

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN — No. 4, 1961



Hon. Secretary :

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THE BRITISH SOCIETY OF RHEOLOGY

News of Members.

We have been notified of the following changes of address:

REEVES, R. P., MR.

The Elms, Babbs Green, Wareside, Ware, Herts.

TRELOAR, L. R. G., DR.

10 Cherington Road, Cheadle, Ches.

DE VERE, R. H., MR.

13 Brandles Road, Letchworth, Herts.

Mr. R. H. de Vere has been appointed Senior Lecturer in Physics at Letchworth College of Technology.

Branch News.

During the year up to October 1961, the *New South Wales Branch* organised a series of six lectures on rheology and held five scientific meetings. The lectures were given by Prof. R. C. L. Bosworth and the papers were as follows:

"Non-linear viscoelasticity, hydrogen bonding and physical properties of wool," by Mr. M. Feughelman.

"Dynamics of thixotropic recovery," by Mr. L. Dintenfass.

"Flow behaviour of unplasticised P.V.C.," by Dr. F. Connors.

"The experimental determination of displacement in the interior of stressed rheological bodies," by Mr. A. A. Sherwood.

"Weissenberg effects," by Mr. R. Bell.

The Branch intends to take an active part in the 1962 Conference of the Australian and New Zealand Association for the Advancement of Science. There will be a section on rheology which will comprise two symposia: "Non-Newtonian flow and deformation in chemistry and engineering" and "Flow and deformation in biological fluids".

At the second Annual General Meeting on 9th October, 1961, the following Committee was elected:

Branch President: Prof. R. C. L. Bosworth.

Hon. Secretary: Mr. L. Dintenfass, 10/234 Campbell Parade,
Bondi Beach, N.S.W.

Hon. Treasurer: Dr. A. A. Palmer.

Members: Prof. F. W. Ayscough, Mr. D. R. Axelrad and
Mr. A. A. Sherwood.

The *Victorian Branch*, inaugurated in November, 1960, held its first Annual General Meeting on 6th September, 1961. The membership of this Branch now stands at 28. Four meetings have been held during the year:

“ Rheological phenomena associated with the non-isotropic character of stresses and strains” by Prof. R. C. L. Bosworth.

“ Linear characterisation of viscoelasticity,” by Dr. N. W. Tschoegl.

“ The rheological properties of surface films and their molecular interpretation,” by Prof. A. E. Alexander.

“ Extrusion and flow of polymers,” by E. R. Price.

At each of these meetings the average attendance of members and guests was about 25. During 1962 it is intended to organise a course of ten lectures on rheology.

The Committee for 1961–62 is:

Branch President: Mr. B. D. Craven.

Hon. Secretary: Dr. P. U. A. Grossman, Division of Forest Products, C.S.I.R.O., P.O. Box 310, South Melbourne, S.C.5.

Hon. Treasurer: Mr. E. R. Ballantyne.

Members: Dr. H. A. J. Battaerd, Mr. K. R. Hall and Mr. R. S. T. Kingston.

Recent Meetings

The Autumn meeting of the British Society of Rheology was held at Llandudno. A report by Dr. M. F. Culpin follows:

“ Rather more than a year ago, someone thought that the Society should hold a joint meeting with the Non-Destructive Testing Group of the Institute of Physics. At about the same time another suggestion was made—that a special issue of the journal *Laboratory Practice* should be devoted to rheology. Further, it was proposed, as a change from having our meetings in college hostels (nearly all of them very pleasant and comfortable), that we should go to a resort. Fortunately, the secretary of the NDT Group, Dr. Peter Lord, knew of a good place to go to. Thus it was that a joint meeting on ‘ *Rheological techniques* ’ was held in Llandudno, mainly at the Imperial Hotel, from the 20th to the 23rd September, 1961, and the proceedings will be published in *Laboratory Practice*.

Let me first thank for their co-operation those participants for whom the arrangements were not quite as convenient as they might have been. A certain inflexibility in the organisation is the price which has to be paid when good hotel accommodation on special terms is taken by a large conference.

