

BULLETIN



BRITISH SOCIETY OF RHEOLOGY

1980, Vol. 23, No. 3

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Hon. Editor:

Dr. C. R. DIMOND,
Morgan Thermic Ltd.,
Technological Centre,
Bewdley Road,
Stourport-on-Severn.



FOREWORD

As members will see I have recently moved back into industry after a period of undertaking University post-doctoral research. Although my main interest is no longer in rheology I will be involved in rheological problems and hope to maintain an active interest in rheological techniques and theoretical advancements.

At recent Council meetings the increasing cost of producing the Bulletin has been discussed and it is interesting to note that the revenue from publishing Rheology Abstracts almost equates with the cost of production of the Bulletin, when considered on an annual basis. Looking through the Editor's bound copies of the Bulletin it is apparent that the majority of members have not submitted articles for publication and have not used the Bulletin for answers to technical enquiries or to publicise important rheological information that could be published relatively quickly in the Bulletin. As Editor I am of course responsible for putting together articles which are submitted and cajoling and suggesting, where necessary, that articles should be written. In order that members get the best out of this important outlet of society I would appeal to members to make full use of the facility available.

OFFICERS AND MEMBERS OF COUNCIL, 1980-1981

President: DR. W. M. JONES, Physics Department, U.C.W., Penglais, Aberystwyth.

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

Treasurer: MR. A. EVANS, Department of Surgery, Royal Victoria Infirmary, Newcastle upon Tyne.

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

Abstracts Editor: MR. J. ASTIN, Department of Applied Mathematics, U.C.W., Penglais, Aberystwyth.

Bulletin Editor: DR. C. R. DIMOND, Morgan Thermic Ltd., Technological Centre, Bewdley Road, Stourport-on-Severn.

Ordinary Members:

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

DR. H. A. BARNES, Unilever Ltd., Port Sunlight, Cheshire.

DR. D. MARSHALL, Institute of Polymer Technology, Loughborough University of Technology, Loughborough LE11 3TU.

DR. D. R. OLIVER, Department of Chemical Engineering, University of Birmingham, Birmingham.

MR. F. N. COGSWILL, I.C.I. Ltd., Plastic Division, Welwyn Garden City.

MR. M. CAMINA, Paint Research Association, Teddington, Middlesex.

NEWS FROM EUROPEAN SOCIETIES

Georges Champetier 1905-1980

The death has occurred of one of the leading figures in rheology in France. The following tribute is abstracted from a lengthy eulogy by Bernard Persoz in Bulletin GFR No. 68, June 1980.

Georges Champetier was the son of poverty stricken peasants, who had moved to Paris following the failure of their crops. He struggled to obtain a good education and at length obtained a post as *maréchal des logis* in the laboratory of Professor André Job at the Sorbonne. This introduction to scientific research enticed him away from his ambition to become an industrial chemist, and later, under the guidance of Georges Urbain, he developed an interest in the structure of cellulose and its study by X-ray diffraction. His interest in macromolecular science widened, and he occupied the first chair created in the subject in France.

He served on the councils of many societies and organizations, including ONERA, and he became joint director of CNRS. He was elected to *l'académie des sciences* in 1960, where he became president of the macromolecular chemistry committee. In addition he wrote or edited a number of books well known in France, and despite these multitudinous activities still made time to direct and inspire several research groups.

With his conviction that it was nonsensical to study chemistry without physics, and vice versa, it was inevitable that Georges Champetier should have a considerable influence on rheology in France. Experimentally his studies included the dynamic properties of both natural and man-made fibres, in particular the influence of plasticisers, but his principal service to rheology was as an administrator.

Together with Sadron he founded the centre for macromolecular research at Strasbourg, where rheology plays an important role. Similarly as president of DGRST he encouraged the study of rheology in industry as well as in universities, where his promptings have led to the improved equipment found in industrial laboratories. In 1953, as joint director of CNRS, he joined Henri Weiss in establishing the national commission on rheology that resulted in the foundation of a *groupe d'études de rhéologie*, the direct forerunner of the present GFR.

D. W. HADLEY

William Prager 1903-1980

Professor Prager, a native of Karlsruhe but an international scientist, died in Switzerland on 16th March. His early career was spent in Germany, but after seven years in Istamboul he moved

to Brown University, USA, where he remained for 24 years. He held visiting Professorships in a number of countries, was the recipient of several honorary doctorships, and was a *membre d'honneur* of GFR.

