

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN



June 1995

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EDITORIAL

Another year has passed and it will shortly be time for our AGM, this year to be held in Aberystwyth. The formal announcement is made elsewhere in this Bulletin, together with the minutes of last year's meeting. Just in time, before the council changes again at the AGM, (although there should be far fewer changes than last year), I have the last of the profiles on the new members on Council.

As you will be aware from previous issues, proposals for the formation of a European Society of Rheology have been under discussion. In this issue we publish a draft of the proposed constitution of this Society and invite you to comment on it, either at the AGM, or by letter to our President, Howard Barnes. I am pleased also to have a report from Prof. Dr M.H.Wagner on a recent two-day meeting of the German, Austrian and Swiss Rheological Societies.

There are reports on two further meetings; the Rossett Workshop on Numerical Methods in Non-Newtonian flow and a Eurobitume meeting on Bituminous Binder Rheology. The group who organised this meeting also have a 'Glossary of Rheological Terms' under preparation. Whilst this is aimed at bitumen researchers, having seen a draft copy, it should be of interest and use to a much broader range of rheologists. If you are interested, please contact David Lyall at Eurobitume, whose address can be found in this meeting report.

Under Conference announcements there are details of two meetings which will be held soon after this Bulletin appears. I must apologise for the short notice given. The cover dates on our Bulletins are misleading and could do with rationalising. They actually refer to the month in which a Council meeting is held, and at which most of the copy is promised. Thereafter the copy has to be chased up, typed and sent to the printers. Copies will only actually reach members about two months after each Council meeting. Can I appeal to all meeting organisers who wish to make announcements in our Bulletin, to supply the copy well before any deadlines for their meetings.

In a move to reduce our costs and increase efficiency, this issue has been printed at the University of Strathclyde, from where it is also distributed. For nearly fifty years, the Bulletin has been printed by the same printers, Fletchers in Farnborough, to whom our grateful thanks.

The (absolutely final) copy date for the next issue is September 20th, 1995.

COMMENTARY ON 281st COUNCIL MEETING

Ross Priory, Scotland

The early summer sun sparkled from distant ripples on the black waters of Loch Lomond, overlooked by rolling purple hills. In the foreground lush gardens and lawns swept up from the loch to the impressive front of Ross Priory, now the conference centre of the University of Strathclyde. Here is the annual gathering of a course on techniques in rheology presented by professors Barnes, Walters, Ferguson and others, so provided the committee with every excuse they needed to spend a day on the bonnie bonnie banks.

Not at all so bonnie evidently are the banks that in recent years have been repositories for BSR members funds. The saga of the missing records of who paid what and when is now thankfully almost over, but financial news at committee meetings is frequently heard at second hand due to difficulties our treasurer has in escaping his other responsibilities. Never to be defeated, however, the eight-page fax of his report arrived in style during the meeting, ably relayed by Nick Hudson's office back in Glasgow.

But we digress. The point of meetings after all is to get through the agenda - and an hour into the afternoon we hadn't yet ticked off item 3 of 9 - the "Euroseptic" (see last report) issue has once again derailed the smooth government of your society and we were once more embroiled in discussing the merits of a single European society over our national past. Would the "ordinary member" have any interest in an ESR Journal and inherent subscription cost (would you? - let us know !)? Would the French ever speak to us again after the glitch in the UK view in Brussels after the last committee change? How best to serve the rheological community in the next decade? And who had actually seen the proposed constitution of the new ESR anyway? When our chairman promised to circulate it to committee members everyone seemed to be satisfied (true to his word it has now arrived).

We live in changing times. The next two issues concerned the "word" - to print it or not to print it? Worry not - the "Bulletin" is not going electronic in the foreseeable future - just a change of printer on economic grounds. More of a concern is that Elsevier are not prepared to continue publishing Rheology Abstracts - news which broke under item 6. After a few glum remarks, the forward-looking nature of the committee began to turn the tide of opinion to more optimistic directions as to what the future of the Abstracts might hold (if the tenor of this section appears deliberately vague then my only reassurance is that it is meant to be so).

Come item 7 and my palms were getting moist - would the three PhD students I had put forward for those much sought-after BSR student travel bursaries be successful? Aberystwyth is a very long way from Leeds (let's face it, it's a long way from most places) and I feared having to tell the young hopefuls that it would be a question of casting lots.....but my fears proved groundless in the face of the carefully judged generosity of my fellows.

The future shape of the committee itself came up among the last items in the form of suggestions for new members. Should anyone out there be considering offering themselves to this sacrificial task may I encourage you with the reminiscence of the evenings skirling pipes, the lordly haggis wreathed in Burns' words as richly as it was soaked in whisky and the evening's Scottish hospitality.

Tom McLeish, University of Leeds

PROFILE OF NEW COUNCIL MEMBER

Dr Roger Burley

Having successfully completed the last 'four year' course in Chemical Engineering at the University of Leeds, Roger continued his research studies into the dynamics of dyeing machinery in a partnership with the Department of Colour Chemistry and Dyeing where his supervisor was Ian Rattee, then recently arrived from ICI. John Flower kept a firm grip on the Chemical Engineering aspects, this leading to a well grounded launch into this previously uninvestigated area.

Having completed this study, [Ph.D. 1968], Roger left for Australia where he continued work under the Chief Research Scientist, (CSIRO, Geelong) George F. Wood, into the flow mechanisms of a wide range of dyeing machine types and the effect of the design on dyeing efficiency, etc. It was at this point that the phenomena of air entrainment became of interest as it was clear that this inhibited good liquid/solid contact. Here was also developed the beginnings of free surface flows with relation to high speed coating of fluids onto textiles [like his Father - see later].

Returning in 1972 to a lectureship at Heriot-Watt University, Roger came under the tutelage of Cecil W. Nutt, who was also, like George Wood, from Birmingham University.

Research continued in the above subjects, expanding to high-speed coating and air entrainment, enhanced oil recovery using air/surfactant mixtures, foam rheology and more recently, self-spreading of fluids with colleague Sean McKee at Strathclyde, Mathematics Department.

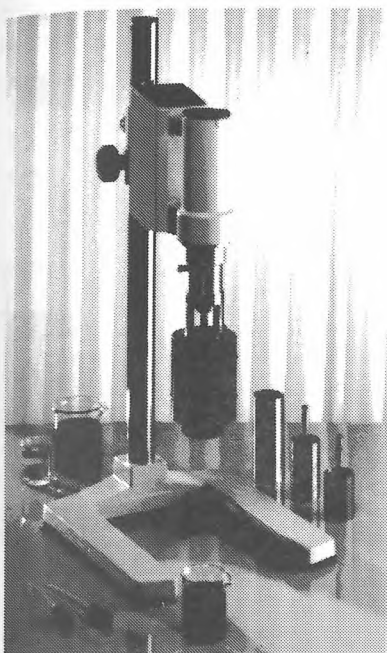
Roger successfully presented the first {Scottish & Heriot-Watt} DEng in Chemical and Process Engineering under the new title of the Engineering DSc in 1988. In 1989 Roger was appointed Reader, and as visiting Professor at both IMF, University of Strasbourg, and IICIT, Polytechnic University of Catalunya.

