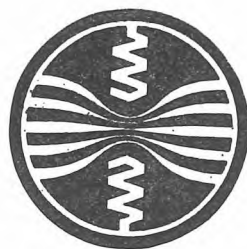


BULLETIN



BRITISH SOCIETY OF RHEOLOGY

1973, Vol. 16, No. 4

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Hon. Editor:

Dr. J. M. HOBBS,
Properties of Fluids Division,
National Engineering Laboratory,
East Kilbride,
GLASGOW, G75 0QU.



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FOREWORD

Recycling has been going on in nature for millions of years as the evidence of rain falling on our planet will testify. This cycle serves to purify and conserve an essential natural resource. In his own way man has imitated nature on a small scale where natural water storage has been augmented and purification has been carried out before recycling.

In more recent times recycling has played an increasingly important role in steel and paper production. As more and more of the basic raw materials are consumed, greater amounts of waste product must be recycled, so much so that the scrap values of both materials are rising dramatically. However, although recycling has much to commend it one must ensure that the end product does not become too "shoddy".

In spite of this limitation there may be other fields which would benefit from recycling. A few years ago plastics technologists devoted a considerable effort to the development of a bio-degradable product. Now with diminishing raw materials we would profit from a greater re-use of waste. The same could well apply to building materials. Potentially valuable rubble is often tipped locally while efforts are being made to obtain cheap aggregate from much further afield. There are probably many more examples, some of which will no doubt be discussed during the forthcoming conference at Harwell. It may be just a coincidence, but there is a significant percentage of recycled manpower in the new Council!

OFFICERS AND MEMBERS OF COUNCIL 1973-74

President: PROFESSOR P. FELTHAM, Department of Physics, Brunel University, London.

Secretary: DR. K. M. BEAZLEY, 44 Brockstone Road, Boscoppa, St. Austell PL25 3DP.

Treasurer: DR. D. R. OLIVER, Department of Chemical Engineering, University of Birmingham, Birmingham B15 2TT.

Membership Secretary: DR. J. FERGUSON, Department of Fibre Science, University of Strathclyde, Glasgow G1 1XW.

Abstracts Editor: DR. D. MARSHALL, Institute of Polymer Science, Loughborough University of Technology, Loughborough.

Bulletin Editor: DR. J. M. HOBBS, National Engineering Laboratory, East Kilbride, Glasgow.

Ordinary Members:

DR. B. S. NEUMANN, Laporte Industries (O. and P. Division), Redhill, Surrey.

MR. F. N. COGSWELL, I.C.I. Ltd., Plastics Division, Welwyn Garden City.

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

MR. J. F. HUTTON, Shell Research Ltd., Chester CH1 3SH.

DR. P. SHERMAN, Department of Food Science, Queen Elizabeth College, London W8.

MR. R. W. WHORLOW, Department of Physics, University of Surrey, Guildford.

AUSTRALIAN BRANCH 1973-74 COUNCIL

President: MR. W. COPLEY, C/- H. B. Selby & Co., 352 Ferntree Gully Road, Victoria.

Vice-President: MR. J. LUBBOCK, C/- Dulux Australia, McNaughton Road, Clayton, Victoria.

Secretary: MR. N. CHILOV, C/- I.C.I. Australia, Research Department, Newson Street, Ascot Vale, Victoria.

Treasurer: DR. R. FOX, C/- I.C.I. Australia, Research Department, Newson Street, Ascot Vale, Victoria.

Ordinary Committee Members:

DR. D. BOGER, Department of Chemical Engineering, Monash University, Clayton, Victoria.

MR. O. DELATYCKI, Department of Industrial Science, Melbourne University, Parkville, Victoria.

MR. G. GIBSON, C/- Davis Fuller Adhesives, 38 Cromwell Road, Collingwood, Victoria.

MR. R. VINEN, Applied Chemistry Department, Footscray Institute of Technology, Ballarat Road, Footscray, Victoria.

