

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN



1983, Vol. 26, No. 1

CONTENTS

Editorial	(i)
Officers and Members of Council	(ii)
Obituary - Prof.J.G. Oldroyd	1
Conference Reports	
Cambridge Sept 1982	3
La Bresse Jan 1983	5
IXth International Congress on Rheology	10
Rheology in Crude Oil Production	12
BSR Conference, April 1984 - Call for Papers	13
RILEM Symposium	14
Membership News	15
Diary	17

Hon Editor
Dr H A Barnes
Unilever Research
Port Sunlight Laboratory
Bebington, Wirral
Merseyside, L63 3JW

ISSN - 0045 - 3145



EDITORIAL

As the last issue of the Bulletin was going to press we heard of the sudden death of Professor Jim Oldroyd and we were only able to carry a brief announcement as a 'stop-press'. This issue carried a lengthy obituary kindly supplied by one of his former research students, Dr Spencer Jones. At the funeral, the Society paid tribute to Jim by the attendance of the president, two past presidents and a number of members.

Professor Oldroyd will be remembered as a pioneer of the mathematic approach to rheology. His research students have carried on his early work in this country and many groups abroad have benefited from his work. He has been honoured by this Society in the presentation of its gold medal (September 1980) and by a special series of articles in the Bulletin to mark his 60th birthday (Volume 24, 1981 pps 21-27). In that issue, Professor K Walters stated that in his opinion, Professor Oldroyd's 1950 paper (J G Oldroyd, Proc. Roy. Soc A200 (1950) 523 and also A202 (1950) 345) "is the most important research paper ever published in the field of Rheology".

We pay tribute to the passing of such a distinguished member of the Society and give "honour to whom honour is due".

This is the first issue of the Bulletin to appear using camera-ready copy. Where possible, we have used the original material supplied by contributors - this has resulted in different type faces but, nevertheless, the result is very readable and also much cheaper and is quicker to produce. Comments on the appearance of the new style layout will no doubt be forthcoming - they will also be welcome.

OFFICERS AND MEMBERS OF COUNCIL

President: MR. J. F. HUTTON, Thornton Research Centre, P.O. Box No. 1, Chester, CH1 3SH.

Secretary: DR. J. J. BENBOW, Department of Chemical Engineering, University of Birmingham, P.O. Box 363, Birmingham B15 2TT. (Telephone: 021-472-1301, ext. 3548)

Treasurer: MR. T. A. STRIVENS, Physics Section, Research and Development Department, ICI (Paints Division) Ltd., Wexham Road, Slough, Berkshire SL2 5DS.

Membership Secretary: DR. D. C-H. CHENG, Warren Spring Laboratory, Stevenage, Hertfordshire SG1 2BX.

Abstracts Editor: DR. D. R. OLIVER, Department of Chemical Engineering, University of Birmingham, P.O. Box 363, Birmingham B15 2TT.

Bulletin Editor: DR. H. A. BARNES, Unilever Research, Port Sunlight Laboratory, Bebington, Wirral, Merseyside, L63 3JW.

Ordinary Members:

DR. S. T. E. ALDHOUSE, B.P. Chemicals, Research and Development Department, Sully, South Glamorgan CF6 2YU.

DR. P. C. ANDERSON, B.P. Research Centre, Chertsey Road, Sunbury-on-Thames, Middlesex TW16 7LN.

DR. A. EVANS, Department of Surgery, Royal Victoria Infirmary, Newcastle upon Tyne. NE1 4LP

DR. T. E. R. JONES, School of Mathematical Sciences, Plymouth Polytechnic, Plymouth. PL4 8AA

DR. M. R. MACKLEY, Department of Chemical Engineering, University of Cambridge, Pembroke Street, Cambridge. CB2 3RA

DR. C. J. S. PETRIE, Department of Engineering Mathematics, University of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU.

OBITUARY

PROFESSOR J. G. OLDROYD

Professor J. G. Oldroyd, a former president and gold medallist of the Society died suddenly on 22nd November 1982 at the age of 61.