Roger is the European Editor of 'Industrial Coating Processes' with Kitano Adachi (Japan), and 'Developments in Chemical Engineering' with Martyn Ray in Curtin University, Perth. Speaking French and Spanish, Roger has lectured and gives seminars to students in France and Spain, and is on the steering Committee for the forthcoming First European Coating Symposium, {Leeds, September 1995}, 'Mechanics of Thin Film Coatings'.

By strange coincidence, Roger's father, Donald W. Burley, carried out original research and development on the coating processes involved in all that may generically be known as 'Elastoplast' during his life-long career at Smith and Nephew, both at Hull and Gilston (Harlow). During that time he often worked with Harold J. Stern, on latex adhesive preparations and the like, and with whom we have been able to re-establish contact, thanks to the kind efforts of the Society and its members.

Roger, and his wife Myra, who is currently Administrative Officer at the Institute of Computer Based Learning, Heriot-Watt University, have an adult family, Robert, Adam and Natashas, and have recently seen the birth of their first grandchild.

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NOTICE OF THE 55th ANNUAL GENERAL MEETING

The 55th Annual General Meeting of the British Society of Rheology will be held on September 4th, 1995 at the University of Wales, Aberystwyth starting at 17.30hrs.

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

- a) Election of Officers and Council Members for 1995-96.
- 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.

Nominations to date are as follows:

Honorary Secretary:
Honorary Treasurer:
Membership Secretary:
Bulletin Editor:
Abstracts Editor:

Dr. G. J. Brownsey
Dr. M. F. Webster
Dr. N. E. Hudson
Mr. P. C. Anderson
Dr. G. H. Meeten.

Ordinary Members of Council:

Prof. P. G. F. Banfill
Dr R. Burley
Prof A.R. Davies
Mr P. D. Doody
Prof T. C. B. McLeish
Mrs C. A. Moules

Nominations are invited for Council or for any of the Offices. Nominations should be sent to the Secretary or may be made at the meeting (see rule 5(b)).

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

Geoff Brownsey
Honorary Secretary.

**MINUTES OF THE 54th AGM HELD AT THE
NATIONAL MOTORCYCLE MUSEUM, WEST MIDLANDS
SEPTEMBER 22nd 1994 14.00hrs**

PRESENT:

Dr. D. R. Oliver	President, in the chair
Mr. R. E. Carter	Hon. Treasurer
Mrs. C. A. Moules	Hon. Secretary

1 APOLOGIES FOR ABSENCE.

These were received from Prof. Doug Hourston, Prof. Peter Townsend, Dr. Malcolm Mackley and Dr. Neville Waters.

2 MINUTES OF THE 53rd AGM.

These had been published in the Bulletin Vol 37(2). There being no queries the Minutes were duly signed by the President.

3 MATTERS ARISING.

There were no matters arising.

4 REPORTS OF OFFICERS.**4.1 President.**

The President read his report which was to be published, together with those of other council members, in the forthcoming Bulletin 37(3). He noted that his time in office has passed quickly and commented that three years was a more realistic term of office for President. He especially mentioned the 'Young Rheologists' meeting, saying that the autumn meeting was a very good idea.

The role of the BSR in the establishment of a European Society of Rheology was mentioned, together with the possibility of supporting a publication such as Rheologica Acta within this framework. The financial cost of this support would be in the region of £2 pa which the President did not consider to be a significant load.

4.2 Treasurer.

Roy Carter was unable to present audited accounts, only provisional accounts were available. He highlighted difficulties he had experienced, the consequences of which meant that the Society's account at Leatherhead (Lloyds) had been closed. A transfer to a new account at Loughborough had been achieved successfully. He noted that the two audited accounts would be presented at the next AGM. Council had awarded significantly more awards and student grants than in previous years. In conclusion, it was stated that the financial state of the Society remained healthy but that Council must pay close attention to future expenditure in relation to a potentially diminishing income.

A question regarding the expenditure of the Scott Blair Funds elicited the response that these were essentially travelling expenses to and from Aberystwyth. On the matter of reviewing the costs of services provided, Ralph Oliver suggested that circulation costs were one such area of future scrutiny. It was also noted that the auditors fee was very reasonable.

4.3 Honorary Secretary.

Carole Moules thanked Council for its support, noting the hard work required for the post but had nevertheless found it rewarding. During the year the Society had been involved in one full meeting and two one-day meetings. The Secretary noted the general low attendance of BSR members at meetings and requested that there be greater representation of the BSR at meetings of other societies. Summarising other activities the Secretary asked that the meeting give its support to a request from David Cheng who wants the working group (Rheology A to Z) wound up so that he can pursue this independently from the BSR. John Benbow the Society Archivist was thanked for his work. There was a plea to please send conference reports to the Society. Carole also highlighted the lack of response from the membership when their views were requested; was this an indication of overall satisfaction in Council policy?

4.4 Membership Secretary.

In his absence, Doug Hourston had tabled a report showing that membership has risen slightly during the year and that it now stood at 611.

4.5 Honorary Bulletin Editor.

Phil Banfill read from the first page of the last Bulletin 37(2), his editorial. He wished his successor well and endorsed the view that the society take the concept of an European dimension further.

4.6 Honorary Abstracts Editor.

Gerry Meeten apologised that there had been slight delays in publication of Rheology Abstracts and confirmed that issues one to three would be with the membership soon. The membership were reminded that they receive Rheology Abstracts as part of their membership. The future held the possibilities of electronic publishing/ CD /Floppy and On-Line access. Gerry said that the Society may well see a change in what Rheology Abstracts represents. Certainly there is added value here, it is a flagship of the Society.

A question from Mr Greener on aspects of electronic publishing highlighted the preference some people have for retaining hard copy, one advantage being the browsability. Ralph Oliver mentioned the thickness of the now obsolete European edition of an abstracting service. As always, there was a plea to the membership for more abstractors.

5 ELECTION OF OFFICERS.

Howard Barnes was elected President for 1994-1996. There were no further nominations from the floor for any of the officer posts and the meeting voted en bloc for the nominees as:-

Hon. Secretary	Geoff Brownsey
Hon. Treasurer	Roy Carter
Membership Secretary	Nick Hudson
Bulletin Editor	Peter Anderson
Abstracts Editor	Gerry Meeten
Members of Council:	
Tom McLeish	Phil Banfill
Carole Moules	Russell Davies
Roger Burley	Paul Doody

Howard took the Chair. There was a vote of thanks to the outgoing President Ralph, by Nick Hudson. Howard said that he would keep the ship afloat and would try to do all the things that the outgoing President said he would. Yes, to become more European, but to keep a club atmosphere was Howard's aim.

6. ANY OTHER BUSINESS.

Carole Moules asked if the meeting would confirm that David Cheng would be able to progress with Rheology A—Z on his own. This was agreed.

There being no further business, the meeting closed at 14.56.