SECRETARY'S REPORT 1972-73

This has been a fairly quiet year, though your Secretary's letter box has been kept unusually busy with ads for conference sites, letter addressing services and all the other odds and ends that the Society usually manages to deal with unaided. As usual, we start this report with

1. Conferences

It became clear from numerous comments received that the domestic arrangements for the International Congress at Lyon were lacking in several significant details. Accordingly, your Council put these down in an orderly fashion on paper and brought them to the notice of the International Committee, and of the organisers of the Lyon meeting. No reply has ever been received, but we sincerely hope that the points which we made will be taken into account with future International Congresses.

Since that meeting, we have held a brief half day meeting in London, during which Professor L. Treloar was presented with the Society's Gold Medal, several papers were given, and the last A.G.M. held. This was followed by a successful joint meeting on "Yield, deformation and fracture in polymers" at Cambridge during March '73, and a joint meeting with the Dutch Society, held in Holland, attended by about 100, and sufficiently successful to demand enthusiastically that a similar meeting be held at a later date; "Composites" and "Rheology in Industry" were the themes on which it was based.

That brings us to the present meeting at Norwich, which was sufficiently oversubscribed with papers to necessitate rejection of several otherwise technically excellent papers. Looking ahead, the Society's Spring meeting for 1974 will be on glasses, concrete and ceramics, and will probably be held at Sheffield, while the '74 Autumn Meeting will be held at Cambridge in the second half of September and will be on "Theoretical Rheology". Add to this meetings such as one at Salford in the week immediately preceding this Cambridge meeting, dealing with transport phenomena in molecularly complex fluids (supported, but not sponsored by, the Society) then it should be clear that the forthcoming rheological nourishment should cater for quite a wide variety of palates.

2. Liaison

The success of the joint meeting with our Dutch friends is a tangible measure of the liaison which we do enjoy with other societies; we hope that similar ventures can be undertaken with our rheological friends in other countries.

Our last report also noted the suggestion that the International Committee on Rheology affiliate with the International Union of Theoretical and Applied Mechanics. On the whole, your Council was not in favour of this affiliation, but I can report that the I.C.R. has voted by a substantial majority to affiliate with I.U.T.A.M.

3. **B.S.I. Glossary Committee**

This magnum opus—and for once, the description is well merited, is now in a state where it is, or shortly will be, available to the public at large. That the ship has been brought safely to port is in a great measure due to the steering of the Chairman of the B.S.I. Committee responsible, Dr. Scott Blair, whose guidance through the multitudinous channels of rheological terminology has enabled this Committee to do a magnificent job. We thank both the Committee and its Chairman.

4. **Publications**

Members may like to know that the Polish “Theoretical and Applied Mechanics”, and the Russian “Ukranian Physical Journal” and “Synthesis of Polymers”, once to be found above his desk at English China Clays, are now in the rather more accessible shelves of the British Library at Boston Spa. All three are abstracted before being passed on.

And there, as they say, the matter rests at present, and I conclude this report.

K. M. BEAZLEY, 28.8.73.

REPORT OF THE HON. TREASURER FOR THE YEAR 1972-73

The attached accounts show a gratifying increase, to £494.93, in the excess of income over expenditure but I regret that this sum is rather misleading. In particular it includes £86 (which will later be disbursed to the University of East Anglia) in advance payments for the Autumn Conference and it reflects low expenditure on production costs of the *Bulletin*. The latter arose because the cost of printing for only three issues of the *Bulletin* (instead of the usual four) was charged during the financial year and a substantial rise in this expenditure can be anticipated for next year.

As predicted in my report last year there is a considerable drop in expenditure under the heading “Membership Secretary”, due partly to the generous offer by Pergamon Press Ltd. to despatch *Rheology Abstracts* direct to members. The system seems to be working well and the only cost to the Society is postage. Income from our share of the profits from commercial sales of *Rheology Abstracts* is now only

about £100 below the amount received some years ago having recovered from the very low level of 1971.

During the year £1,300 was transferred from Deposit Account to the Trustee Savings Bank in order to obtain a higher interest rate. On a short term basis this has not proved very advantageous but over a period may be beneficial.

A major decision taken during the year was that the Society should not register for V.A.T.—our turnover is such that registration would be voluntary. Little if anything would be gained financially and the paper work would be considerable.