James Gardner Oldroyd was born in Bradford on 25th April 1921 and educated at Bradford Grammar School from which he won a scholarship to Trinity College Cambridge. In 1943 he was appointed to the Ministry of Supply at Aberporth where he was involved in rocket research. At the end of the war he joined Courtaulds and worked at their Fundamental Research Laboratory in Maidenhead until 1953, when he accepted the chair of Applied Mathematics at the University College of Swansea; he was then only thirty two. He was a fellow of Trinity College Cambridge from 1947-51. While he was at Courtaulds he produced a series of remarkable papers culminating in the 1950 paper in the Proceedings of the Royal Society on the formulation of rheological equations of state. Amongst these publications is a series in the Proceedings of the Cambridge Philosophical Society on Bingham and non-Bingham plastic solids which demonstrate his originality in problem solving and his considerable mathematical skills. Much has been written on the 1950 paper and it was the focal point of two articles on Professor Oldroyd's work which appeared recently in the Bulletin to celebrate his sixtieth birthday.

At Swansea, Professor Oldroyd continued with his research and his many publications during this period range over a broad spectrum of rheological activity, from micro-rheology to an attempt to formulate equations of state consistent with the laws of thermodynamics. Perhaps the outstanding contributions of this period are the 1958 and 1965 papers in the Proceedings of the Royal Society. He was awarded the Adams prize in 1964. In 1965 he moved to the University of Liverpool as Professor of Applied Mathematics and in 1973 became head of the Department of Applied Mathematics and Theoretical Physics.

Professor Oldroyd joined the British Rheologists' club, as the Society was then called, in 1947. He subsequently served as membership secretary, treasurer and was president from 1955-57. In 1980 the Society recognised Professor Oldroyd's unique contribution to Rheology by awarding him the Society's Gold Medal at the annual general meeting of that year.

It is significant that in his address to the Society, Professor Oldroyd stressed the importance of relevant physical qualities and the duty of the mathematician to clarify the concepts, for it is these qualities of clarity and relevance that shine through all his publications. To mark his sixtieth birthday the following April, the council invited two special articles on his work, one from Professor R. B. Bird and the other from Professor K. Walters, a former student. These were subsequently published in the Bulletin. Any attempt here to summarize Professor Oldroyd's work would be merely to paraphrase these articles.

In addition to his own personal contribution to the science of deformation and flow, Professor Oldroyd directed the research of many postgraduate students. To these he gave ungrudgingly of his time and it is a tribute to the help, guidance and the inspiration he conveyed to them, that many are still working in this field and have made notable contributions to it.

Professor Oldroyd was an accomplished after dinner speaker and possessed a keen, subtle sense of humour. He leaves a widow and three sons.

APPRECIATIONS

My own thinking in the field of rheology has been greatly influenced by Professor Oldroyd's writings. My copies of his papers have been read and reread many times, and they are filled with marginal notes. I found his publications a joy to read because of their clarity and accuracy; it is evident he has taken enormous pains to check his manuscripts and printers' proofs so that the final publications are flawless.

PROFESSOR BOB BIRD

1931, Vol. 24, No. 2

Over the years, Professor Oldroyd has been a constant source of encouragement to me and many other research workers and I hope that he has gleaned some pleasure from the way that many of us have taken up and developed his distinctive outlook and ideas. These are closely associated with his classic 1950 paper which, in my opinion, is the most important research paper ever published in the field of Rheology. It appeared years before its time and contains a complete and all embracing study of the formulation of equations of state for rheologically-complex materials, including a discussion of the basic principles and how one can write down equations which satisfy them.

PROFESSOR KEN WALTERS

Conference report

Rheology & Microstructure; General Rheology

This meeting, held in Cambridge from September 22nd to 24th 1982, was a combination of a joint meeting (Rheology & Microstructure with the Statistical Mechanics and Thermodynamics Group of the Royal Society of Chemistry) and our usual annual meeting on the Friday morning (following our A.G.M. on the previous evening). The programme organisation was in the hands of Professor Pearson and Drs. Barnes, Dickinson and Richmond who attracted a number of "stars" to head an interesting programme. Local organization was in the hands of Professor and Mrs. Pearson and Dr. and Mrs. Mackley, with some assistance from Dr. Richmond's Secretary from Norwich. In thanking all the organisers and congratulating them on an excellent meeting, one small note of criticism creeps in. Speaking from the tradition of rheologists in this Society who attend annual meetings and interest themselves in all sorts of rheological phenomena, there appeared to be an abrupt demarcation between the meetings, marked by the disappearance of the S.M.T. organisers. This is regretted, and a personal view is that joint meetings in future should be wholly joint so that several themes - a good thing - do not lead to several disjoint meetings.