Draft for Discussion

CONSTITUTION OF THE
EUROPEAN SOCIETY OF RHEOLOGY

1. Definition of the European Society of Rheology

Membership of the **European Society of Rheology** (hereinafter called **The Society**) is open to all European national societies and groups devoted to rheology (hereinafter called **Rheology Groups**) belonging to the **International Committee on Rheology**. The Society is set up under the laws of the European Union and shall be governed by this Constitution. The Society shall come into being after the Constitution has been approved by at least five Rheology Groups. Alterations to this Constitution must be agreed by at least two thirds of the Rheology Groups which belong to The Society. Membership of a Rheology Group may be terminated by The Society if financial obligations or other duties of membership are not fulfilled. A Rheology Group may revoke membership by the end of a calendar year only. In the case of dissolution of The Society, any net worth of The Society falls to the Scott-Blair collection*.

2. The Aims of The Society are

To encourage European, and wider international, collaboration in all aspects of rheology.

To promote rheology and be active at national and international level in seeking funds for rheological research, education and training.

To act as a steering body for the European Rheology Conference and delegate its organization to a Rheology Group.

To publish a Newsletter and circulate this to the Rheology Groups and their individual members.

To collect news of conferences and other rheological activities and disseminate this in the Newsletter and in other appropriate ways.

*This is a collection of books and papers on Rheology set up by endowment from the estate of the late Dr George Scott-Blair, a pioneer of British Rheology, and is built on his own large collection of books on the subject. The collection is presently housed at the University of Wales, Aberystwyth.

To investigate the possibility of further European publications, and consider how these may be made available to Rheology Groups and their individual members.

3. The Society shall be governed by a Committee and its Officers.

The Committee shall consist of one delegate from each Rheology Group belonging to The Society, together with the Officers. The Delegates shall be appointed by the Rheology Groups in whatever way the Rheology Groups wish (without restriction imposed by The Society), normally for a period of at least four years. The Delegates shall elect Honorary Officers of The Society, not necessarily from among the Delegates. The Officers shall be the President, Past-President, Secretary and Treasurer. The Officers shall be elected for a period of four years. The President shall be Past-President for the next four-year period. Neither the Secretary nor the Treasurer shall be permitted to hold office for more than eight years consecutively. No monies of The Society shall be used for travel or other personal expenses of Delegates or Officers.

The Committee shall meet on the occasion of each European Rheology Conference, and on such other occasions as are deemed necessary. Decisions of the Committee shall be taken, as far as possible, by consensus. If a vote is necessary, it shall be decided by a qualified majority. This is defined to be more than half of those eligible to vote. Decisions may be taken following a postal ballot, with communications to the Secretary by letter, FAX and electronic mail being acceptable.

The Officers shall normally meet once a year to execute the policy of The Society as defined by this Constitution and the decisions of the Committee.

4. Operation of The Society

A subscription shall be levied on each Rheology Group, in proportion to its membership, at a rate determined by the Committee. The subscription for a calender year shall be due in September of the previous year. Failure to pay the subscription will result in a withdrawal of services (e.g. the Newsletter) and privileges of membership, and will render the member liable to termination of membership by the Committee. The Committee shall have power to seek further financial levies in pursuit of its agreed aims, either from the European Rheology Conference, through its organisers, or from members of The Society when necessary.

Rheology Groups shall make every effort to accord the same privileges to individual members of all Rheology Groups belonging to The Society as they accord to their own individual members, e.g. access to and discounts at conferences.

ESR Draft Constitution.

A Note from our President, Prof. Howard Barnes.

I am the Chairman of the formation committee of the proposed European Society and Prof. Dr Manfred Wagner is the secretary. After a number of iterations this is the final form of the draft constitution which is being put to the European Societies and their members for their approval. The lead in this has been taken by the British Society as the largest society and the views of our members and Council will be very important. There will be an opportunity to discuss this draft at our AGM in Aberystwyth on the 4th September. If you can't be present, please send your written comments to Howard Barnes.

EUROPEAN SOCIETY NEWS

At the AGM of the Deutsche Rheologische Gesellschaft held in Berlin in May 1995, the following Officers of the Society were elected:

President (Reelected)

Prof. Dr.-Ing M.H.Wagner,
Computational Fluid Dynamics / Rheology,
Institut für Kunststofftechnologie der Universität Stuttgart
Böblingerstr. 70, D-70199 Stuttgart, Germany
Tel: 0711/641-2330, Fax: 0711/641-2335
Email: wagner@ceylon.verfahrenstechnik.uni-stuttgart.de

Secretary and Treasurer (new)

Dr W. Mielke,
Bundesanstalt für Materialforschung und -prüfung,
Unter den Eichen 87,
D-12205 Berlin

A Note from Our Archivist

B.S.R. ARCHIVES - BUSINESS PAPERS.

The Society's Archives consists of several parts. These are mainly the Scott-Blair Collection of papers and books at Aberystwyth. There is also a set of papers at Sheffield on the rheology of fresh concrete and cement pastes and matters concerning the practical measurement of the workability of concrete including quality control. This was given to the Society by Dr.G.H. Tattersall; it is held in the University of Sheffield, where the contact is Mr Peter Carnell, University Library, University of Sheffield, Sheffield, S10 2TN. This note, however, deals only with recent steps to deposit some of the business papers in a safe store at Aberystwyth.

At the end of their terms of office, each Council Officer passes his or her papers to their successors. Over the fifty five years since the formation of our Society, the amount of paperwork moving around the country had increased to a level where it became difficult to handle. This was particular true for the Hon. Secretary's files. At the request of Ralph Oliver and Carole Moules, I have tried to improve this situation by sifting through the literature and filtering out what I considered to be no longer useful.

The most important part of the Society's business is recorded in the bound minutes. In practice those older than 10 years are seldom referred to, so the older ones have now been placed in a locked store in the library of the University College of Wales, at Aberystwyth. The other business papers have been sorted into envelope files, divided into six categories, and put into "Bankers Boxes" for keeping permanently in the same store.

A "B.S.R. Business" section contains interesting correspondence about the setting up of the British Rheology Club and is followed by letters dealing with the establishment of the rules and constitution. It also includes early membership lists as well many interesting letters about the Club's, and later the Society's, various activities.

Among the collection of papers dealing with "Conferences" are programmes and reports of the regular meetings organised by the Society. For many years each meeting was followed by a report in *Nature*. The contents of the programmes provide a fascinating record of changes in the rheological interests during the past fifty or so years. There is scope for a detailed analysis of these developments and why they came about. Working notes on the planning of the International Meeting at Oxford in 1953 and the Centenary celebrations in Edinburgh in 1990 are also included.

"Other Rheological Societies" correspondence shows how the number of Rheological Societies has grown and how co-operation with these has been maintained by holding many joint conferences. The same tendency for co-operation is found in the papers filed under "Other Societies".

"Photographs" of Dr Scott-Blair and Professor Reiner remind us of the early days. In the same category are photographs of several Award Winners and a rogue's gallery of recent Council Members.

