

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN



1985, VOL 28, No. 1

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Hon Editor
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UNILEVER RESEARCH
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MERSEYSIDE

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OFFICERS AND MEMBERS OF COUNCIL



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

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MR H. SCHIMANSKI, Contraves Industrial Products, Times House, Station Approach, Ruislip, Middlesex, HA4, 8LH.

EDITORIAL

This Bulletin brings a variety of material. We get to know more about our new President; Chris Petrie obviously enjoyed himself in Mexico and was pleasantly surprised; Jack Astin gives us a puzzle and we catch up with the normal Society news.

Annual Award time is approaching and the Hon. Sec. looks forward to receiving your suggestions.

Our congratulations to Dr Tattersall, a Society member of long standing, on receiving the title of Honorary Reader on his retirement from the Dept. of Building Science, University of Sheffield

In the last issue of the Bulletin a number of pages were left blank intentionally so that the page overleaf could be removed conveniently. Unfortunately some members received their copies with other pages left blank! This was due to slight problems at the printers; our apologies to those members.

P.S. It's not too late to register for the "Rheology in the Process Industries" Meeting on 8th May in London!

Howard Eaves

BIOGRAPHICAL DETAILS



Professor Ward read Physics at Oxford, and subsequently undertook post-graduate research on the electron spin resonance behaviour of inorganic complexes and irradiated materials, gaining a D.Phil in 1954. From Oxford he joined I.C.I. Fibres Division, where his special responsibilities included infra-red spectroscopy; nuclear magnetic resonance and physical properties of fibres. In 1961 Professor Ward was seconded to the Division of Applied Mathematics U.S.A. for a year and on his return to I.C.I. Fibres took charge of the Basic Physics Section, becoming an I.C.I. Research Associate in January 1965. He returned to academic life in 1966 as Senior Lecturer in the Physics of Materials at the H.H. Wills Physics Laboratory, University of Bristol until 1970 when he was appointed to a Chair in Physics at the University of Leeds. The Polymer Group, which he founded at Leeds is concerned primarily with the structure and properties of solid polymers with particular interest in the development of very highly oriented polymers. Professor Ward was Chairman of the Physics Department from 1975-78.

Professor Ward is the author of a textbook "Mechanical Properties of Solid Polymers" and has edited several other books. He is also currently an Editor of Polymer, Journal of Macromolecular Science Physics and the Solid State Science Series (Cambridge University Press). He is a Fellow of the Institute of Physics and the Plastics and Rubber Institute and was one of the co-founders of the British Polymer Physics Group, for which he was Secretary (1963-71) and Chairman (1971-75). From 1976-81 he was also Chairman of the Macromolecular Physics Section of the European Physical Society.

In 1982 Professor Ward was awarded the A.A. Griffiths Silver Medal of the Materials Science Club for distinguished work on polymers, and in particular for the understanding and development of orientation in fibres. In 1983 he was elected a Fellow of the Royal Society for distinguished contributions to our understanding of the physical properties of solid polymers, and to the invention of the technology for the production of very strong versions of these materials.

The delay in writing this account of the Congress may be taken as a tribute to the relaxed attitude engendered by contact with the Mexican climate and people. For many the Congress began and ended in Mexican airline departure lounges. On leaving Mexico City for Acapulco we were delayed by fog in Acapulco, and on the return journey by fog in Mexico City - a slightly more credible phenomenon. Still, the lesson of relaxing and waiting without worrying is a useful one, and the company was pleasant. We arrived too late for the official welcoming cocktail, but were soon made welcome in our hotel and found a good company of rheologists assembled there.