He was internationally known for his work on plasticity theory, with particular interests in finite deformation and non-analytic problems in rheology. His books on plasticity and continuum mechanics remain widely known, both in their original version and in translation.

(Translated and abridged from GFR Bulletin No. 68, June 1980.)

D. W. HADLEY

The Rheology of Fresh Concrete

The proceedings of a one day conference held at the Université de Liège on 15th May, 1979, have now been published (in French). Copies, price 500 Belgian francs, may be obtained from J. M. Rigo, Inst. du Génie Civil, 6 quai Banning, 4000 Liège, Belgium.

DOKUMENTATION RHEOLOGIE

A copy of Dokumentation Rheologie 1979 No. 45 ISSN 0340-8388 has just been received from the Deutsche Rheologische Gesellschaft (D.R.G.). It is an organised reference guide to the world's published literature on deformation and flow of materials. The documentation aims at providing a comprehensive bibliography of relevant titles, and therefore, all materials available as sources (primary as well as secondary) are scanned and exhausted for references.

The following publications are covered: Papers, books, collections, reports and monographs, dissertations, preprints, bibliographies, standard and test methods, industrial literature (not merely commercial), occasionally even abstracts of papers thus far only presented in lectures, but not patents.

The four basic subjects classified are:

Fundamentals of rheology and rheology of materials.

Rheology of processing.

Rheology of friction and lubrication.

Rheology in damping and sealing elements.

The publication by the Bundesanstalt für Materialprüfung (BAM) Fachgruppe Rheologie and Tribologie and the Deutsche Rheologische Gesellschaft (DRG) D-1000 Berlin 45, Unter den Eichen 87 is available for DM.100—for European Members and US \$60—overseas (surface mail only).

MEMBERSHIP NEWS

APPLICATIONS FOR MEMBERSHIP

(July 1980).

The following applications were approved by Council at its last meeting

Huxtable, Jon, A.P.R.I.
f,ea,B,C,D.

I.C.I. Ltd. Plastics Division,
P.O. Box 6,
Welwyn Garden City,
Herts, AL7 1HD.

Griffith, Wyn Meurig, B.Sc.
A,(i),(ii),C,F.

University College of Wales,
Department of Applied Mathematics,
Penglais,
Aberystwyth,
Dyfed, SY23 3BZ.

Young, Robert Charles, H.N.C.
f,et,a,B,C,D,H.

I.C.I. Ltd. Plastics Division,
Bessemer Road,
P.O. Box 6,
Welwyn Garden City,
Herts, AL7 1HD.

Abbas, Ayad Mundher, H.N.D.
f,et,a,C,D.

Cosmocord Ltd.,
Eleanor Cross Road,
Waltham Cross,
Herts.

Bilgin, Sitki, B.Sc.
f,et,sa,B.

U.M.I.S.T.,
Dept. of Mechanical Engineering,
Sackville Street,
P.O. Box 88,
Manchester, M60 1QD.

Jansma, Jon B., B.S.Ch.E.
f,et,sa,B,C,D,N.

G.E.C. Research and Development
Centre,
P.O. Box 8,
Bldg. K-1, Rm. 4A10,
Schenectady,
N.Y. 12301, U.S.A.

Harborg, Hans, M.Sc.
f,et,sa,F,G,H,M,O.

Dumex A/S,
Prags Boulevard 37,
2300 Copenhagen S.,
Denmark.

Bowman, Anthony John,
F.D.S.R.C.S.
p,e,a,B,C,M,O.

Dental Hospital,
Richardson Road,
Newcastle upon Tyne,
NE2 4AZ.

McCabe, John Francis,
B.Sc., Ph.D., C.Chem., M.R.I.C.
p,e,a,A,B,C,M,O.

University of Newcastle upon Tyne,
The Markham Laboratories,
The Dental School,
Newcastle upon Tyne.

Williams, Phylip Rhodri, B.Sc.
f,et,sa,D.

University College of Wales,
Physics Department,
Penglais,
Aberystwyth,
Dyfed, SY23 3BZ.

Norris, Judith A., B.Sc.
f,et,sa,B,C,F,G,H,L,M,N.

Unilever Research Ltd.,
Port Sunlight Laboratory,
Port Sunlight,
Wirral, Merseyside.

William J. Puller of Freuchie, Fife, who had been a member of the Society since 1952, died on 24th February, 1980.

The following is a list of addenda and corrigenda to be added to the List of Members compiled in 1978:

Batchelor, G. K. (deletion).

Cooper, R. G. (deletion).