The "Miscellaneous" section is made up of material not easily classified in the other parts of the collection.

A detailed list has been made of the contents of each envelope file; this can be borrowed by Society members. The files will be available to Council Members, who will be able to borrow the papers only with the agreement of the Chairman of the Scott-Blair Working Party, Dr Mervyn Jones. I regard what has been done as the start of a system which, I hope, will be on-going and added to from time to time. For example, Dr R. Whorlow has recently passed on to me some interesting accounts of conferences held during the 1960s and some reports of B.S.R. committees.

John Benbow.
BSR Archivist

CONFERENCE REPORT EUROPEAN SOCIETY NEWS

Report on Rheologentagung 1995, a two-day meeting of the German (DRG), Austrian (ARGÖC) and Swiss (FRPGS) Rheological Societies, Berlin 22-23 May 1995

This two-day meeting of the three societies at the Logenhaus Berlin attracted more than 150 participants, mostly from Germany, Austria and Switzerland, but also from Belgium, Czech Republic, England, Italy, Lithuania, Poland, Sweden, The Netherlands and Ukraine.

In the opening ceremony, the history of Berlin in this century and its entanglement with the history of rheology was commemorated: 70 years ago, in 1925, Karl Weissenberg, then a member of the Kaiser-Wilhelm-Institut for Textile Chemistry, was appointed as Professor of Theoretical Physics at the University of Berlin, a position he held until his forced emigration in 1933. What followed was a scientific hiatus of 12 dark years, and it was only in 1951 that the Deutsche Rheologische Gesellschaft (DRG) was founded in Berlin.

74 papers from all fields of rheology were presented, including three plenary lectures on "Extensional Rheology of Polymer Melts" (J. Meissner), "Rheology of Polymer Solutions" (W.-M. Kulicke), and "Shear Induced Crystallisation of Isotactic Polypropylene" (H. Janeschitz-Kriegl).

The AGM of the DRG approved new by-laws, explicitly allowing the society to join and fund a European Society of Rheology. After resignations of Dr Schneider (vice President) and Prof. Habig (secretary and treasurer) were received, the (re)elected officers of the DRG are Prof. Wagner (president), Prof. Münstedt (vice president), Prof. Schnabel (vice president), and Dr Mielke (secretary and treasurer).

At the conference dinner, the Rheology Prize 1995 of the journal Rheology was awarded to Dr M. Kröger for his paper on "NEMD Computer Simulation of Polymer Melt Rheology". Prof. Kirschke, who served as secretary and treasurer of the DRG from 1959 to 1991, received the newly installed Honorary Membership of the DRG for his devoted services to the society.

M.H. Wagner

CONFERENCE REPORT

European Workshop: Brussels, 5 to 7 April 1995 The Rheology of Bituminous Binders: Where are we now?

by G. R. Dobson

La Bergerie, Grand' Rue, 30260 Cannes et Clairan, France

Mixtures of bitumen and stone have been used to make roads for 2000 years. Like most traditional industries, a number of empirical tests grew up over time to specify the consistency of the bituminous binders. The modern study of the rheology of bituminous binders started 40 years ago with the publication of a pioneering paper by Van der Poel, in which he proposed a mathematical model to calculate the viscoelastic properties of bitumens over a wide range of frequency and temperature. Since the actual measurement of dynamic viscoelastic modulus was experimentally difficult at that time, Van der Poel defined his model in terms of two empirical tests for consistency, which were by then well established in the industry. This simple model was remarkably successful and is still widely used today by road engineers as part of the process of designing mixes for road surfacings. However with the introduction of polymer modified binders (PMBs) the simple model is no longer adequate.

In the intervening years there has been a considerable research effort devoted to developing both the test methods to measure viscoelastic properties, and more sophisticated mathematical models for that viscoelasticity in terms of parameters introduced by rheologists for the study of polymers. The development of modern rheometers has made the study of bitumen viscoelasticity accessible to a much greater number of researchers, and has led to an acceleration of interest in the last few years in the measurement of complex dynamic modulus, both of binders and of mixes used for road construction.

One result of all this activity was the "Strategic Highways Research Program" (SHRP) in the USA which culminated in the publication of a proposal for a new "Superpave Specification". This new specification is written in terms of parameters such as Complex Modulus and Loss Angle, at defined combinations of frequency and temperature to define binder performance, and so should cover PMBs as well as conventional bitumens.

The Americans have also developed special new pieces of test equipment for each set of defined conditions. These new tests are intended to predict the relative performance of binders in preventing the failure of roads in the three most important ways. These are rutting caused by slow traffic at high temperature, cracking caused by thermally induced stresses at low temperature, and fatigue failure caused by repeated loads at intermediate temperatures.

The European Bitumen Association decided at its 1993 Technical Conference that it was timely for Europe to hold a workshop to review the status of the study of the rheology of bituminous binders from a European perspective. The objects were to define the state of the art, review the SHRP proposals, and to decide what things were adequately specified, and which still needed research. It is a measure of the success of this proposal that the call for papers received 56 responses from 114 authors representing 20 countries. The format of the conference was that the submitted papers were circulated in advance and then taken as already read for the meeting.

At the actual conference, each session consisted of an invited lecture on the state of the art for the topic under consideration, followed by discussion groups addressing questions selected by a panel of experts. Each session was rounded off by a plenary presentation given by the chairman of each discussion group. The invited lectures were by Prof. D. Anderson of the Penn State University, USA (Equipment), Dr L. Francken of CRR Belgium (Test methods), Dr J. Bonnot of LCPC France (Interpretation of dynamic testing results for bitumens), and Prof. A. Molenaar of Delft University, Holland (Applicational relevance of rheological testing of bituminous binders).

The opportunity was also taken at the conference to display a "Glossary of Rheological Terms" in both French and English, compiled by a sub committee of Eurobitume. The intention of this glossary is to attempt to standardise the language used by bitumen researchers when discussing rheological phenomena. It is a very comprehensive document applicable to all fields of rheological research, and is worthy of a wider circulation.

The conclusions of the conference were that the rheology of road binders, including PMBs could indeed now be specified by a unified system of dynamic testing. There was considerable scepticism about the development of specific rheometers to measure each condition required by the specification. It was said that if one added up the full cost of the "Superpave" equipment, it was more cost effective to buy one of the many

full range rheometers available. However bitumen remains a difficult material to work with, and the experimental problems it presents are poorly understood by the rheometer manufacturers. "It is very easy to measure the properties of the apparatus instead of the bitumen", "Never believe the output of the computer on the rheometer", and "Our demands from a rheometer are like wanting a ruler to measure accurately distances ranging from 1mm to 1km", were three comments made.

Regarding proposed new specifications, there was general agreement that the relative performance of binders could be predicted satisfactorily in terms of high temperature rutting and low temperature cracking. However failure by fatigue is still poorly understood, and there is even no general agreement on how to define it in terms of laboratory fatigue tests. It was pointed out in one of the invited lectures that the interpretation of fatigue measurements would require an understanding of fracture mechanics as well as rheology. The proceedings of the conference including all the discussion papers will be published by Eurobitume.