About 115 members of the Society and the Group attended the meeting, including several overseas visitors. The duties of chairman were shared between Prof. R. W. Douglas, President of the British Society of Rheology, and Prof. J. Lamb, rep-

representing the Group. Over eighty of the participants visited the Chance-Pilkington Optical Works at St. Asaph, thanks to the kindness of the general manager, Mr. S. T. Pickering; and a party of a dozen were taken on a tour of the Penmaenmawr & Welsh Granite Co.'s workings at Penmaenmawr.

So that one should not feel too remote from the real world of rheology, Jack Roberts and Ken Lammiman arranged to have one of their rheogoniometers on show and, in some respects, working. Unfortunately, one valve of the equipment did not survive the journey from Bognor Regis, and Llandudno could not offer a replacement. Nevertheless, we are grateful to them.

Abstracts of all the papers, except Prof. Douglas's Presidential Address on the "Rheology of Glass," have appeared in *Rheology Abstracts*. By the time this note appears, ten of the papers will have been published in full in *Laboratory Practice*. Three papers were essentially interim reports on uncompleted work and will not appear with the rest.

The Annual General Meeting was the occasion of the retirement "by rotation" of Dr. J. H. C. Vernon from the editorship of *Rheology Abstracts*. The Society is particularly indebted to him for his efforts during the past four years. Also to Mr. D. W. Jopling who finally retired from the Committee after nine years of service, including four as treasurer.

The choice of meeting-place having attracted a number of the participants' ladies, a tour of the mountains was arranged for them. Unfortunately, visibility was poor that day. Luck returned to the organisers, however, when 118 persons decided to attend the Conference Dinner. There were places available for only 119.

Seven research students took advantage of the Society's offer of a subsidy towards their expenses. The Secretary would be pleased to receive the views of members as to whether or not conferences should be held more often in this sort of setting, even if the charges are higher than they have usually been in the past."

M.F.C.

A list of the members of the new Committee elected at the Annual General Meeting, and a statement of the accounts of the Society for the year 1960-61 are given at the end of this Bulletin.

On the 26th September, 1961, the Nederlandse Reologische Vereniging held a symposium on "Fracture" in Utrecht. The papers were:

"On the energy changes accompanying the fracture process and the related problem of breaking time," by Prof. H. Rumpf (Technische Hochschule, Karlsruhe).

"Long-term strength of plastics," by Dr. A. K. van der Vegt (Koninklijke/Shell Plastics Laboratorium, Delft).

"Stress corrosion of organic materials of construction," by Dr. G. Salomon (Centraal Laboratorium, T.N.O., Delft).

The 32nd Annual Meeting of the U.S. Society of Rheology was held at the University of Wisconsin on 30th October to 1st November, 1961. At this meeting the Bingham Medal for 1961 was presented to Mr. W. R. Willetts of the Titanium Pigment Corporation, New York., N.Y. The following papers were read:

- "Rheo-Optical Properties of Polymers," D. G. LeGrand and P. F. Erhardt, General Electric Research Laboratory, Schenectady, New York.
- "A Method of Measurement of Flow Birefringence of a Thin Fluid Layer for Oscillatory Shear," G. B. Thurston and J. L. Schrag, Physics Department, Oklahoma State University, Stillwater, Oklahoma.
- "Birefringent Techniques in Two-Dimensional Flow," D. C. Bogue, and F. N. Peebles, University of Tennessee, Knoxville, Tennessee.
- "Correlation of Static and Dynamic Measurements Using Flow Birefringence," S. J. Gill, University of Colorado, Boulder, Colorado, and W. Philippoff, Esso Research and Engineering, Linden, New Jersey.
- "Correlation of Ultrasonic Experiments and Steady State Measurements on Polymer Solutions in Oil," W. Philippoff, Esso Research and Engineering, Linden, New Jersey.
- "Dynamic Measurement of Mechanical Properties of Polymers by Free Vibration Methods, II. The Glass Transition Concentration," A. F. Lewis and M. C. Tobin, Central Research Division American Cyanamid Company, Stamford, Connecticut.
- "Solution and Experimental Results for a Problem in Linear Viscoelasticity," J. H. Baltrukonis, Catholic University of America, Washington, D.C., and W. G. Gottenberg and R. N. Schreiner, Space Technology Laboratories Inc., Los Angeles, California.
- "Viscoelastic Properties of Dilute Polystyrene Solutions and Verification of the Zimm Theory," R. B. De Mallie, M. H. Birnboim, J. E. Frederick, N. W. Tschoegl, and J. D. Ferry, University of Wisconsin, Madison, Wisconsin.
- "Stress Relaxation and Dynamic Mechanical Properties of Stretched Natural Rubber," E. R. Fitzgerald, Anthony J. Bur, and E. A. Metzbower, Department of Physics, The Pennsylvania State University, University Park, Pennsylvania.
- "Viscoelastic Behaviour of Amorphous Elastomers Subjected to Large Tensile Deformations at Constant Strain Rates," Thor L. Smith, Stanford Research Institute, Menlo Park, California.
- "Large Longitudinal Retarded Elastic Deformation of Rubberlike Network Polymers," Herbert Leaderman, National Bureau of Standards, Washington, D.C.

- “Special Problems of Blood Rheology,” M. H. Knisely, Department of Anatomy, Medical College of South Carolina, Charleston, South Carolina.
- “The Rheology of Blood in the Living Microvascular System,” E. H. Bloch, Department of Anatomy, Western Reserve University, Cleveland, Ohio.
- “The Comparison of the Shear Stress-Shear Rate Characteristics of Blood with the Tube Flow Behaviour,” S. E. Charm and G. S. Kurland, Department of Nutrition, Food Science and Technology, Massachusetts Institute of Technology, Cambridge 39, Massachusetts.
- “Shear Rate Dependence of Viscosity of Human Blood and Blood Plasma,” R. E. Wells, Department of Medicine, Harvard Medical School, Boston, Massachusetts, and E. W. Merrill, Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- “Measurement of High Viscosities at Low Shear Rates,” D. C. West, Central Research Laboratory, Canadian Industries Ltd., McMasterville, Quebec, Canada.
- “A New Instrument for High Shear Viscometry,” D. G. Williams, C. L. Carey, and G. A. Hemstock, the Institute of Paper Chemistry, Appleton, Wisconsin.
- “Non-Newtonian Flow of Concentrated Solutions of High Polymers,” Shigeharu Onogi, Tadashi Kobayashi, Yasuhiro Kojima and Yoshishige Taniguchi, Department of Polymer Chemistry, Kyoto University, Kyoto, Japan.
- “Correlations for Non-Newtonian Flow,” R. S. Porter and J. F. Johnson, California Research Corporation, Richmond, California.
- “The Upper Newtonian Regime in Polymer Solutions,” E. W. Merrill, H. S. Mickley, A. Ram, Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, and W. H. Stockmayer, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- “The Rheology of Poly (Neopentyl Succinate),” L. J. Garfield, S. E. Petrie, and D. W. Vanas, Research Laboratories, Eastman Kodak Company, Rochester 4, New York.
- “Theoretical and Experimental Studies on Temperature Dependence of Mechanical Behaviours of Polymer Solids by Creep Recovery Method (Part 1) Uniaxial Compression Method,” Katsuhiko Ito, The Institute of Physical and Chemical Research, Komagome, Bunkyo-ku, Tokyo, Japan.
- “Two-dimensional Rheology and Its Application to Cereal Protein Monolayers,” N. W. Tschoegl, Department of Chemis-

try, University of Wisconsin, Madison 6, Wisconsin.