Enyiegbulam, M. O. (B.Sc., M.Sc., Ph.D.), College of Technology, P.M.B. 1036, Owerri, Imo State, Nigeria (f,et,sa,B,C,D,F,G,J,N), 1974.

Higginbotham, R. S. (deletion).

Hoyle, F. (deletion).

Kaye, A. (M.A., D.Phil., A.Inst.P.), 18 Ogden Road, Bramhall, Stockport (C,D), 1957.

Laws, N. (B.Sc., Ph.D., Professor), Cranfield Institute of Technology, Dept. of Mathematics, Cranfield, Bedford (C,D), 1975.

Martin, B. (B.Tech., Ph.D.), University of Aston in Birmingham, Dept. of Mathematics, Gosta Green, Birmingham, B42 7ET (C,D), 1967.

Mell, C. C. (deletion).

Mill C. C. (M.Sc., A.Inst.P.), 19 Cray Avenue, Ashstead, Surrey, KT21 1QX (p,et,a,E,G), 1940.

Oldroyd, J. G. (M.A., Ph.D., Sc.D., Professor), The University of Liverpool, Dept. of Applied Mathematics and Theoretical Physics, P.O. Box 147, Liverpool, L69 3BX (f,t,s), 1946.

Schnurmann, R. (Ph.D., M.Sc., F.Inst.P., F.Inst.Pet.), 134 Green Road, Moseley, Birmingham 13 (A,C,D,J), 1945.

Scott, Blair G. W. (M.A., D.Sc., Ph.D., F.R.I.C., F.Inst.P., Hon. Member), Grist Cottage, Iffley, Oxford (f,t,L,M,N), 1940.

Stephens, R. W. B. (Ph.D., F.Inst.P., Hon. Member), 49 West Hill Road, Wandsworth, London, SW18 (A,C,D,F,G,I), 1942.

Swift, W. A. C. (deletion).

Treloar, L. R. G. (D.Sc., O.B.E., Professor, Hon. Member), U.M.I.S.T., Dept. of Polymer and Fibre Sci., Sackville Street, Manchester 1 (p,ets,C), 1942.

European and Mediterranean Members

Astarita, G. (Ph.D., Professor), Istituto di Principi di Ingegneria Chimica, University of Naples, Piazzale Tecchio, Naples, Italy (f,t,s,G,D), 1974.

Bontinx, W. G. (D.Sc.), U.C.B., Division Sidac, Research Dept., Ottergramese Stwg., Ghent, Belgium (C,D,F,G), 1968.

Giesekus, H. (Professor Dr.), University of Dortmund, Abteilung Chemie-technik, Lehrstuhl für Strömungsmechanik, Emil-Frigge-Strasse, 4600 Dortmund 50, West Germany (f,et,sa,D,F,G,J,M,N), 1964.

Ingenhousz, I. F. (Professor), Enschede, Drienerbrakenweg 12, The Netherlands (f,et,a,C,D,H.), 1975.

Leblanc, F. J. (Lc.Sc.Chim., Dr.Sc.), Monsanto Technical Centre, Rue Laid Burniat, B-1348, Louvain-la-Neuve, Belgium (p,e,a,C,D), 1972.

Meissner, J. (Professor Dr.), Eidgenössische Technische Hochschule, Technisch-Chemisches Laboratorium, ETH-Zentrum, CH-8092 Zurich, Switzerland (f,et,sa,C,D), 1961.

Muenstedt, H. (Dr., Dipl.Phys.), B.A.S.F., Aktiengesellschaft, WHM C201, D-67 Ludwigshafen, Rhein, West Germany (f,e,sa,D,G), 1975.

Oittinen, P. T. (M.Sc.), Helsinki University of Technology, Forest Products Dept., 02150 Otaniemi, Finland (f,et,a,D,F,G,J), 1971.

Reiner, M. (deletion).

Vinogradov, G. V. (Professor), U.S.S.R. Academy of Sciences, Inst. of Petrochemical Synthesis, Leninsky Prospect 29, Moscow B-71, U.S.S.R.
de Vries, A. J. (Dr.), Rhone Poulenc Industries, CTR Res. Croix de Berny, 182 Avenue Aristole Briande, F-92160 Antony, France (p,et,sa,C,D,F,H), 1960.

North American Members

Chaffey, C. E. (Professor), University of Toronto, Dept. of Chemical Engineering, Toronto, Ontario, Canada M5S 1A4 (p,et,s,D,F,G), 1967.