That said, the congratulations need to be reiterated, and in particular the appreciation of many participants for the work of the ladies mentioned above must be recorded. (It is hoped that the sexism explicit in that remark is accepted as descriptive only, with no undertones unacceptable to feminists). Without Mrs. Pearson's knowledge of Trinity Hall, her dealings with the college servants, and the long times spent by her and by Mrs. Mackley in the conference office, things would have run much less smoothly, and we are all grateful.

The scientific content of the conference was, as usual, of mixed quality and it is not for an outsider in the fields discussed to venture a classification of the papers. One notable general feature was the active participation of many of the "stars" in discussion of many of the papers, which made for a lively and educative meeting. The interrelations between the topics were such that similar topics were raised several times, and confusions of terminology (between chemists and rheologists as well as within each discipline) became apparent.

The first paper, from J. W. Goodwin, gave a sense of security to most of the audience, taking us through linear viscoelastic properties of

monodisperse latex suspensions and showing how theory and experiment can work together harmoniously. One important point made later by G. Marrucci (again combining discussion of theory and experiment) was of the importance of polydispersity; in the nonlinear viscoelastic behaviour of polymer solutions polydispersity is more important than whether a polymer is rigid or flexible. There were further discussions of polymer molecules, and of reptation by C. F. Curtiss, and by S. F. Edwards, and by L. Leger. These covered the statistical mechanics needed to obtain rheological equations, speculations on comparisons of the behaviour of a polymer molecule in a liquid with that of a flexible fibre in an elastic matrix, and detailed discussion of molecular motions which introduced ideas of self-diffusion and cooperative diffusion, to the evident confusion of some rheologists.

There were also papers on computer simulations of molecular motion one of which prompted a question about experimental details which elicited the reply "I'm sorry but they are computer experiments" to which the response was "There is no need to apologise, as long as we know". Of course there is a serious side to that exchange - there were papers where we (by which is meant the majority of the audience) didn't know precisely what the speaker had measured or calculated, and this cannot make for useful scientific discussion. It became evident that computer experiments can show nonlinear effects in very simple liquids, by using a shear rate of, say, 10,000,000,000 reciprocal seconds. Real experimenters are rather pleased to reach a million reciprocal seconds, but remarks in discussions did seem to indicate that the computer predictions were believable.

Another area of interest in the joint meeting was in the aggregations of particles in suspension - flocculation, coagulation, and formation of gels were all related to rheology. The presentations included such ideas as the use of "superglue" to stop slip between a gel and the rheometer plates (E. B. Bagley) and examples of experimental patience in a report of a 1978 gel which is still hydrolysing (T. Tanaka).

The meeting on General Rheology started with some microstructure in a report on liquid crystal work by D. S. Graziano and one on flow of filled polymer melts by G. Akay. Oil recovery was the application for work on the affect of dissolved gases on viscosity of oil and that paper by H. Killesreiter would also have been suitable for the joint meeting. The review of elastohydrodynamic lubrication by K. L. Johnson was most informative, and our final entertainment was offered by D. R. Oliver in the form of some understandable mathematical analysis of a thought experiment which seemed at the time unlikely to be turned into a real experiment.

SECOND INTERNATIONAL WORKSHOP ON EXTENSIONAL FLOWLA BRESSE, FRANCE 24th - 28th JANUARY 1983

At the First International Workshop at Ross Priory, Scotland it was agreed that France would host the second meeting and this workshop in the beautiful ski resort of La Bresse was the result. Some 64 delegates from eleven countries attended.

Extensional flow is still very much the growth area in rheology and what was very evident throughout was the enormous increase in work in the subject in France. Perhaps this was to be expected given the venue, but it must be said that the French CNRS committee on Rheology, chaired by Professor Claude Wolff is being highly successful in promoting this subject.

The format of the workshop was a series of sessions introduced by a review lecture followed by shorter contributed papers. Dr. C. J. S. Petrie opened the workshop with a review of current constitutive laws, kinematics and dynamics applicable to extensional flow. The other review lectures ranged from Professor Meissner's description of experimental aspects of polymer melt rheometry, through James's "Extensional flow in porous media" and Hassager's lecture on molecular models in extensional flows to Agassant and Demay's survey on the modelling of the elongation of textile fibres and films.