In the final session of the meeting, the present writer received a pleasant surprise when he was the recipient of a special award to recognise his contributions to the subject over thirty years, and particularly the leading role he played in the discussions of this meeting.

For further information contact the Eurobitume Secretariat:

David Lyall,
Tour Madou (25th floor),
Place Madou 1,
B - 1030 Brussels, Belgium
Tel: +32 (0) 2 2261949 Fax: +32 (0) 2 2261940

CONFERENCE REPORT

Report on Ninth International Workshop on Numerical Methods in Non-Newtonian Flow

Lyndir Hall, Rossett, Wales
19-22 April 1995

Impressions

The application of numerical methods to simulate complex flows in non-Newtonian fluid mechanics began in earnest in the late 1970s. It was apparent from the beginning that while numerical methods already available for the Navier-Stokes equations could be readily adapted to simulate inelastic non-Newtonian fluids, this was not the case for viscoelastic (memory) fluids. These present challenges for numerical methods, which, although enormous progress has been made over the past 15 years, are by no means completely resolved.

This meeting was the ninth in a series of workshops designed to bring together experimentalists, theoreticians, and computational scientists to address specialist topics in the field of Computational Rheology. (This is the new name given to the subject of numerical simulation of non-Newtonian flow). The first workshop was held at Brown University, Rhode Island, in 1979. (Five of the workshops have been held in the US, and four in Europe). The ninth workshop was co-sponsored by the University of Wales and the British Society of Rheology. Over 70 participants attended, making it the largest in the series. It was encouraging to note that many of the participants were under 30 years old, which reflects the topicality, vigour and importance of the subject.

As usual, the technical papers fell into one or more of the following categories:

- (1) Experiments and challenges to numerical simulation.
- (2) Constitutive models.
- (3) Numerical methods - new developments and benchmark problems.
- (4) Specialist topics.

Under (1) & (2), Professor Crochet, in his BSR Gold Medal Lecture (assisted by Pernode), showed how he could simulate different mechanisms for vortex growth in contraction flows with the FENE-P model. Agreement with the early experiments of Evans and Walters on lip vortex growth and salient vortex growth in contractions was reported. Professor McKinley, in his BSR Annual Award Lecture, spoke on steady and transient motion of a sphere sedimenting through shear-thinning and constant-viscosity elastic fluids. Both these lectures were aptly chosen - shedding new light on topics previously explored by past presidents of the BSR.

Other experimental papers addressed the influence of molecular configurations on the kinematics of flow of polymer solutions; Boger fluids in stagnation flows; and combined velocity and stress-optical measurements compared with numerical simulation.

Under (3), new developments in low order (h) finite element methodology were reported. Interest in high order (p) finite element methods was also represented, but the greatest excitement, in my view, was in the combination of h and p methodology. A balance of economy and accuracy is offered by h-p adaptivity which could be of critical importance for the future of numerical simulation. There was also one paper on finite-volume, tackling transient 3D simulation in contraction, supported by a movie of the results. Other techniques included semi-Lagrangian finite elements, and - yes, believe it or not - finite differences, but with a new twist, namely overlapping grids.

Special topics (4) included stability issues (linear and non-linear), corner singularities, and non-isothermal flows. Exciting developments in thermorheological modelling were reported by the Eindhoven group. Papers on Stochastic simulation and parallel computation also offered us a glimpse of the (perhaps not-too-distant) future.

In summary, then, a lively and enjoyable workshop. Social events included a mediaeval banquet at Ruthkin Castle, garnished with wine, maidens (?) and song, and a sunny, if cold, afternoon at the seaside resort of Llandudno.

Readers wanting a more detailed discussion of the contents and conclusions of the meeting should look out for a forthcoming report by Bruce Caswell of Brown University. The tenth workshop will be held in Delaware in May 1997.

Russell Davies.

CONFERENCE ANNOUNCEMENTS

POLYMER MELT RHEOLOGY CONFERENCE UNIVERSITY OF WALES ABERYSTWYTH 3 - 6 September 1995

BSR members received details of this jointly sponsored meeting, together with a registration form in the last issue of this Bulletin, Vol 32 no. 1. It is now possible to give fuller details of the programme of papers in the attached list, although finalised timings have yet to be decided. There is outstanding coverage of much of the leading work in this field, and the opportunity for those working with polymer melts to appraise what is precisely known about the subject. Early registration is recommended to secure attendance.

The local Conference Committee comprises A.R. Davies, K. Thomas and K. Walters FRS.

Address for Enquiries and Correspondence:

Professor Ken Thomas
Department of Mathematics,
University of Wales,
Penglais, Aberystwyth,
Dyfed, SY23 3BZ, UK

Tel: +44 (0) 1970-622768 Fax: +44 (0) 1970-622777

PROVISIONAL CONFERENCE PROGRAMME

Sessions are planned to take place in the A12 Lecture Theatre of the Hugh Owens Building .

* Indicates paper title has still to be confirmed.

SESSION 1, Monday 4 September, 08.50 - 12.45

WELCOME - K. Thomas (U Wales)

MODELLING BEHAVIOUR - Chairman, K. Walters (U Wales)

OPENING ADDRESS - S.F. Edwards (Cambridge U)

*Simulation of polymer melts and of foams.**

T.C.B. McLeish (Leeds U)

Molecular rheology of branched polymers.

D. Porter (To be advised)

Combining molecular and continuum mechanics concepts for constitutive equations of polymer melt flow.

COFFEE

KEYNOTE LECTURE - M.J. Crochet (Louvain la Neuve U)

*Modelling viscoelastic effects in plastics processing.**

G.J. Manogg, P. Townsend, M.F. Webster (U Wales)

Numerical simulation of multilayer injection moulding.

G. Bishko, D. Bick, O. Harlen, T.C.B. McLeish (Leeds U)

A new Lagrangian flow-solver for molecular constitutive relations in polymer melts.

12.45 LUNCH

SESSION 2, Monday 4 September, 14.00 - 17.30

CHARACTERISATION OF VISCOELASTIC BEHAVIOUR -

Chairman, P. Townsend (U Wales)

KEYNOTE LECTURE - M.H. Wagner (Stuttgart U)

Damping functions and non-linear viscoelasticity - A review.

P. Ehrecke, M.H. Wagner (Stuttgart U)

The irreversibility assumption for network models of polymers flow

G.W.M. Peters, F.P.T. Baaijens (Eindhoven U Tech)

Modelling of non-isothermal viscoelastic flows.

TEA

KEYNOTE LECTURE - H.H. Winter (U Massachusetts)

*Determining relaxation time spectra.**

F.P.T. Baaijens (Eindhoven U Tech)

Viscoelastic flow of a polymer melt around a confined cylinder.

D.K. Bick, T.C.B. McLeish (Leeds U)

Topological contributions to non-linear elasticity in branched polymers.