Denn, M. M. (B.S.E., Ph.Dd.), University of Delaware, Dept. of Chemical Engineering, Newark, Delaware 19711, U.S.A. (f,et,sa,B,D,N), 1976.

Krieger, I. M. (B.S., M.S., Ph.D.), Case Western Reserve University, Dept. of Chemistry, Cleveland, Ohio 44112, U.S.A. (f,e,r,sa,D,G), 1977.

Martin, B. (deletion).

Mena, B. (B.Sc., M.Sc.), Centra de Investigation de Materials, Ciudad Universitaria, APDO Post 70-360, Mexico 20 DF (f,et,sa,D,G,N), 1971.

Overseas Members

Worth, R. A. (deletion).

BIRTHDAY HONOURS

In the June Queen's birthday honours list Antony Challis, Ph.D., B.Sc., Hon.F.R.I.C., was awarded the CBE for his services to polymer engineering. Dr. Challis, who has been a member of the Society since 1975, works at the Science Research Council.

EXCHANGE OF JOURNALS

The exchange of journals with other European and World organisations was discussed at the recent Council meeting. It appears that some journals may still be received by ex-Council members and all members who received journals on behalf of the Society are asked to let the Editor know so that a list can be compiled and published.

Dr. Hadley acts as a liaison between the French Society and our own and frequently sends interesting articles to the Bulletin; perhaps others would like to fulfill this role with other societies of rheology.

CONFERENCE NOTICES

**Institute of Biology and British Society for Rheology
One Day Meeting on**

VISCOSITY OF BLOOD AND BODY FLUIDS

December 10th, 1980, 10 a.m. Kennedy Lecture Theatre,
Institute of Child Health, London

Provisional Programme

Chairman: Dr. A. J. Palfrey, Department of Anatomy, Charing
Cross Hospital, London.

Contributors: morning session,

Dr. C. Marriott, Reader in Pharmecutics, Brighton Polytechnic
—mucus

Dr. B. Roberts, Senior Lecturer, Guys Hospital, Medical and
Dental school—saliva

Dr. B. Warburton, Lecturer, London School of Pharmacy—
surface rheology of body fluids

afternoon session,

Dr. S. Roath, Senior Lecturer, Southampton General Hospital
—blood—technical aspects

Professor H. Schmid-Schonbein, Abteilung Physiologie Medi-
zinische Fakultät, West Germany—blood cellular aspects.

The organisers express their appreciation to Dulphar Laboratories
Ltd. for their assistance with this meeting.

Registration Form

Full Name: Prof./Dr./Mrs./Miss

.....

Address:

.....

Telephone Number:

Member of (please tick):

Institute of Biology

Association for Clinical Pathologists

British Society for Rheology

British Society for Haematology

Member's fee: £5.00

Non-member's fee: £5.00

Coffee and Tea will be provided

Please return this half of the form with your remittance (cheques made payable to National Viscosity Meeting) not later than 31st October, 1980, to The Joint Secretaries, Dr. S. Roath and Dr. B. Warburton, Department of Haematology, Level C, Room 84, South Laboratory and Pathology Block, Southampton General Hospital, Tremona Road, Southampton, SO9 4XY.

GROUPE FRANCAISE DE RHEOLOGIE

The Annual Conference of GFR will be held in December 1980 on the theme of *Rheological Behaviour and the Structure of Materials*. It is hoped that members of BSR will participate in the meeting, further details of which are obtainable from Mon. E. Absi, CEBTP, 12 rue Brancion, 75735 Paris Cedex 15, France.

Intending authors should send a title and half page abstract. The proceedings are normally conducted in French.

The proceedings of the December 1979 Conference on *The Thermodynamics of Rheological Behaviour* have recently been published as a special number of *Cahiers de GFR*, which will be summarised in *Rheology Abstracts*.

BRITISH SOCIETY OF RHEOLOGY

Annual Conference, 1981

The Society will hold its 1981 annual conference in Newcastle upon Tyne from Tuesday, 8th September (evening), until Friday, 11th September (afternoon). The main theme of the conference will be

STRETCHING FLOWS

and offers of papers are invited on any aspect of this topic, e.g. extensional rheometry, converging flows, sheet inflation, bubble collapse, fibre spinning. Papers dealing with theory, experiment, practical applications or any combination of these will be welcomed. So that the conference will not be too specialized, or in any way exclusive, it is planned to include at least one session on

GENERAL RHEOLOGY

and offers of papers for this are invited.

The conference will be held in the University and accommodation has been arranged in nearby Hall of Residence. It is intended that those papers on stretching flows which are accepted will be published in a special issue of the Journal of Non-Newtonian Fluid Mechanics, and full text of papers will be required by 1st August, 1981, for this.