The shorter contributions (20 minutes each) were equally comprehensive with a nice blend of theoretical experimental and technological. A full list of the papers is attached. One particularly helpful suggestion which was made was that if a lecturer was talking in French his slides should be in English, and vice versa. On the several occasions when this was done it

was found to be very successful.

While it would be unfair to pick out any specific lecture as outstanding, the use of a video camera for flow visualisation studies on the movement of viscoelastic fluids past a rotating cylinder was extremely effective. Doremus and Piau showed the results using a video recorder and T.V. set - a most dramatic technique which will become widespread I am quite sure.

The workshop format of lectures in the morning and evenings left the afternoons clear for sampling the winter sports. A considerable amount of experimental testing of linear laminated epoxy resin composites at freezing temperatures went on, particularly the cross-country variety.

The committee from E.N.S.I.T.M., notably Professors Wolff and Sigli as well as the others helping them, did a marvellous job of organising the workshop. They also produced a very substantial book of preprints which I would recommend to anyone interested in extensional flow. This can be obtained from:

Professor C. Wolff
Laboratoire de Mécanique et Rhéologie
E.N.S.I.T.M.
Université de Haute Alsace
11, rue Alfred Werner
F 68093 - MULHOUSE Cedex
France

TABLE DES MATIERES

CONTENTS

CONFERENCES GENERALES - REVIEW LECTURES

- 1.1 J.F. AGASSANT, J.R. CLERMONT, Y. DEMAY
Modélisation de deux procédés élongationnels : le filage et le
fibrage du verre.
- 2.1 O. HASSAGER
Molecular models in extensional flows
- 3.1 D.F. JAMES
Extensional flow effects in porous media
- 4.1 J. MEISSNER
Experimental aspects in polymer melts elongational rheometry
- 5.1 C.J.S. PETRIE
Extensional flow theory : constitutive laws, kinematics and
dynamics.

COMMUNICATIONS

- 6.1 H. ABEL, A. AMBARI, C. DESLOUIS, B. TRIBOLLET
Elongation des macromolécules et instabilités induites en
écoulement axisymétrique.
- 7. S. BASU
(annulé - cancelled)
- 8.1 W. van der BRUGGHEN, P.K. CURRIE
Reliability of extensional tests on polyethylene melts.
- 9.1 G. CHAUVETEAU, M. MOAN, N.T. HOA, P. CARREAU
Ecoulements élongationnels de solutions diluées et semi-diluées
de polymères flexibles de très grande masse.
- 10.1 Y. DEMAY, J.F. AGASSANT
La stabilité en filage textile.
- 11.1 G. DEMBEK
Behaviour of polyisobutene solutions flowing through orifices.

- 12.1 J.F. DIJKSMAN
Some comments on the wire-coating process.
- 13.1 P. DOREMUS, J.M. PIAU
Experimental study on viscoelastic effects in a cylinder-plane lubricated contact.
- 14.1 F. DURST, T. LOY
Predictions of the strain rate distribution in a sudden contraction for a newtonian fluid.
- 15.1 J. FERGUSON, K. MISSAGHI
The measurement of extensional viscosity by the spin-line technique : effect of instrument variables.
- 16.1 D.H. FRUMAN
Sur le gonflement des jets immergés de solutions de polymères.
- 17.1 S.A.A. GHONIEM
Extensional flow of polymer solutions through porous media.
- 18.1 A. HELMY, D. BARTHES-BIESEL, V. CHHIM
Comportement d'une capsule en suspension libre dans un écoulement d'élongation.
- 19.1 N.T. HOA, R. GAUDU, Y. FANJEAU, D. ANNE-ARCHARD
Comparaison des conditions d'apparition du comportement épaississant d'une solution diluée de polymère flexible dans les modèles bidimensionnel et tridimensionnel d'une contraction brusque.
- 20.1 D. JAMES
Influence of deformation history on extensional flows.
- 21.1 W.M. JONES
Behaviour of dilute polymer solutions in some extensional flow situations.
- 22.1 R. KEUNINGS
Numerical prediction of stress and velocity development in melt spinning.
- 23.1 Y. LAYEC
Technique de corrélation de photon appliquée aux écoulements élongationnels.
- 24.1 A. LYAZID, O. SCRIVENER, A. ERN
Etude expérimentale et essai de modélisation d'un écoulement élongationnel.
- 25.1 B. MENA, L.G. LEAL
The influence of rheological properties on the translation of spheres.