R. W. WHORLOW, Honorary Treasurer.

BRITISH RHEOLOGY SOCIETY

Balance Sheet as at 30th June, 1973

ASSETS

Brentwood U.D.C. 7% Bond	...	...	...	...	1500.00
Trustee Savings Account	...	...	...	...	1300.00
Debtors	...	...	...	...	15.75
Cash at Lloyds Bank Ltd.					
Deposit Account	...	...	...	...	649.37
Current Account	...	...	...	...	261.59
Conference Account	...	...	...	...	86.00
					996.96
					£3812.71

Less

CURRENT LIABILITIES

Sundry Creditors	...	...	...	...	...	345.01

NET ASSETS	...	...	...	...	...	
						£3467.70

Represented by:—

GENERAL FUND

As at 1st July, 1971	...	...	...	...	...	2972.77
Add Excess of income over expenditure for the						
year	...	...	...	...	...	494.93
						£3467.70

R. W. WHORLOW. Hon. Treasurer.

We have examined the above Balance Sheet and annexed Revenue Account together with the books and vouchers of the Society, and certify them to be in accordance therewith. We have not inspected the membership records.

ALFRED SIMMONS & CO.,

Chartered Accountants.

The Market Hall,
Redhill, Surrey.
6th September, 1973.

CONFERENCE ACCOUNT

Cost of Autumn 1972 meeting	33.75
Estimated cost of Spring 1973 meeting	180.00
	213.75
Income for Autumn 1973 meeting	86.00
Net loss shown in Revenue Account	£127.75

BRITISH SOCIETY OF RHEOLOGY

Revenue Account for the year ended 30th June, 1973

EXPENDITURE

	Committee Expenses (mainly travel):—		
247	Council	271.18	
99	B.S.I. Committee	155.72	
11	British National Committee on Materials ...	4.95	
			431.85
562	<i>Bulletin</i> —Production Costs		346.07
98	<i>Abstracts</i> —Production Costs		94.50
	Expenditure by Officers:—		
42	Secretary	29.20	
16	Treasurer	9.29	
595	Membership Secretary	333.05	
			371.54
57	Conferences—net loss		127.75
25	Professional Fees		27.50
18	General Expenses (Including gold medal) ...		103.07
			1502.28
165	Excess of Income over Expenditure for the year		494.93
			£1997.21

INCOME

1014	Annual Subscriptions and Entrance Fees ...	947.66
641	Publisher— <i>Rheology Abstracts</i>	789.13
14	<i>Bulletin</i> Subscription	6.28
	Sale of Publications	56.44
2	Donations	10.00
	Circulation of leaflets	20.00
	Investment Income—Gross:—	
27	Bank Deposit Interest	61.70
124	Brentwood 7% Bond	105.00
		166.70
	Miscellaneous Income	1.00
		£1997.21

BRITISH SOCIETY OF RHEOLOGY

MEMBERSHIP SECRETARY'S REPORT

Membership of the Society stands at 570. Of those, 370 are British and 200 are foreign. On the face of it, this represents a very large drop in membership from last year when membership appeared to be 627. However, the latter figure included a large number of members who were anything up to two years in arrears with subscriptions and who consequently had their membership discontinued.

Wastage is always a problem in any Society and this must be accepted. At this moment 24 members are £2 in arrears and are in great danger of forfeiting membership. A further 16 members are continuing to pay by banker's order the old subscription of £1 per annum instead of the new subscription of £2 per annum. I would appeal to any members in this position to make up the £2 deficit as quickly as possible.

During the year 33 new members joined the Society and 16 resigned. The resignations were almost all due to change of work or retirement.

Your committee was pleased to be able to grant honorary membership to 5 members during the year.

Many members change their addresses without informing the Society. This means that mail gets returned and then the member does not receive either *Bulletins* or *Abstracts*.

I would appeal to all members to bear this point in mind.

J. FERGUSON, 14th September, 1973.

ANNUAL REPORT OF HONORARY EDITOR, RHEOLOGY ABSTRACTS

Rheology Abstracts continues to appear at regular intervals much as before. Over the last year we have published 901 new abstracts from the world literature, four book reviews and summaries of 43 papers presented at the Society's conferences. In addition there were of course my author index and Dr. Mardles' immense subject index for volume 15. Dr. Mardles has now been compiling these indexes since 1964, and we are all most grateful for his assistance.

