society of Rheology's "Young Rheologists' Workshop"

Dr Malcolm Mackley, Dept of Chemical Engineering, University of Cambridge, Pembroke Street, Cambridge, CB2 3RA, UK
T: 01223 334784 F: 01223 334796 E: mrml@cheng.cam.ac.uk

22 Sept
Cambridge
UK

The British Society of Rheology's "Rheology & Processing I: Printing Inks"

Dr Malcolm Mackley, Dept of Chemical Engineering, University of Cambridge, Pembroke Street, Cambridge, CB2 3RA, UK
T: 01223 334784 F: 01223 334796 E: mrml@cheng.cam.ac.uk

1-2 Oct Shrewsbury UK	Rheology - A Practical Approach to Quality Control RAPRA Technology Ltd Conference Organiser: Janine Kitson , Rapra Technology Ltd, Shawbury, Shrewsbury, Shropshire, SY4 4NR, UK http://www.rapra.net T: 01939 250383 F: 01939 251118 E: conferences@rapra.net
4-8 Oct Monterey CA USA	70th Annual Meeting of the Society of Rheology Local Arrangements Chair: Prof Gerald G Fuller , Dept of Chemical Engineering, Stanford University, Stanford, CA 94305, USA T: +1 415 723-9243 F: +1 415 725-7294 E: ggsf@chemeng.stanford.edu Technical Programme Chair: Dr Patrick Mather , WL/MLBP, Bldg. 654, 2491 P St., Ste 1, Wright Patterson AFB, OH 45433, USA F: +1 937 255-9157 E: matherpt@ml.wpafb.af.mil
12-14 Oct Biarritz France	Joint Annual Meeting of the GFR and GER- "Rheology in Multiphase Systems: Rôle of Interfaces and Interphases" Prof Antxon Santamaria , Dpto Ciencia y Tecnología de Polímeros, Facultad de Química, Universidad del País Vasco, Paseo Manuel de Lardizabal, 3. Apdo. Correos 1072, 20009 San Sebastian, Spain E: popsaiba@sq.chu.es Prof Gerard Marin , University of Pau, France E: gerard.marin@univ-pau.fr
22-29 Oct Düsseldorf Germany	K 98 Organiser: NOWEA, Germany T: +49 (0)211 4560 240 F: +49 (0)211 4560 548
3 Nov London UK	Thin Films and Foams - a conference by the Colloid & Surface Chemistry Group of the SCI Conference Secretariat, SCI, 14/15 Belgrave Square, London, SW1X 8PS, UK http://sci.mond.org T: 0171 235 3681 F: 0171 823 1698
15-20 Nov Anaheim CA USA	Symposium on "Rheology and Fluid Mechanics of Nonlinear Materials" ASME International Mechanical Engineering Congress & Exposition Prof Dennis A Siginer , Dept of Mechanical Engineering, Auburn University, 201 Ross Hall, Auburn, AL 36849, USA T: +1 334 844-3331 F: +1 334 844-3307 E: dsiginer@eng.auburn.edu Prof Daniel DeKee , Dept of Chemical Engineering, Tulane University, New Orleans, LA 70118, USA T: +1 504-865 5772 F: +1 504 865-6744 E: ddekee@mailhost.tcs.tulane.edu
30 Nov - 1 Dec London UK	TPE 98 - New Opportunities for Thermoplastic Elastomers 98 RAPRA Technology Ltd & Plastics and Rubber Weekly Conference Organiser: Janine Kitson , Rapra Technology Ltd, Shawbury, Shrewsbury, Shropshire, SY4 4NR, UK http://www.rapra.net T: 01939 250383 F: 01939 251118 E: conferences@rapra.net

16-18 Dec Ilkley UK	The British Society of Rheology's Christmas Meeting - "Partners in Rheology" Prof T C B McLeish , IRC in Polymer Science & Technology, University of Leeds, Leeds, LS2 9JT, UK T: 0113 233 3845 F: 0133 233 3846 E: phy6tcbm@phys-irc.novell.leeds.ac.uk
1999	
March Leipzig Germany	Rheolgentagung 1999 German Society of Rheology (DRG) and the Polymer Physics Group of the German Society of Physics (DPG)
17-21 Oct Madison WI USA	71st Annual Meeting of the Society of Rheology
2000	
21-26 Aug Cambridge UK	Rheology 2000 - XIIIth International Congress on Rheology To be organised by the BSR with the assistance of the European Society of Rheology. Chairman of the Executive Committee: Prof K Walters FRS , University of Wales, Dept of Mathematics, Penglais, Aberystwyth, Dyfed, SY23 3BZ, Wales, UK http://abbey4.swan.ac.uk/rheology2000/ T: 01970 622750 F: 01970 622777