- 26.1 R. MULLER, D. FROELICH, C. PICOT
Rheological and molecular orientation measurements on binary polystyrene blends.
- 27.1 D.R. OLIVER, S.I. BAKHTIYAROV, M. SHAHIDULLAH
External near-contact of sliding cylinders : polymer solutions give increased load and reduced friction coefficient.
- 28.1 G. PEREZ
Effect of molecular weight and branching of polyethylene terephthalate on strain profile and crystallization in high speed spinning.
- 29.1 W. PHILIPPOFF
Some correlations for extensional experiments.
- 30.1 J.M. PIAU
New constitutive equations for viscoelastic fluids in complex flows.
- 31.1 M. SENGELIN
Quelques aspects du comportement élongationnel et de la dégradation mécanique des solutions de polymères en milieu poreux.
- 32.1 D. SIGLI, A. ELKAYLOUBI
Influence of wall effects and fluid properties on some characteristics of a nearly extensional flow.
- 33.1 A. TEN BOSCH, P. MAISSA, P. SIXOU
Phase transition of semi-rigid polymers in an elongational flow.
- 34.1 L.A. UTRACKI, J. LARA
Melt rheology of PE. Part I : correlation between extensional and shear flows.
- 35.1 K. WALTERS, R.W. WILLIAMS
Experimental methods of determining the extensional viscosity of mobile liquids.
- 36.1 F.P. LA MANTIA, D. ACIERNO
Melt strength and stretchability of high density polyethylene.

**IXth INTERNATIONAL CONGRESS
ON RHEOLOGY**

ACAPULCO, MEXICO

8 – 13 OCTOBER, 1984

OBJECTIVES

Rheology is an interdisciplinary field encompassing all aspects of the deformation and flow of materials. In an age when synthetic and complex materials are becoming an essential component in modern-day technological advances, rheology plays a major role in the understanding of the behaviour of such materials.

The principal objective of the IXth International Congress on Rheology is to bring together experts from the academic and industrial worlds to exchange ideas, share experiences and discuss new developments and problems encountered in the distinct areas of rheology.

DEADLINE FOR ABSTRACTS

The closing date for receipt of abstracts is December 1st, 1983. Abstracts should be typed on a single page, should not exceed 500 words and must include the full postal address of the principal author.

A second circular with further information will be sent in early 1983 to all persons who return the attached form to the organizing committee.

TOPICS

Contributions covering the following topics will be considered:

GENERAL THEORY: Continuum mechanics, thermodynamics, molecular theories, etc.

FLUIDS: Fluid dynamics, polymer melts and solutions, suspensions, emulsions, etc.

SOLIDS: Polymers, rubber, glass, metals, concrete, etc.

COMPOSITE MATERIALS

POLYMER PROCESSING

BIORHEOLOGY

FOOD RHEOLOGY

PETROLEUM RHEOLOGY: Oil recovery, etc.

TECHNICAL APPLICATIONS: Lubrication, plastics technology, adhesives, etc.

INSTRUMENTATION: Rheometry, new techniques, etc

NUMERICAL ANALYSIS IN RHEOLOGY

Address for correspondence:

The Organizing Committee
IXth International Congress on Rheology
Apdo. Postal 70 — 353
Ciudad Universitaria,
Coyoacán,
04510 México, D.F.
MEXICO

The British Society of Rheology
Society of Petroleum Engineers

**"RHEOLOGY IN CRUDE
OIL PRODUCTION"**

A Conference to be held at
Imperial College, London.

13th-15th April, 1983.

In oil-man's terms, production refers to processes by which crude oil is abstracted from the earth and loaded on to crude carriers or pipelined ashore. There is no doubt that oil production is a key activity in the world's economies and that rheology plays an important part in a number of aspects of production.

Drilling fluids are highly non-Newtonian colloidal systems that are required to carry away the drilling debris as well as maintain the high pressures down the hole. One section of the Conference is entitled 'Drilling Fluids'. However, this section also contains contributions on other fluids of rheological interest that are used to prepare the well, including cement, which is used to hold the well casing in place, and proppants, which are used to hold apart fractures in the rock and hence improve flow.