Intending authors (for either set of sessions) should send a title and summary by the end of November, 1980, to

Dr. C. J. S. Petrie,
Department of Engineering Mathematics,
University of Newcastle upon Tyne,
Newcastle upon Tyne, NE1 7RU.
United Kingdom.

CONFERENCE REPORT

"Practical Rheology in Polymer Processing"

Preprints of contributions made at the International Conference held at Loughborough University of Technology, March 25th-27th, 1980, can be obtained from The Publication Dept., Plastics and Rubber Institute, 11 Hobart Place, London SW1, at a cost of £15 per copy and £11.50 to members of the British Society of Rheology and Rubber Institute.

A report of the conference appeared in the previous bulletin Vol 23, No. 2.

LETTER TO THE EDITOR

Imperial College of Science and Technology,
Department of Chemical Engineering and
Chemical Technology,
London.

11th July, 1980.

Dear Dr. Dimond,

Your correspondent, F. N. Cogswell, reporting on the Loughborough Conference makes some severe strictures on those who presented papers on the prediction of mould filling. He answers his own question 'have we made any progress in this field in the last five years' in the negative, and then asserts that the number of papers developing mathematical models is nearing one hundred, that each of the authors involved at Loughborough ignored 'everything that has gone before' and suggests that they are 'so obsessed with the need to do "original" work that (they) scorn to research the literature'.

It is both inappropriate and unjust for him to dismiss so casually what we believe to be careful and useful work. The only paper he himself quotes is one by Moroni (*et al.*) given at a previous Loughborough conference in 1975. It uses 'a simplification, separately suggested by Barrie and Grinblat which, *although hard to accept* (our italics), has proved in practice to be extremely (sic) valid . . . that the melt flows at the constant temperature of the cylinder within an immobile envelope of cooled polymer . . . that heat developed by friction is negligible'. Even a casual reading of two of the papers to which Cogswell refers will show:

- (a) that they refer to elastomers entering a heated mould and not to thermoplastics entering a cooled mould;

- (b) that viscous heating can be dominant for the former, and is expressly included in the model of Richardson *et al.*;
- (c) that a complex series of flow channel is considered by Richardson *et al* and treated more fully than in previous work;
- (d) that the curing process is central to the Colbert model;
- (e) that a series of papers and reports published after 1975 is referenced, and that these supercede much earlier work.

Had Cogswell argued that increasing complexity—in mathematical modelling, in numerical analysis and in computer programming—made such work difficult to present in depth at a general meeting and therefore difficult to assess, we could not have objected. (Although we may not have made the point clear, the object of the work by Richardson *et al.* was to provide a compact interactive computer program that would be simple to use and would not require the user to be familiar with all the scientific and mathematical details.) Had he argued in favour of a careful objective study to compare the predictions of various models and computational routines, in a series of test situations, with experimental observations, then he would have found more support. However, the latter involves much more than a review and would be a major task, necessary nevertheless if he wishes to 'progress the science'.

His extravagant remarks suggest that he has not himself researched the literature in the field, and so does a disservice both to those who are attempting to advance our understanding of polymer processing, and those who stand to gain from such advances. Progress may be slow (and it may demand a more profound understanding of diverse fields of knowledge and a greater familiarity with difficult techniques than your reporter would wish), but it is surely the function of the Society to encourage such efforts. We are disappointed that a Council member and past Secretary be so needlessly derisive of carefully-mounted and industrially-supported work.

Yours sincerely,

J. R. A. PEARSON

S. M. RICHARDSON

RHEOLOGICAL JOURNALS—INCOME FOR SOCIETIES

Members should be aware that sales of Rheology Abstracts help to keep down the subscription to this Society, and the Journal of Rheology similarly helps the Society of Rheology. You are therefore asked to try to persuade your organisation to subscribe to Rheology Abstracts (Pergamon Press) and to the Journal of Rheology (John Wiley & Sons). The subscription prices for 1980

are \$72 for four issues of Rheology Abstracts and £43.50 (in the U.K.) for six issues of the Journal of Rheology.

Please help your Society, and hence yourself, and do the same for other Rheological Societies.

DIARY

1980

9th September—Scientific Meeting and A.G.M. London.

10th December—Viscosity of Blood and Body Fluids, London.

December—Rheological Behaviour and the Structure of Materials. Paris.

1981

8th-11th September—Stretching Flows. Newcastle.