18.00 **British Society of Rheology AGM**

19.30 **DINNER**

SESSION 3, Tuesday 5 September, 09.00 - 12.30**CHARACTERISATION OF EXTENSIONAL BEHAVIOUR -**

Chairman, C. Petrie (U Newcastle upon Tyne)

KEYNOTE LECTURE - J. Ferguson (U Strathclyde)*Measurement of transient extensional viscosity of polymers from the solution to the melt.*

I.R. Harrison, T.C. Hsu (Pennsylvania State U)

Transient equibiaxial elongational viscosity measurements using lubricated squeezing.

K. Koyama (Yamagata U)

*Elongational viscosity measurements of polymer melts with various molecular structures.***COFFEE****KEYNOTE LECTURE - J. Meissner (ETH Zurich)***New developments in polymer melt elongation.*

M.T. Martyn, P. Olley, M. Kamala, P.D. Coates (U Bradford)

Experimental observations and modelling of the flow behaviour of polymer melts through an abrupt contraction geometry.

M.H. Wagner (Stuttgart U)

*Rheotens - mastercurves and drawability of polymer melts.***12.30 LUNCH****14.00 prompt:** Depart Rosser Hall main car park by coach for afternoon visits.**19.30 RECEPTION** in Penbryn Hall.**20.00 CONFERENCE DINNER.****SESSION 4, Wednesday 6 September, 09.00 - 12.30****MELT FLOW MEASUREMENTS - Chairman, A.R.Davies (U Wales)****KEYNOTE LECTURE - M.M. Denn (U California)***Chain dynamics near a surface.*

N. El Kissi, J.-M. Piau (Grenoble U)

Sharkskin and cracking of polymer melt extrudates.

R.S. Anderssen (CSIRO, Canberra)

On the inversion of relationships connecting rheological measurements to the molecular weight distribution.

COFFEE

KEYNOTE LECTURE - M.R. Mackley (Cambridge U)

Polymer melt processing: rheological characterisation, extrusion and simulation.

B.A. Costello, D. Bell (TA Instruments, Leatherhead)

Parallel superposition rheology of polyethylene as a function of temperature.

D.J. Groves, T.C.B. McLeish (Leeds U)

Predicting the rheology of linear with branched polyethylene blends.

12.30 LUNCH

SESSION 5, Wednesday 6 September, 13.45 - 16.15

MELT FLOW MEASUREMENTS (continued) -

Chairman, K.Thomas (U Wales)

M. Rides (NPL, Teddington)

Round-robins for capillary extrusion and parallel plate oscillatory rheometry using polyethylene and polypropylene melts.

D. Mulligan (Rheometric Scientific, Epsom)

Prediction of the processability of liquid crystal polymers compared with conventional polymers, using rheological measurements.

A. Romo-Urbe, A.H. Windle (Cambridge U)

Flow dynamics of thermotropic main-chain liquid crystalline polymers.

D.M. Stocks, A.G. Dunn (ICI, Wilton)

Plateau modulus determinations for amorphous and crystalline polymer melts - An experimental viewpoint.

A. Hakiki, J. Johnson, R.N. Young (Sheffield U), T.C.B. McLeish (Leeds U)

Rheological properties of monodisperse branched polyisoprenes.

P.R. Williams, R.L. Williams (U Wales)

Gel-point studies in reacting systems by shear wave dispersion measurements.

TEA

END OF CONFERENCE

CONFERENCE ANNOUNCEMENTS (Cont.d)

Workshop on Material Instabilities

Sacramento Hyatt, Sacramento, California, U.S.A.

7 - 8 October 1995

An intensive two day workshop on material instabilities in complex materials such as polymer fluids, granular media and particulate suspensions will be held in conjunction with and immediately preceding the upcoming Society of Rheology Meeting, October 8 - 12, in Sacramento. Attention will be confined to instabilities of the type commonly associated with non-linearities in constitutive equations, such as 'blowup' in nonlinear hyperbolic dissipative systems and loss of uniqueness and homogeneity associated with non-monotonicity of stress-strain relations. Among the topics to be discussed are:

Strain localization phenomena, including

Shear bands in complex materials

Neck formation in the cold drawing of polymers

'Meltfracture' and 'spurt' in polymer melts and solutions

Density and concentration fluctuations, such as

Clustering instabilities in particulate systems

Concentration waves in polymer solutions or blends

Presentations are to consist mainly of expository or general survey lectures, with ample time allowed for questions and comments by workshop participants. The workshop will be followed by a symposium at the Rheology meeting, consisting of research papers on the same subject. A registration fee of \$100 will be charged for workshop participation and will cover registration at both the workshop and the Sacramento SoR meeting.

With the goal of achieving a small-meeting atmosphere, and because of limitations on meeting-room size, the workshop will be restricted to approximately 50 invited participants. Those wishing to participate are encouraged to send a brief statement of interest, including a summary of any previous work on related phenomena, no later than 31st July to one of the co-organisers below. (Editors note: Because of the timing of the issue of this Bulletin, this deadline has been extended by two weeks, but speed is of the essence as only a few places remain).

The co-organisers are:

Bernard Coleman,
Rutgers University,
Dept of Mech. & Materials Science,
P.O.B. 909
Piscataway, NJ 08855-0909
(908) 445-5558; Fax: (908) 445-5977
Email: coleman@gibbs.rutgers.edu

Joe Goddard,
Applied Mech. & Eng. Science,
University of California, SD
9500 Gilman Dr.,
La Jolla, CA 92093-0411
(619) 534-4508; Fax: (619) 534-4543
Email: jgoddard@ames.ucsd.edu

It is anticipated that there will be limited funds available to provide travel support for students and some of the invited speakers. Further information will be sent with the reply to your application. Eligible graduate students are also encouraged to apply for a regular SoR travel grant, according to the instructions in the July 1995 Bulletin of the Society of Rheology.

FIRST EUROPEAN COATING SYMPOSIUM

'The Mechanics of Thin Film Coatings'

19th - 22nd September 1995

University of Leeds, Leeds, England

Interest in the mechanics of thin film coatings has risen sharply in recent years. Indeed coating is now established as an interdisciplinary research area incorporating analytical, computational and experimental methods. Given the increasing European interest in coating and its applications, the time is now right to launch a European Symposium meeting on a biannual basis. This would provide a suitable forum for the presentation and discussion of recent work and the exchange of ideas and information between academics and industrialists.

The First European Coating Symposium will be held at the University of Leeds in September 1995 and its theme will be 'The Mechanics of Thin Film Coatings'. Papers and poster presentations on Experimental and Numerical Methods, Rheology, Stability and Defect Mechanisms, Coating Fundamentals, Industrial Coating Technology and Novel Coating Processes will be included. For further information, please contact:

The Secretary, European Coating Symposium '95,
Department of Mechanical Engineering,
University of Leeds, LEEDS, LS2 9JT, England
Tel: +44 (0) 1132 335135 Fax: +44 (0) 1132 429925

CONFERENCE ANNOUNCEMENTS (Cont.d)

Fourth International Conference on Flow Processes in Composite Materials. FPCM '96 9-11 September 1996

**University of Wales Aberystwyth
First Announcement and Call for Papers**

Scope

This conference is the fourth in a series related to polymeric composite manufacturing. The previous meetings at Brunel (1988), Limerick (1991) and Galway (1994) each attracted high quality papers and provided a forum for discussions amongst academics and industrialists.