Oil recovery by whatever process requires the oil to be driven through the porous rock structure. In a new well system the earth pressure is sufficient to achieve this, whilst in secondary recovery water is pumped into the rock formation to drive the oil towards a well. Since the conventional primary and secondary recovery methods leave a high proportion of the crude in the earth there is a great incentive to re-work old wells by so-called tertiary processes. Tertiary processes include the use of dissolved gas, emulsification, foams and aqueous polymer-solutions. The Conference has two major sections in recognition of the importance of recovery processes, namely "Flow in Porous Media", which covers the more-academic approach and "Enhanced Oil Recovery", which, hopefully, will cover more practical aspects.

The last section is "Pipeline Flow". Here the flow is generally turbulent and the material flowing is multi-phase.

Two other important papers will be presented: there will be an introductory paper which will present the rheologically-based problems as a production expert sees them and a summing-up by an expert rheologist.

THE BRITISH SOCIETY OF RHEOLOGY

CONFERENCE ON GENERAL RHEOLOGY

FIRST CALL FOR PAPERS

This Conference is due to be held at the Vale Conference Centre (in High and Ridge Halls), Edgbaston, Birmingham during the period

11th - 13th April 1984

The organisers wish to place no restriction on the topics to be covered; the Conference subsections will depend entirely on the nature of the papers submitted.

Prospective authors should send a title and short abstract to:

Dr D R Oliver
Chemical Engineering Department
Birmingham University
PO Box 363
Edgbaston
Birmingham
B15 2TT

RILEM INTERNATIONAL SYMPOSIUM

TESTING OF HYDROCARBON BINDERS AND MATERIALS

TOPICS :

1. Rheological tests for hydrocarbon binders
2. Physico-chemical composition and performance of binders
3. Performance tests for waterproofing products
4. Practical mechanical tests for the design and control of asphaltic mixes

WHERE :

Beograd (Yugoslavia)

WHEN :

12 - 16 September, 1983

Any information inquiry should be sent to :

Secretariat RILEM SYMPOSIUM
Institut za Puteve
11000 BEOGRAD
Kumodraska 257
Yugoslavia
Tel. (38-11) 466.543/466.522
Telex : 11036 Yu insput

MEMBERSHIP NEWS

The following applications for membership were approved at the December Council Meeting.

Alan JENNINGS Viscometers (UK) Ltd Newbury House 13A Newbury Road Highams Park London E4 9JH	HNC
P A P HASTILOW South Bank Polytechnic Dept of Applied Biology and Food Science Borough Road London SE1 OAA	BA feta CDLM
E B BAGLEY Northern Regional Research Center 1815 N. University Peoria Illinois 61550 U.S.A.	BSc, PhD fetsa DFGL
Lars GILLBERG AB Carbogel Box 16036 S-250 16 Helsingborg Sweden	PhD fea G
David Mark RAWLINSON University College of Wales Dept of Applied Mathematics Penglais Aberystwyth SY23 3BZ	BSc A(i) & (ii) CF
David Gary THOMAS University College of Wales Dept of Applied Mathematics Penglais Aberystwyth SY23 3BZ	BSc A(i) & (ii) CF
Seung Jong LEE University College of Wales Dept of Applied Mathematics Penglais Aberystwyth SY23 3BZ	PhD A(i) & (ii) CF
Neil John ALDERMAN University of Cambridge Dept of Chemical Engineering Pembroke Street Cambridge CB2 3RA	BSc petsa CDFGHO
Reginald SAYNOR Northern General Hospital Sheffield Cardiothoracic Unit Sheffield S5 7AU	MSc, FIMLS petsa M

Richard David ORWOLL
 Rheometrics Inc
 2438 US Highway 22
 Union
 NJ 07083 U.S.A.

PhD

fea BCDFGLM

RESIGNATIONS

Dr W Regel
 Institut für Makromolekulare Chemie
 der Universität
 Freiburg
 Germany

Miss S A Benbow
 Northampton

HONORARY MEMBERSHIPS

Dr H L D Pugh and Prof Dr J Th G Overbeek have been elected Honorary Members. Their resignations were incorrectly recorded in the Bulletin, Vol. 25, No. 2/3.