The Congress itself commenced with about 450 delegates facing a platform full of welcoming dignitaries. After the formalities, and statistics such as the size of the Universidad Nacional Autónoma de México (369,000 students) and of the larger societies of rheology (1120, 610, 600, 300, ...), the plenary lecture on "Forty Years of Non-linear Continuum Mechanics" was delivered by Professor Ronald Rivlin, now, as he confessed, in his anecdotage. Indeed much of what Professor Rivlin said may have seemed like ancient history to those in the audience who had not visited any of the Aztec sites before arriving in Acapulco. The scene may be captured by imagining a small figure on a large stage in front of an extremely large screen marshalling rows of symbols with authority. He has a pointer which does not reach half-way up a display of tensorial equations; the microphone catches the remark "Most people wouldn't touch this stuff with a ten foot pole" and the audience agrees. Not everyone would agree with all that Professor Rivlin had to say, but the glimpses afforded of personalities of another age made up for a certain irritability in discussing rationality in mechanics and thermodynamics.

The other 249 (or so) lectures were delivered in between three and six parallel sessions. The Convention Center was extremely well suited to this arrangement and, with most session chairmen maintaining a reasonable degree of discipline, changes between the sessions were easily effected. The proceedings of the Congress fill four volumes which awaited delegates when they registered, so if there had been time for homework, speakers would have had well prepared audiences. The proceedings are edited by organisers Baltasar Mena, Andres García-Rejón and Carlos Rangel-Nafaile and published by U.N.A.M. (the university in Mexico City). Presumably enquiries about obtaining copies should be addressed by Professor Mena.

The invited lectures offered a wide variety of topics, from constitutive equations based on molecular models through numerical simulation, applications

of polymer and suspension rheology, to cement and dough rheology, as well as discussions of polymer engineering research and of unusual phenomena in rheology. The contributed papers covered an even wider range of topics and while there were some poor presentations and some small audiences both for invited and contributed papers, the overall standard of the scientific programme was as high as any recent congress. Discussion was on occasion lively and entertaining, as well as constructive, and the writer of this account was surely not alone in coming away from Acapulco with many new ideas and new contacts with whom to discuss them. What more can one ask of a scientific programme apart from such memorable sayings as "Life is easier without the Maxwell model" and "There is no magic bloody recipe for Boger fluids". These remarks are not to be found in the written texts of papers by two rheologists working in the country which will act as host to the next International Congress, so it would be unfair to attribute them.

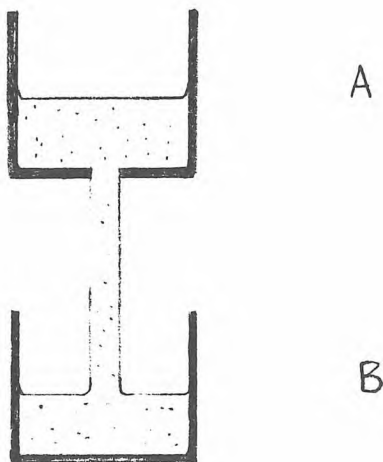
The social programme must also be mentioned - though this will inevitably be reported less accurately since your reporter did not take notes while on the beach or in the swimming pool, or even at the banquet. Highlights of a rather conventional touristic type (and none the worse for that) included an open-air performance of the Folkloric Ballet, an evening of Mexican food and aerial entertainment, a cruise of Acapulco Bay and a visit to "La Quebrada" to watch the cliff diving. Less conventional was the conclusion of the final banquet with the newly elected president of the International Committee on Rheology leading his rock and roll band with enthusiasm. Earlier in the week Sangamo-Schlumberger had entertained in a suite near the top of the hotel while Rheometrics had organised parascending trips round the bay for brave or fool-hardy rheologists. Happily neither firm lost any customers, and two I.C.R. presidents and two B.S.R. council members might testify to the delights of being towed behind a speedboat while supported by a parachute a hundred feet in the air.

Memories of a midnight visit to the swimming pool for some quite competitive international swimming, of standing at midday in the shade of the Convention Centre's large sign waiting for the buses and of excellent food in a variety of places sum up Acapulco. It remains only to say the most important thing - thank you Baltasar and all your many helpers for an excellent congress; the efforts that went into the organisation were apparent mainly in the lack of problems during the meeting. You have set a high standard for Sydney to match - good luck Roger, may you have as good a band of helpers.