During the year five new abstractors have started, though exactly the same number have resigned, so the total stays at 29. Once again I must express the Society's thanks to everyone who helps in this way, and also to the reviewers of books. These are organised by Mike Culpin who writes: "Will anyone who desperately wants to, or indeed has the slightest inclination to, review a book in any way connected with rheology get in touch with me at 55 Laburnum Grove, Striling". A list of Abstractors over the year is given in the appendix.

My four-year term as Editor has now come to an end, so I am now handing over to Dr. D. E. Marshall of the Institute of Polymer Technology at Loughborough. I would like to wish him success, and I hope that he will enjoy his term as much as I have done. As I mentioned earlier we have had five abstractors' resignations this year; three of these have been in the last few weeks so there are some journals which have no cover at the moment. The most important is *Rheol. Acta*, and some others are included in the appendix. If anyone would like to have a go at abstracting these or any other relevant journal which we miss at present I know Dr. Marshall would like to hear from you.

A. EVANS, September 1973.

Department of Surgery,
Royal Victoria Infirmary,
Newcastle-upon-Tyne.

List of Abstractors 1972-3

- Mr. D. M. Bancroft (Netherlands)
- †Dr. H. A. Barnes (Port Sunlight)
- Mr. M. Bayliss (Strathclyde)
- Dr. K. M. Beazley (St. Austell)
- Dr. C. E. Chaffey (Canada)
- *Mr. F. N. Cogswell (Welwyn)
- *Mr. M. M. Cross (Manchester)
- (B) Dr. M. F. Culpin (Stirling)
- *Dr. P. K. Currie (Coleraine)
- Mr. C. R. Dimond (Sheffield)
- †Mr. C. B. Duckham (Salford)
- Dr. J. Ferguson (Strathclyde)
- Mr. F. A. Glover (Shinfield)
- †Dr. M. J. Groves (Chelsea)
- Dr. D. W. Hadley (Reading)
- Mr. R. W. Higman (Warren Spring)
- Mr. J. F. Hutton (Chester)
- Mr. H. A. Johns (Reading)
- *Dr. R. S. Jones (Aberystwyth)
- Mr. P. Langborne (N.E.L.)
- Mr. R. S. Lenk (South Bank)
- Dr. F. M. Leslie (Strathclyde)
- Dr. J. Nebrensky (Swansea)
- Dr. D. R. Oliver (Birmingham)
- Dr. A. J. Palfrey (Charing Cross)
- Dr. C. J. S. Petrie (Newcastle)
- †Dr. M. C. Phillips (Chester)
- Mr. R. N. F. Pinfold (Melton Mowbray)
- Dr. A. Plochocki (Poland)
- Dr. R. Roscoe (Newcastle)
- Dr. J. Scott (Colchester)
- *Mr. M. Sherriff (Holloway)
- †Mr. G. R. Sothern (Brunel)
- Dr. J. Ulbrect (Salford)
- (B) also co-ordinator of book reviews
- †Resigned
- *New abstractor

SOME JOURNALS NOT AT PRESENT COVERED FOR RHEOLOGY ABSTRACTS

Acta Pharm. Suecica
 Arch Pharm. Berlin
 A S L E Trans
 Arzneimittel Forsch.
 Annls. pharm. fr.
 Appl. Materials Res.
 Bull Acad. Polon. Ser. Sci. Tech.
 Bull Chem Soc Japan
 Chem. Petrol. Engng
 Chim. Ind. Milan
 Coll Czech Chem Comm.
 Dokl (Akad nauk SSSR) Chem Technol Phys Chem
 Ind. Labor.
 Indian J Technol
 Int J Nonlinear Mech.
 Int J Solids Structures
 J appl chem.
 J appl chem U.S.S.R.
 J appl Mech.
 J biomech.
 J chem engng
 J chem phys
 J chem Soc.
 J composite Mater.
 J materials sci.
 J pharm. pharmac.
 J pharm Sci.
 J pharm Soc Japan
 J. Res. N B S
 J Soc cosmet. chem.
 J text Inst.
 Jap. J appl phys.
 Ko Fen Tza Tung Hsan
 Koks i Khim
 Lab Pract.
 Meccanica
 Pharm Weekblad
 Pharm acta Helv.
 Pharm. J
 Polymer Mech.
 Rheologica Acta
 Schweizer Archiv.
 Sov. phys tech phys
 Sov. plastics
 Text. res J
 Zairyo.