Papers are invited on the topics listed below, these may be experimental or theoretical and related to research or industrial applications:

Rheology of Polymeric Composites, Sheet Forming of Advanced Composites, Resin Transfer Moulding, Autoclave Processing an Heat Transfer, Injection Moulding of Reinforced Materials, Adhesion/Bonding of Composites, Intelligent Processing Techniques, Filament Winding and Pultrusion Processing, Numerical Modelling of Processing.

Call for Papers

Abstracts, not exceeding 150 words, should be sent to the address shown below by 15th December 1995. These should state clearly the objectives, results and conclusions of the work undertaken. Authors of accepted papers will be advised by March 1st 1996 and manuscripts of the full text will be required by June 1st 1996.

Papers presented at this conference will be included in a conference proceedings which will be issued to all registered delegates and selected papers will be published in a special issue of Composites Manufacturing.

Enquiries should be addressed to:

Dr R.S.Jones, Dept of Mathematics, University of Wales, Penglais,
Aberystwyth, Dyfed, SY23 3BZ, United Kingdom
Tel: +44 (0) 1970-622762 Fax: +44 (0) 1970-622777

Sponsored by the University of Wales, Institute of Non-Newtonian Fluid Mechanics

CONFERENCE DIARY

DATE	PLACE	DETAILS
3-6/9/95	Aberystwyth, Wales	'Polymer Melt Rheology' , See pp63-66 for Programme. Contact: Prof K.Thomas, Dept.of Mathematics, University of Wales, Penglais, Aberystwyth, SY23 3BZ Tel: 01970-622768 Fax: 01970-622777
6-8/9/95	Leeds, UK	Physical Aspects of Polymer Science - Biennial Meeting of the Polymer Physics Group of the Institute of Physics Contact: Prof G.R.Davies, IRC in Polymer Science & Technology, University of Leeds. Tel: 0113 233 3815 Fax: 0113 233 3846
6-8/9/95	Paris, France	'Gels' , Contact: Dr J.W.Goodwin, School of Chemistry, University of Bristol, Cantocks Close, Bristol, BS8 1TS
13-15/9/95	Bordeaux, France	'Recent Developments in Rheology.' '30th Annual Meeting of the Groupe Français de Rheologie, organised in collaboration with the British Society of Rheology. Contact: Secretariat of the 30th Meeting of GFR MASTER - ENSCPB, Université Bordeaux 1, 351 Cours de Liberation, 33405 Talence CEDEX, FRANCE. Tel: (33) 56 84 66 88 Fax: (33) 56 84 66 68
19-22/9/95	Leeds, UK	'First European Coating Symposium', 'The Mechanics of Thin Film Coatings', Contact: Dept of Mechanical Engineering, University of Leeds, LS2 9JT
12/10/95	London, UK	'The Glassy State in Foods'. SCI Food Eng. Group & Inst. of Food Technologists. Contact: Prof R.Jowitt. Tel: 0171-333 4487 Fax: 0171-937 7783
7-8/10/95	Sacramento Ca, USA	'Workshop on Material Instabilities' Contact: Prof Joe Goddard, Applied Mechs & Eng. Science, University of California, SD, 9500 Gilman Dr., La Jolla, CA 92093-0411, USA Tel: (609) 534-4508 Fax: (609) 534-4543 Email: jgoddard@ames.ucsd.edu
8-12/10/1995	Sacramento, CA, USA	'67th Annual Meeting, Society of Rheology.' Contact: Robert Powell, Dept. Chemical Eng.& Materials Science, Univ. of California, Davis, CA 95616, USA Tel: (916) 752-8779; Fax: (916) 752-1031 E-Mail: rlpowell@ucdavis.edu. Through 8/15/95 reached at (703) 306-1371; Fax: (703) 306-0319

DATE	PLACE	DETAILS
12-17/11/95	San Francisco, CA, USA	Symposia on 'Developments in Non-Newtonian Flows III' & 'Electrorheological Flow III' . ASME Int.Mech.Cong. and Exposition, Contact: Prof. Dennis A. Siginer, Dept.Mech.Eng., Auburn Univ., 201 Ross Hall, Auburn, AL 36849-5341, USA Tel: 1 205 8443331 Fax: 1 205 8443307 E-mail: dsiginer@eng.auburn.edu
1995	Caracas, Venezuela	'3rd Caribbean Conf. on Fluid Dynamics' , Contact: Dr H.Ramkissoon, University of the West Indies, Dept of Mathematics, St Augustine, Republic of Trinidad and Tobago.
3-5/6/96	Glasgow, Scotland	'Production Methods and Workability of Concrete & 4th Concrete - Scotland Exhibition' . Contact: Carol MacDonald, Technology & Business Centre, University of Paisley, Paisley, PA1 2BE, Scotland Tel: 0141 848 3734 Fax: 0141 848 3739
8/1-22/6/96	Cambridge, UK	6 month Workshop on 'Dynamics in Complex Fluids' . For further details, see page 35, Vol. 38, No.1
18-23/8/96	Quebec City, Canada	'XIth International Congress on Rheology' , Canadian Rheology Group / Groupe Canadien de Rhéologie, Chairman: Prof. D.DeKee, Dept of Chemical Engineering, University of Sherbrooke, Sherbrooke, Québec, J1K 2R1. Canada Congress Secretary: Dr M. Dumoulin, National Research Council - Canada Industrial Materials Institute, 75, de Mortagne, Boucherville (Québec), Canada, J4B 6Y4 Fax: 1-514-641-5103
9-11/9/96	Aberystwyth, Wales	'4th International Conference on Flow Processes in Composite Materials (FPCM '96)' Contact: Dr R.S.Jones, Dept of Mathematics, University of Wales, Penglais, Aberystwyth,Dyfed, SY23 3BZ, UK Tel: +44(0)1970-622762 Fax: +44(0)1970-622777
16-20/2/1997	Galveston, TX, USA	'68th Annual Meeting of the Society of Rheology.'

Travel grants are available to help students attend any of these meetings.
Applications to the BSR Secretary supported by a letter from supervisor.