Chris Petrie

THE LEAKING BUCKET PROBLEM

Submitted by Jack Astin
(Station House, Ampleforth, Yorks.)



A bucket A is attached to a weighing device which registers zero when the bucket is empty. A second bucket B, placed vertically below A is attached to a second weighing device which also initially registers zero. Bucket A is filled with a liquid which can be viscous or viscoelastic. The weighing device at A now registers 100 units.

A hole is made in bucket A and the liquid drains into bucket B. In the subsequent motion, how do the readings on the two devices vary with time and is there any straight-forward connection between the readings?

(Interesting solutions will be published!....Ed.)

BALANCE SHEET as at 30th JUNE, 1984ASSETSFixed Assets

Microcomputer	2174		
Less: Depreciation	<u>868</u>	(434)	1306 (1740)

Investments

Redbridge 9¾% Bond	2500		
Trustee Savings Account	2277	(2099)	4777 (4599)

Current AssetsCash at Lloyds Bank:-

Deposit Account	7344	(6947)	
Current Account	<u>2339</u>	(729)	9683 (7676)

Sundry Debtors			<u>3866</u> (1121)
			<u>19632</u> (15136)

LIABILITIESCurrent Liabilities

Sundry Creditors			<u>240</u> (261)
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<u>Net Assets</u>	<u>£19392</u>	(14875)	
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Represented by:-

General Fund as at 1st July 1983	14875	(12377)	
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<u>Add: Trustee Savings Bank Interest</u>	<u>178</u>	(164)	
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15053 (12541)

<u>Add: Excess of Income over Expenditure</u>	<u>4339</u>	(2334)	
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£19392 (14875)


..... Hon. Treasurer

We have examined the books of account of the British Society of Rheology and report that to the best of our knowledge the above Balance Sheet and Revenue Account are in agreement therewith.

Chancery House,
3 Hatchlands Road,
Redhill, RH1 6AA
29th August, 1984

Alfred Simons *etc.*
Chartered Accountants.

BRITISH SOCIETY OF RHEOLOGY

REVENUE ACCOUNT for the year ended 30th JUNE 1984

Expenditure

Council Expenses		1271	(1302)
Bulletin Production Costs		1996	(1379)
Expenditure by Officers:-			
President	38	(-)	
Secretary	21	(38)	
Treasurer	9	(18)	
Membership Secretary and Circulation	983	(724)	1051 (780)
Professional Fees		138	(92)
Insurance		49	(29)
Annual Awards		845	(240)
Miscellaneous		114	(94)
Depreciation:-			
Microcomputer		434	(434)
		5898	(4350)
Excess of Income over Expenditure		4339	(2334)
		<u>£10237</u>	<u>(6684)</u>

Income

Annual Subscription and Entrance Fees		3220	(2805)
Publisher - Rheology Abstracts		2484	(2350)
Bulletin Subscriptions		55	(110)
Leaflet Circulation		111	(75)
Investment Income:-			
Bank Deposit Account Interest	398	(422)	
Redbridge Bond	171	(174)	
Inland Revenue (Tax Repayments)	73	(74)	642 (670)
Conferences: Net Surplus per account		3725	(666)
		<u>£10237</u>	<u>(6684)</u>

Conference Account

Surplus: Cambridge Conference less expenses	273
Birmingham Conference less expenses	546
London Conference less expenses	2878
Sundry: re Newcastle 1982 Conference	28
	<u>£3725</u>

MEMBERSHIP NEWS

The following applications for Membership were approved at the Council Meeting on December 14th 1984.