AUTRALIAN BRANCH

New Members

Dr N A BLACKMAN
 Australian Synthetic Rubber Co Ltd
 Maidston Street
 Altona Vic 2019

T S TRINH
 7/52 Baker Street
 Richmond Vic 3121

CD

RESIGNATIONS

P J K PATERSON
 Dept of Applied Physics
 RMIT
 Melbourne

H P SCHLANGER
 Div of Applied Geomechanics
 Syndall
 Vic.

Dr G R SMITH
 Australian Synthetic Rubber Co Ltd
 Altona
 Vic.

N W SMITH
 Davy McKee Pacific Pty Ltd
 South Melbourne
 Vic.

Dr D R G WILLIAMS
 Dept of Chemical Engineering
 University of Adelaide
 North Adelaide S.A.

- April 14-15 London, England: *Rheology in crude oil production.*
(B.S.R., Soc. Petrol. Eng. — London Sect.)
Contact:
Dr. T. E. R. Jones
School of Mathematical Sciences
Plymouth Polytechnic
Drake Circus
Plymouth
PL4 8AA
- April 19-24 Caserta, Italy:
The mechanical properties of biological solids.
(Euromech 170)
Contact:
Professor G. Pallotti
Istituto di Fisica 'A. Righi'
Via Irnerio 46
40126 Bologna BO
Italy
- May 16-17 Melbourne, Australia:
Third National Conference on Rheology.
(B.S.R., Australian Branch)
Contact:
Dr. J. O'Donnell
Department of Chemical Engineering
La Trobe Street
Melbourne, Vic. 3000
Australia
- June 6- 8 Vermont, U.S.A.:
International Workshop on Numerical simulation of non-Newtonian flows.
Contact:
Professor B. Caswell
Division of Engineering
Brown University
Providence
Rhode Island
U.S.A.

- June 13-16 Capri, Italy:
European meeting on polymer processing and properties.
 (Societa Italiana di Reologia)
 Contact:
 Dr. Paolo Masi
 Istituto di Principi di Ingegneria Chimica
 Piazzale Tecchio
 80125 Napoli
 Italy
- Aug. 20-24 Baden-Baden, West Germany:
Fifth International Congress on Biorheology.
 Contact:
 Prof. Dr. K. Messmer
 Department of Experimental Surgery
 Zm Neuenheimer
 Feld, 347
 D6900
 Heidelberg 1
- Sept. 6-10 Bucharest, Rumania:
Viscoplasticity and applications.
 (Euromech 175)
 Contact:
 Professor N. Cristescu
 Faculty of Mathematics
 University of Bucharest
 Str. Academiei 14
 Bucharest 70109
 Rumania
- Sept. 19-23 London, England: *Engineering Rheology.*
 (B.S.R. and Deutsche Rheologische Gesellschaft)
 Contact:
 Dr. D. C-H. Cheng
 Warren Spring Laboratory
 (Ref: 116/43)
 P.O. Box 20
 Gunnels Wood Road
 Stevenage
 Hertfordshire
 SG1 2BX

Dec. 8- 9 Cambridge, England:
Molecular and Microstructural Basis of Viscoelasticity.
 Contact:
 Dr. M. Lal
 Unilever Research
 Port Sunlight Laboratory
 Bebington
 Wirral
 L63 3JW

INDUSTRIAL RHEOLOGY

Applications and use of the Rheogoniometer and Spin-line Viscometer

Ross Priory, Loch Lomond, Scotland

Tuesday, 10th May - Thursday, 12th May, 1983

The Fifth Ross Priory Course on Rheogoniometry and Extensional Viscosity, sponsored by Sangamo Schlumberger, Rheology Division, will be held at the University of Strathclyde's Staff Educational and Recreational Centre on the banks of Loch Lomond, Scotland. There will be a considerable difference in content from the subject matter in previous years. While the fundamentals will still be dealt with, the main emphasis will be on the application of the Rheogoniometer and Extensional Viscometer to industrial flow problems and their solution.

The course fee will be £110 including full board and transport.

Contact:

Dr. J. Ferguson
 Head of Fibre and Textile Research Unit
 Department of Pure and Applied Chemistry
 University of Strathclyde
 Cathedral Street
 GLASGOW
 Scotland G1 1XL