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COURSE DIARY

DATE	PLACE	DETAILS
16-20/10/95	Strasbourg, France	'European School in Colloid Science' Contact: Dept for Continuing Education, University of Bristol, Bristol, BS8 1HH Tel: 0117 928 7122
16-20/10/95	Telford, UK	School of Industrial Rheology - SIR'95 this year offers an optional Starter Day which can be taken on its own or added to the 4 day course. 1 day - 'Back to Basics' SIR'95 Venue: Telford Hotel Golf & Country Club. Contact: Terry Hickey, Camtel Ltd, 5 Carrington House, 37 Upper King St., Royston, Herts, SG8 9AZ. Tel: 01763-244280 Fax: 01763-244298
16/10/95 17-20/10/95		
13-17/11/95	Univ of Strathclyde, Scotland	One Week Course: 'Engineering Rheology.' Contact: Prof J. Ferguson, Dept of Pure & Applied Chemistry, University of Strathclyde, 295 Cathedral St., Glasgow, G1 1XL. Tel: +44 (0) 141 552 4400 X 2161 Fax: +44 (0) 141 552 5664

LETTER TO THE EDITOR,

Dear Sir,

What a pleasure it is to have made contact again with the BSR after 15 months out in the wilderness! My fees were being paid but I was not receiving any mail after the Axxess take-over of Polymer Laboratories - and my only contact was via Paul Buckley / Ralph Oliver who asked me to be the BSR representative on the triennial Fracture meeting at Churchill, Cambridge. I was duly accepted and hope to fulfil whatever is required of me there.

For those tennis-playing members of BSR who might like to know what I am doing now - I have just set up as a consultant and agent for certain small scientific apparatus manufacturers. My main specialisms are Dynamic Mechanical Testing and On-Line Rheology, and I can be contacted at:

1 Ashwell St., Ashwell, Herts. Tel: 01462-742007; Fax: 01462-742565.

Now that I know where the meetings are again, I hope to be at some of them again soon. Thanks,

John W.E.Gearing

RECENTLY PUBLISHED BOOKS

Information on recent books is given here for the benefit of members, but the Society cannot answer queries about the availability of particular titles. Place orders for books with publishers through booksellers and agents. The summaries are based on those of the publishers. The editor takes no responsibility for their accuracy.

Rheology of Industrial Polysaccharides. 1995, R.Lapasin & S.Pricl.
Chapman & Hall, London. c. 640pp, 250 line illustrations.
ISBN 0-7514-0211-7. Hardback, c. £99.00

This book describes the structures, sources and synthesis of polysaccharides and explains the fundamental concepts of rheology. In nature polysaccharides perform a variety of functions which are largely dependent on their structural form, whether hard, solid gums or solutions. These rheological properties mean that they also have important industrial applications in a wide range of areas including fermentation, food systems, paint manufacture and drug release systems. The book begins with a comprehensive review of polysaccharide structure, from molecular conformations in the solid phase to supermolecular structures in solutions and gels. The main applications of polysaccharides in industry as speciality chemicals are reviewed, and the book draws together the basic concepts of rheology and the industrial applications of polysaccharides. The rheology of polysaccharide systems, from dilute solutions to liquid crystals and gels, is examined in detail. Finally, the fundamentals of rheometrical techniques are discussed, with guidelines for the choice of instrumentation.

MEMBERSHIP NEWS

The following applications for membership were approved at the Council meeting on June 1st, 1995

Mr D.K.Bick,
IRC in Polymer Science & Tech.,
University of Leeds,
Leeds, LS2 9JT
(fts DN)

Mr G.Bishko,
IRC in Polymer Science & Tech.,
University of Leeds,
Leeds, LS2 9JT
(ftsa DN)

Dr B.A.Costello,
TA Instruments Ltd.,
Europe House,
Cleeve Road,
Leatherhead, KT22 7UQ
(fesa DFGL)

Dr C. J.Lawrence,
Dept of Chem. Eng.,
Imperial College,
London, SW7 2BY
(fts DFGHI)

Dr G.R.Mitchell,
Department of Physics,
University of Reading,
Whiteknights,
Reading, RG6 6AF
(petsa D)

M L-I Palade,
Laboratoire de Rheologie,
Domaine Universitaire,
38041 Grenoble,
France
(fetsa CDIN)

Dr A. Rusli,
Dept of Physics,
Institut Teknologi Bandung,
40132 Indonesia
(ftsa ABCDEIKN)

Mr G.Sworn,
Kelco,
Waterfield,
Tadworth,
Surrey, KT20 5HG
(feta CFGKL)

The following cease to be members under rule 4(d):

Mr C.A.Street of York has been made an Honorary member of the B.S.R.

Mr T.Ahmed, Dr U.Busch, Mr N.J.Collins, Mr R.Crisp, Mr J.D.Dachtler,
Mr J.S.Dale, Mr N.H.Davies, Miss Ping Gao, Dr H.P.Hurlimann,
Mrs M.Mooney, Mr A.Nithiananthan, Miss L.N.Ray, Mr M.G.Sayer,
Mr I.J.Turner, Mr P.R.Wood, Dr R.A.Worth.

We regret to inform members of the death of Dr Robert Schnurmann of Birmingham, who joined the BSR in 1945. Dr Schnurmann had been an honorary member of the B.S.R. for many years.

Classification of abbreviations for Members' Rheological Interests

- f Member's main interest is rheology (ie. full-time)
- p rheology is secondary interest (ie. 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 and 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 | |

Members' Appointments

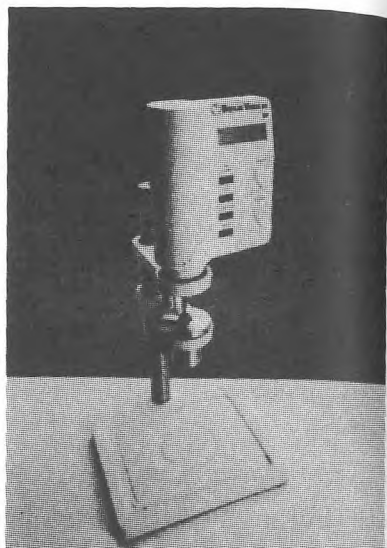
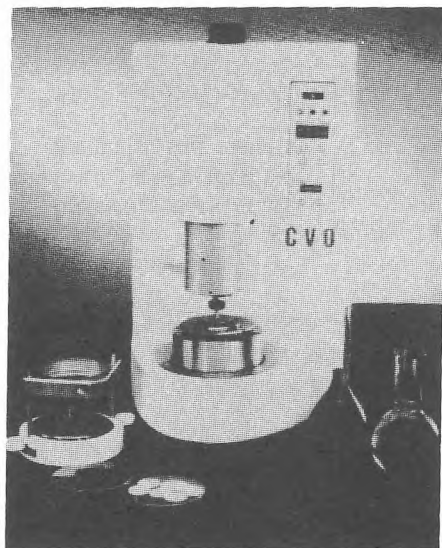
Your Council wishes to congratulate Prof. Frank Leslie of the University of Strathclyde on his appointment as a Fellow of the Royal Society. Congratulations are also due to Prof. Ken Walters F.R.S. on his appointment as a Foreign Associate of the National Academy of Engineering of the United States. There are currently only fifty Foreign Associates, eight having been appointed this year, just three of them from the UK. Ken will be signing the members' book in Washington in September.

A Note from the Membership Secretary.

You will have received the new membership list with this Bulletin. I have included some blank pages so that you may keep it up to date with new members joining. Once a year I will issue some loose pages including the details of all new members, and any changes notified to me. Those who wish to will be able to cut and paste these into the booklet. Please remember to inform me of any changes in your address, interests or other relevant details.

RHEOLOGY OR VISCOSITY ?

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