COURSE DIARY

1998	
12-13 Oct Malmö Sweden	Basic Course in Rheology - HELD IN SWEDISH Gunlög Tänge , Calmia AB, Box 2161, SE-220 02 Lund, Sweden http://home3.swipnet.se/~w-35509 T: +46 (0)46-211 00 20 F: +46 (0) 46-211 00 20 E: calmia@swipnet.se
19-21 Oct Malmö Sweden	Powder Sampling & Characterisation Gunlög Tänge , Calmia AB, Box 2161, SE-220 02 Lund, Sweden http://home3.swipnet.se/~w-35509 T: +46 (0)46-211 00 20 F: +46 (0) 46-211 00 20 E: calmia@swipnet.se
26-29 Oct Hinckley UK	School of Industrial Rheology (SIR '98) - Camtel Limited Sponsored by BOHLIN INSTRUMENTS Mrs B Duffy , CAMTEL LTD, 5 Carrington House, 37 Upper King Street, Royston, Herts SG8 9AZ, UK http://www.camtel.co.uk T: 01763 244280 F: 01763 244298 E: info@camtel.co.uk
2-6 Nov Glasgow Scotland	The 5th European School of Rheology and Course on Process Rheology Dr N E Hudson , Dept of Pure & Applied Chemistry, University of Strathclyde, 295 Cathedral St, Glasgow G1 1XL, UK T: +44(0)141 548 2162 F: +44(0)141 548 4822 E: n.e.hudson@strath.ac.uk
16-17 Nov Malmö Sweden	Emulsion Science & Technology - HELD IN SWEDISH Gunlög Tänge , Calmia AB, Box 2161, SE-220 02 Lund, Sweden http://home3.swipnet.se/~w-35509 T: +46 (0)46-211 00 20 F: +46 (0) 46-211 00 20 E: calmia@swipnet.se

23-24 Nov	Advanced Course in Rheology - <i>HELD IN SWEDISH</i>
Malmö	Gunlög Tånge, Calmia AB, Box 2161, SE-220 02 Lund, Sweden
Sweden	http://home3.swipnet.se/~w-35509
	T: +46 (0)46-211 00 20 F: +46 (0) 46-211 00 20 E: calmia@swipnet.se
30 Nov-1	The Rheology of Industrial Coatings Systems
Dec	Gunlög Tånge, Calmia AB, Box 2161, SE-220 02 Lund, Sweden
Malmö	http://home3.swipnet.se/~w-35509
Sweden	T: +46 (0)46-211 00 20 F: +46 (0) 46-211 00 20 E: calmia@swipnet.se

AIMS OF THE SOCIETY

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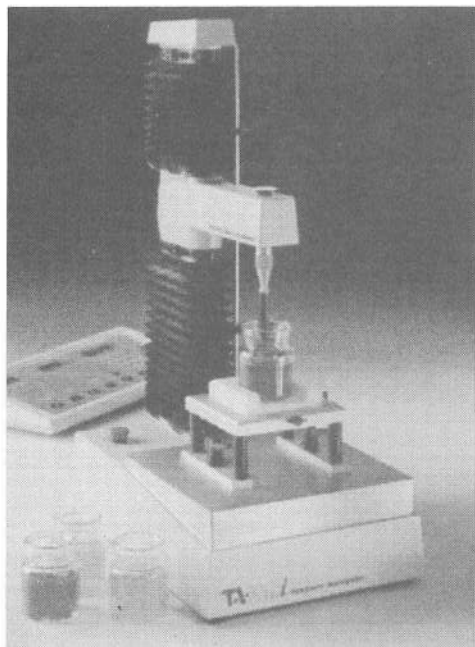
Extraction and processing of crude oil, moulding of plastics, use of toothpaste, spreading of margarine, painting and the lubrication of joints in the human body are all examples of processes depending upon rheological behaviour. Rheology is defined as the science of the deformation and flow of matter.

If your work is concerned with rheology in any way, then you have much to gain by joining the British Society of Rheology - publications, conferences and access to fellow members who, while working in a different discipline or industry, may be facing similar problems to yours.

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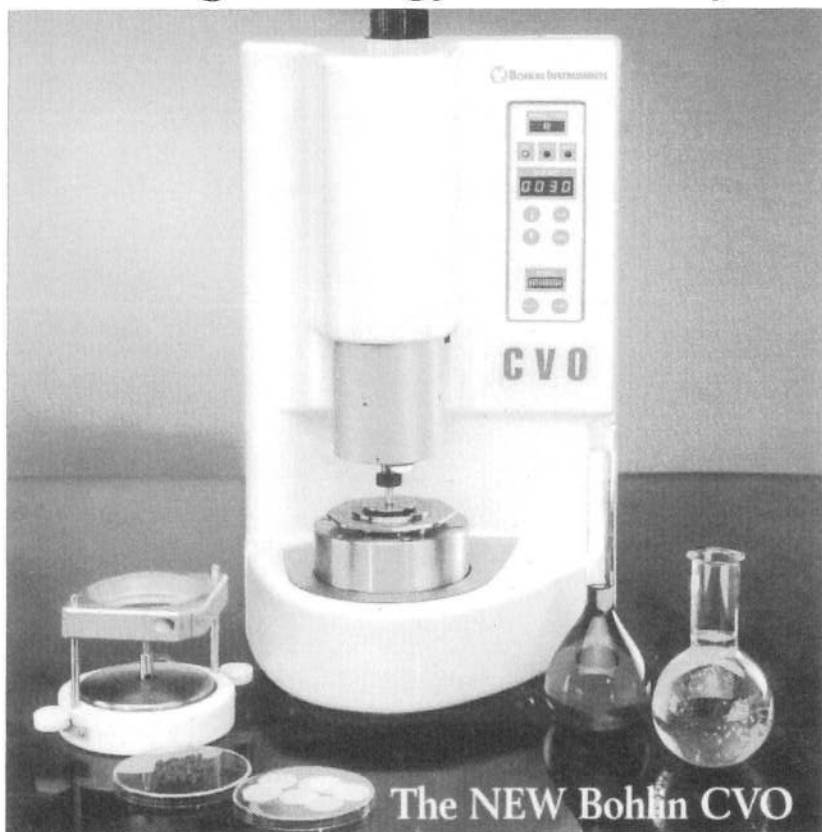
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