REPORT OF THE EDITOR OF THE BULLETIN

This report marks the end of the present incumbent's first full year of office. Inevitably there have been a few teething troubles and human failings which it is hoped members will excuse. For example, one of last year's aims, to include "stop press" news sheets, has not been possible owing to the withdrawal of an offer of assistance that had been made earlier. If any member would be willing to help in this direction the idea could be reconsidered.

During the year there have been some useful contributions from members in the form of technical and general articles and we are most grateful to those concerned. However, there is always room for more, no matter how large or small. With the risk of almost repeating last year's report, the "news" in the bulletin can only contain what is fed into it. Please keep on writing and get your friends to as well.

B.S.R. AUSTRALIAN BRANCH—ANNUAL GENERAL MEETING

Melbourne, September 20th, 1973

The meeting was addressed by Mr. P. Dunn, Head of the Polymers and Textiles Groups at the Defence Standards Laboratories, on the subject of "Polymers in Adverse Environments". In contrast to the years prior to 1965 when many new kinds of polymeric materials were developed, recent years have seen concentrated efforts to improve and apply such polymers. Examples were given of polymers proved suitable for exacting conditions, such as high or low temperature, severe mechanical treatment, exposure to severe climatic conditions, to fire and biological attacks. Australia has sites of extreme exposure to sunlight, to high humidity or to severe biological attack, and such sites have been chosen for testing whether new polymers comply with such stringent requirements.

REPORT ON THE WORK OF THE B.S.I. COMMITTEE (C/41) ON RHEOLOGICAL NOMENCLATURE

This Committee has met about twenty times in the course of the last five years. All the Members (about half a dozen) were nominated by the Council of the British Society of Rheology. Most of the Meetings were held at the B.S.I. Office in Green Street, London, W.1., but a few of the later Meetings (two of which were two-day Meetings) were held at the Graduate Club, Oxford.

This list of definitions of rheological terms is now completed (except for a few minor points that can be settled by post) and will shortly be published by the B.S.I., to be reviewed in five years' time, in accordance with the rules of the B.S.I. Some three hundred rheological terms (some of them synonyms) were discussed in detail and defined. Some other terms, although used by rheologists, are commonly applied in other departments of physics and are defined in the standard physics textbooks. These were not included. Purely mathematical terms were also not defined. It was agreed to use mathematical formulae only when essential to define a term adequately, and this was very rare.

Three previous documents were always on the table and were frequently used: (1) The French list of rheological terms, with English translations: (2) The Australian list: and (3) The list published in Eirich's text-book by Reiner and Scott Blair in 1967. Towards the end of the series of Meetings, comments were invited from other rheologists, not Members of the Committee, and these were all carefully considered. (At one point, the Chairman found himself faced with something like 250 suggested amendments!)

During this five-year period, several B.S.I. Secretaries served the Committee and all were most helpful; but special mention should be made of the present Secretary (since the Committee still exists): Mr. O. W. Molony. Although he often said that he was not a rheologist and did not follow all the technical discussions, the whole Committee was impressed by the quite remarkable way in which he reproduced, in concise Minutes the often very complicated "to and fro" of the discussions; and the efficiency with which he instantly spotted any *non sequitur* in what was proposed.

The work of the Committee was also greatly helped by the attitude of all its Members. These represented a wide range of rheological interests and sometimes the same term was found to be used in different senses in different industries. Discussions often became very controversial, but in the end, a vote was seldom necessary and if one (or very occasionally two) Members were in disagreement, they always accepted willingly the majority view. The extremely friendly personal relations between all the Members of the Committee throughout the long and sometimes tiring discussions certainly made the Chairman's task very much easier than it might otherwise have been.

In a recent criticism of a book, the Chairman was accused of being "obsessed by nomenclature". Perhaps he should plead guilty! It seems quite essential that if we are to understand one another, we must try to attach the same meanings to the same technical terms.