Key to Interests codes
See Vol 27 No 2

Mr M.H. AL-SAYED
Civil Engineering Dept.,
University of Leeds
Leeds

B.Sc
pea 6HK

Dr Peter E. CLARK
Department of Chemical Engineering
University of Tulsa
Oklahoma, USA

B.S., Ph.D
fetsa DFG

Dr Nicholas J. CROWTHER
School of Pharmaceutical Technology
University of Bradford
Richmond Road, Bradford
West Yorkshire

Ph.D, B.Sc, G.R.S.C
pesa DFGM

Deepak DORAISWAMY
Dept. of Chemical Engineering
University of Delaware
Newark, Delaware 19716
USA

B.Chem.Eng
fetsa BD

Mr William J. FRITH
Instituut voor Chemie Ingenieurtechniek
Katholieke Universiteit Leuven
De Croylaan 2, B-3030 Leuven
BELGIUM

B.Sc
fetsa DG

Mr Timothy S GRUNDON
MSE, Manor Royal,
Crawley
Sussex, RH10 2QQ

B.Sc(Hons)
fesa CDFGIJKLM

Mr Andrew M. KEELEY
Dept. of Applied Maths & Theoretical Physics
University of Liverpool
Liverpool

B.Sc
fts DFJN

Dr Ronald LARSON
Bell Laboratories
600 Mountain Ave.,
Murray Hill, New Jersey,
USA

Ph.D

fetsa CD

Dr John LEVERIDGE
Research Division, Kodak Ltd,
Headstone Drive,
Harrow, Middlesex

B.Sc, D.I.C, Ph.D

petsa DFG

Mr Cyril J LYNSDALE
Civil Engineering Department,
University of Leeds
Yorkshire, LS2 9JT

B.Sc, M.Sc

peta BGG

Dr Raymond C. ROWE
ICI Pharmaceuticals Division
Alderley Park
Macclesfield
Cheshire

PhD, B.Pharm, M.P.S

fetsa DFGH

Dr Jeffrey H. WILLIAMS
Schlumberger Cambridge Research
PO Box 153
Cambridge

B.Sc, PhD, GRSC

fetsa DFGH

Mr Neville C. YAPP
SSP Pumps Ltd, Birch Rd,
Eastbourne
East Sussex

LRSC

feta DEFGJKLM

Mr Albert C. YOUNG
Colburn Lab.,
University of Delaware
Newark, Delaware 19716
U S A

B.Sc

fetsa BDGJL

RESIGNATIONS

Mr R.R. Addis, Sandhurst, Camberley, Surrey. Joined in 1970

Mr H.M. ELDER, University of Strathclyde, Division of Pure and Applied Chemistry. Joined in 1974

Dr Ir J.M. Kooijman, Nutricia, Zoetermeer, Holland. Joined in 1972

announce a joint

ONE DAY SYMPOSIUM
entitled

"RHEOLOGY IN THE PROCESS INDUSTRIES"

to be held at
The Scientific Societies Lecture Theatre
New Burlington Place, LONDON W1

on Wednesday 8th May 1985
Registration and coffee 9.30am : lectures begin at 10.30am

Six leading figures in the field of rheology will review the latest ideas in this important and practical branch of science. The symposium is aimed at the industrial chemist, process technologist and chemical engineer and those academics who are interested in process technology.

The symposium is a follow-up to the successful 1981 meeting when Dr H A Barnes presented the results of his Survey on Dispersion Rheology following his Industrial Fellowship. At the symposium a report will be given on progress in setting up a similar Industrial Fellowship on Emulsions sponsored by various Companies in association with the Process Technology Group.

*** Subjects and Speakers ***

Colloidal Suspensions	-	Dr J Goodwin	(Bristol University)
Polymer Melts	-	Mr N Cogswell	(ICI Plastics, Wilton)
Rheometry	-	Dr H A Barnes	(Unilever Research)
Flow Modelling	-	Prof M Crochet	(Leuven, Belgium)
Engineering Applications	-	Prof M Edwards	(Bradford University)
Flow of Xanthan Gum	-	Prof A Nienow	(Birmingham University)

in a Bioreactor

There will also be

** AN EXHIBITION OF LABORATORY AND PROCESS VISCOMETERS **

Cost (including morning coffee, lunch and tea & biscuits):

Members of either Society : £25

Nonmembers : £35

Those not in gainful employment : £15

Application for registration, with payment enclosed and made out to "RSC Process Technology Group Trust" should be addressed to:
Mr H L Bennister
174, Beverley Drive,
EDGWARE,
Middlesex, HA8 5ND
Telephone: 01-952-4154