- "Elastic Effects in the Extrusion of Polymer Solutions," D. L. McIntosh, Polychemicals Department, E. I. DuPont de Nemours Company, Wilmington, Delaware, and J. M. McKelvey, Chemical Engineering Department, Washington University, St. Louis, Missouri.
- "The Adhesion of Acrylate Polymers to Cellophane as Measured by the Peeling Test," J. L. Gardon, Textile Research Laboratory, Rohm and Haas Company, Philadelphia 37, Pennsylvania.
- "Phenomenological Characterization of a Rheopectic Suspension," J. B. Yannas, Frick Chemical Laboratory, Princeton University, Princeton, New Jersey, and R. N. Gonzalez, W. R. Grace & Company, Dewey and Almy Chemical Division, Cambridge 40, Massachusetts.
- "The Flow of Dilute Suspensions Through Cylindrical Tubes," H. L. Goldsmith and S. G. Mason, Department of Chemistry, McGill University, Montreal, Quebec, Canada.
- "Viscosity of Concentrated Suspensions of Rigid Particles," Stephen Prager, Department of Chemistry, University of Minnesota, Minneapolis 14, Minn.
- "The Viscosity of Liquid Helium II," A. C. Hollis-Hallett, Department of Physics, University of Toronto, Toronto 5, Ontario, Canada.
- "Plastic Flow of Aluminium Single Crystals as Revealed by Interferometric Cinemicrography," R. B. Pond, Department of Mechanics, The Johns Hopkins University, Baltimore, Maryland.
- "Vibrations and Wave Propagation in Aluminium Alloys at Elevated Temperatures," S. R. Bodner and A. F. Fraser, Brown University, Providence 12, Rhode Island.
- "Melt Viscosity—Viscosity Average Molecular Weight Relations of Polyethylenes," W. F. Busse and R. Longworth, Research and Development Division, Experimental Station, E. I. Du Pont de Nemours & Company, Wilmington 98, Delaware.
- "The Dynamics of a Viscoelastic Particle Between Sliding Surfaces," W. D. May, Wood and Fibre Physics Division, Pulp and Paper Research Institute of Canada, Montreal, Canada.
- "Rheological Studies with the Brabender Farinograph," I. Hlynka, Grain Research Laboratory, Board of Grain Commissioners for Canada, Winnipeg 2, Manitoba, Canada.
- "The Splitting of Thin Liquid Films. II. Cavitation Dynamics," R. D. Hoffman, and R. R. Myers, Lehigh University, Bethlehem, Pennsylvania.

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- "Analysis of Forces Causing Flow in Roll Coaters," G. B. Schneider, Duplicating Products Division, Minnesota Mining and Manufacturing Company, 900 Bush Avenue, Saint Paul 6, Minnesota.
 - "Mechanical Behaviour of Rubbery Material," P. J. Blatz and W. L. Ko, California Institute of Technology, Pasadena, California.
 - "The Viscous Heating Correction for Viscometer Flows," E. A. Kearsley, National Bureau of Standards, Washington, D.C.
 - "Conditions for Second Order Waves in Hypo-Elastic Materials," B. Bernstein, U.S. Naval Research Laboratory, Washington, D.C.
 - "Orientation Induced by Flow," J. L. Ericksen, The Johns Hopkins University, Baltimore, Maryland.
 - "On 'Substantially Stagnant Flows' a Kinematical Concept useful in Investigations of the Physics of Viscoelastic Fluids," B. D. Coleman, Mellon Institute, Pittsburg 13, Pennsylvania.
 - "On Streaming Birefringence," Bernard D. Coleman, Mellon Institute, Pittsburg, Pennsylvania, and Richard Toupin, U.S. Naval Research Laboratory, Washington, D.C.

Future Meetings

The Spring Conference jointly held by the Deutsche Rheologische Gesellschaft and the Deutschen Rheologen-Vereinigung will take place in 1962 in Berlin. The meeting will be held at the Bundesanstalt für Materialprüfung, Unter den Eichen 87, Berlin-Dahlem, which is also the address of the secretariat of the host society, D.R.G.

A West Coast Regional Meeting of the U.S. Society of Rheology will be held on 1st-2nd February, 1962, at the California Institute of Technology in Pasadena. The technical programme is in the hands of Dr. T. L. Smith, Stanford Research Institute, Menlo Park, California, and Paul J. Platz, Guggenheim Aeronautical Laboratory, California Institute of Technology, Pasadena, Calif. should be contacted about accommodation.

The Society of Glass Technology will hold a Symposium on *The structure of glass* on 9th-11th April, 1962, at the Department of Glass Technology, University of Sheffield.

The 33rd Annual Meeting of the U.S. Society of Rheology will take place at the Johns Hopkins University, Baltimore, Maryland, on 29th-31st October, 1962, under the local direction of Prof. J. L. Eriksen.

As announced in Bulletin No. 2, 1961, the *Fourth International Congress on Rheology* will be held at Brown University, Providence, Rhode Island, U.S.A., on 26th-30th August, 1963. Prospective authors are invited to submit, by 30th March, 1963, abstracts of not more than 500 words, in a form suitable for publication, to Prof. E. H. Lee, Editor of the Proceedings of the Fourth International Congress on Rheology,

Brown University, Providence 12, R.I. It is intended that twenty minutes will be allotted for the presentation of papers and ten minutes for discussion. There will also be invited plenary lectures of longer duration. All enquiries should be addressed to Prof. R. S. Rivlin at Brown University.

Contacts Required

Mr. R. Smith, of the Colour Laboratory of Messrs. Goodlass, Wall & Co. Ltd., Goodlass Road, Speke, Liverpool 24, wishes to contact anyone who has had experience with, or knowledge of, the "Rotovisko" viscometer. This is a German-made instrument covering a range of measurements of 0.07 to $10,000 \text{ sec.}^{-1}$ rate of shear. Mr. Smith would also like to know if there is an equivalent instrument of British manufacture.

Officers and Committee for 1961-1962

President:

Professor R. W. Douglas, D.Sc., F.Inst.P., Department of Glass Technology, The University, Northumberland Road, Sheffield.

Honorary Secretary:

Dr. M. F. Culpin, Ph.D., F.Inst.P., 8 The Broadway, Pontypool, Monmouthshire.

Honorary Membership Secretary:

Dr. G. H. Tattersall, M.Sc., Ph.D., A.Inst.P., 32 High Storrs Drive, Sheffield 11.

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Honorary Editor (Rheology Abs.):

Mr. R. W. Whorlow, B.Sc., A.R.C.S., A.Inst.P., Physics Department, Battersea College of Technology, Battersea Park Road, London, S.W.11.

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Mr. P. E. Knapp, B.Sc., A.Inst.P., 20 Wayside Avenue, Harrogate.

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Mr. D. R. Reid, M.A., 18 Wellesley Road, Colchester, Essex.

Dr. R. Roscoe, Ph.D., F.Inst.P., King's College, Newcastle-upon-Tyne.

Dr. D. W. Saunders, Ph.D., A.R.C.S., F.Inst.P., College of Aeronautics, Cranfield, Bletchley, Bucks.

Dr. J. H. C. Vernon, B.Sc., Ph.D., 106 Monkswood Avenue, Waltham Abbey, Essex.

ACCOUNTS FOR YEAR ENDING 30th JUNE, 1961

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1959-60	<i>Income</i>		£	s.	d.
681	Balance on 1st July	..	681	1	3
281	Subscriptions	..	324	19	1
12	Interest P.O.S.B.	..	11	8	2
—	Subscriptions for Meetings ..	..	176	17	0
5	Casual sales of Abstracts ..	..	2	0	0
			<u>£1,196</u>	<u>5</u>	<u>6</u>

1959-60	<i>Expenditure</i>		£	s.	d.
98	Printing and distribution of Bulletin and Abstracts ..	..	304	0	6
122	Committee and administrative expenses	..	50	13	1
77	Subsidy of Meetings	..	—		
681	Balance 30th June	..	841	11	11
			<u>£1,196</u>	<u>5</u>	<u>6</u>

Colin C. Mill,
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Alan G. Ward,
Hon. Auditor.

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