Industrial Physical Chemistry Group

Faraday Division

ROYAL
SOCIETY OF
CHEMISTRY

An Informal Discussion Meeting on

A MOLECULAR APPROACH TO LUBRICATION AND WEAR

will be held at

GIRTON COLLEGE, CAMBRIDGE, UK

on 23-25 September 1985

It is hoped that this meeting will bring together scientists interested in lubrication and wear phenomena and the use of the molecular sciences to aid in their study. Of special interest will be the role of additives and the use of in-situ techniques at high temperature and pressure which allow the study of "real" lubrication and wear situations. Theoretical studies will be particularly welcome.

Speakers will include Professor J. Jonas (University of Illinois, USA), Mr. G.D. Galvin, Shell Research, and Dr. D. Gardiner, Newcastle Polytechnic.

Applications for student bursaries should be made to the organisers who are

Dr. A.D.H. Clague and Dr. M.P. Dare-Edwards
Shell Research Ltd., PO Box 1
Chester CH1 3SH

Dr. D. Gillies
Royal Holloway College
Egham, Surrey

Abstracts of about 400 words are invited before 31st March 1985.

To: Dr. M.P. Dare-Edwards
Shell Research Ltd.
Thornton Research Centre
PO Box 1
Chester CH1 3SH

I am interested in the meeting/I shall probably attend/I would like to present a paper

(please underline the applicable)

Name Address.....

.....

.....

Title of paper

OTHER MEETINGS

13-15 May Berlin (West): Annual Meeting of German Society

Contact: Prof Dr K Kirschke
German Society of Rheology
Unter den Eichen 87
D-1000 BERLIN 45
West Germany

10-12 October Reading: New Techniques in Experimental Rheology
(BSR Autumn Conference)

Contact: Mr H Schimanski,
Contraves Industrial Products
Times House, Station Approach,
RUISLIP, Middx. HA4 8LH

1986

13-16 January Grenoble : Viscoelasticity of Polymeric Liquids
(International Conference)
** CALL FOR PAPERS **

Contact: Jean-Michel PIAU
International Conference of Viscoelasticity
Institut de Mechanique de Grenoble
B.P.no.68 - Domaine Universitaire
38402 SAINT MARTIN D'HERES CEDEX
France.

17-20 June Prague: Second Conference of European Rheologists
** CALL FOR PAPERS **

Contact: Institute of Hydrodynamics
Czechoslovak Academy of Sciences
Podbabska 13, 166 PRAGUE
Czechoslovakia

BOHLIN RHEOMETER SYSTEM

A general purpose instrument for rheological measurements in Quality control, Process equipment design, Product development and in Research work.

Applications include:

Foods	Blood
Suspensions	Plasma
Emulsions	Synovial fluids
Foams	Mucus

Pastes	Waxes
Greases	Bitumen
Inks & Paints	Polymer melts
Detergents	Thermosets

Also manufacturing:

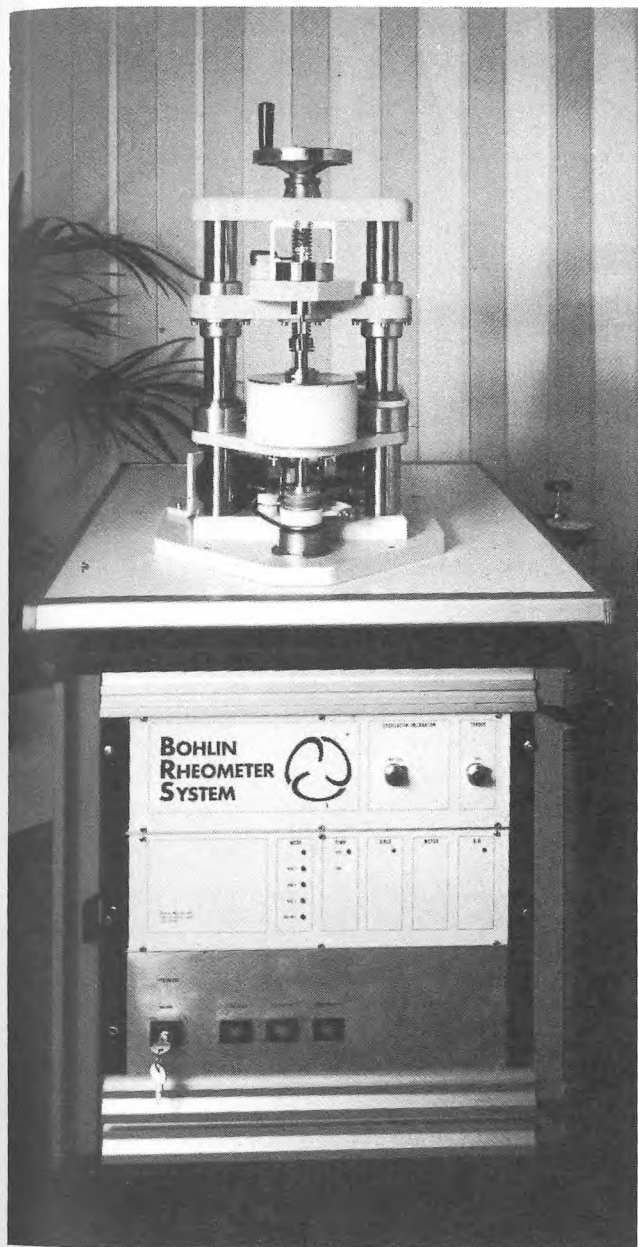
Viscometers
In-Line rheometers
Impact test instrumentation



BOHLIN REOLOGI

Science Park Ideon, University site,
Box 742, S-22007 Lund, Sweden,
Ole Römers väg 12, 046/15 03 60

Rheology – application research
Rheology – seminars and courses
Rheometry –
development of sensors
Rheological instruments –
manufacture and sales

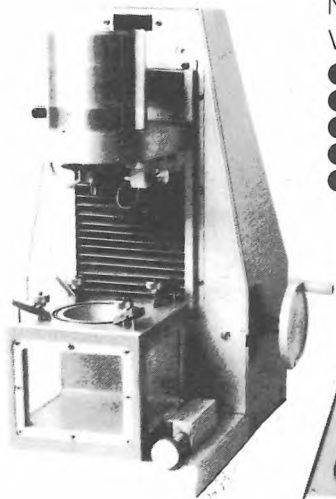


MATERIALS TESTING FROM **SANGAMO** **RHEOLOGY**

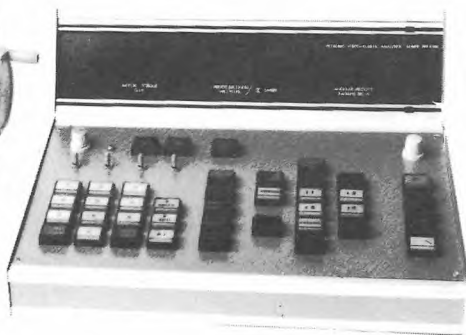
A comprehensive range of sophisticated rheology equipment for the measurement of shear, yield, thixotropic and the visco-elastic properties of Polymer Melts, Suspensions, and most Newtonian or non-Newtonian fluids.

Visco-elastic Analyser offers:

- Yield stress evaluation
- Creep growth and relaxation
- Oscillatory mode tests
- Temperature to 300°C
- With IEEE Interface and Software



Visco-elastic Analyser
Constant Stress Tester



Other Rheology products from Sangamo include:

- New Series II R20 Weissenberg now available
- Elongational Viscometer
- Rheovibron Solids Tester

Computer Controlled versions of the above available.

SANGAMO

Schlumberger

Sangamo Transducers (Rheology Division)
Steyning Way, Southern Cross Trading Estate
Bognor Regis, West Sussex PO22 9ST
Telephone 0243 825011 Telex 86827