G. W. SCOTT BLAIR, Chairman, B.S.I.
Committee on Rheological Nomenclature, Norwich, September, 1973.

**REPORT ON THE CONFERENCE ON "MULTIPHASE
SYSTEMS" AND "ELONGATIONAL FLOW" HELD
AT THE UNIVERSITY OF EAST ANGLIA, NORWICH,
18th-21st SEPTEMBER, 1973**

By P. L. LANGBORNE

The Autumn Conference of the Society is usually something to look forward to and the 120 delegates to the 1973 Conference should have left Norwich with most of their expectations fulfilled.

Dr. Godfrey, Bradford, opened the proceedings with a paper on the "Breakdown and recovery of thixotropic fluids". Fluids for which viscometric measurements had been made included fuel oils, crude oils, clay suspensions, salad cream, yoghurt and flour slurries. This long "shopping list" set the tone for the conference. Before we left other speakers had mentioned asbestos, polymer solutions, alkaline Perbunan latex, melted chocolate and printing inks—so the most varied interests were catered for.

David Cheng has, of late, taken to producing small bottles, whose contents, when shaken, bounced or otherwise disturbed, can be relied upon to exhibit some outrageous rheological behaviour. On this occasion he did not disappoint us. His paper "Some measurements on a negative thixotropic fluid" described the properties of an alkaline Perbunan latex dispersion which turned, on shaking, from a milky white fluid into a gelatinous mass, rolling about in the bottle. There was a lot more to it than that, of course. Careful mapping of constant structure curves and other measurements showed the structural build-up to be governed by a critical shear rate/time of shear relation.

The opening session went on with papers by Deysarkar, Chavan and Ulbrecht on the rheology of thixotropic pastes and by Dr. W. M. Price on the green strength of ceramics. The latter was completely new ground to many delegates and dealt with the application of the modulus of rupture test to various clays and ceramic bodies over a wide range of moisture contents. Simplicity with depth was the keynote of this approach.

Two papers dealing with oscillatory motion then followed. Both were characterised by their polished presentation and a wealth of careful research work. In the first paper J. Ferguson, M. Bayliss and J. Beresford examined the oscillatory flow of pigment suspensions of different concentrations and in different media and related their results to the steady thixotropic characteristics. In the second paper Dr. H. A. Barnes and Mr. A. R. Eastwood penetrated into areas where many other workers have hesitated to venture in their experimental study of "The effect of the superposition of oscillatory motion on the steady flow of shear thickening gels". Those of us who struggle to determine what the various theories mean had these simplified and

ably explained by Dr. Barnes who reviewed the published work and presented his own experimental study of shear-thickening starch suspensions.

The afternoon session on the first day began with a paper by I. A. Whittaker and F. J. Mallon on the rheological properties of aqueous dispersions of chrysotile. A lively interest was shown in this paper in view of recent reports of the use of asbestos fibres as drag-reducing agents. To the evident disappointment of questioners in the subsequent discussion, drag reduction received only a passing mention.

Dr. I. Wagstaff of I.C.I. Paints let delegates into the mysteries of "dispersymer" technology when he illustrated the remarkable viscosity changes resulting from variations in the particle diameter and disperse phase volume of absorbed preformed graft copolymers on various dispersions of polymethyl methacrylate in aliphatic hydrocarbons.

A founder member of our Society, Dr. Scott Blair can always be relied upon to present the Conference with a challenge. This year he offered us a "few new suggestions in connection with the Nedonchelle-Schutz effect". Needless to say these "suggestions", offered with Dr. Scott Blair's usual clarity of expression, sparked off a lively discussion, whose echoes could be heard later in informal discussions.

Two papers of extraordinary quality dealing with suspensions were those of Mr. M. M. Cross, "Viscosity-concentration relations in suspensions" and Dr. E. J. Hinch, "The rheology of a suspension of particles affected by Brownian couples". Mr. Cross gave a very lucid exposition of his theme, supported by excellent slides and Dr. Hinch evinced that quality so rare amongst mathematicians of making a complex subject readily understandable. His idealised dilute suspension "had everything"—strain hardening, shear thinning and oscillatory overshoots. No wonder a member of the audience appealed for Messrs. Cross and Hinch to "get together".

Day One of the Conference was concluded with papers by Dr. C. B. Duckham on the "Rheology of thick inelastic suspensions applied to pipe flow" and Mr. W. L. Murray on "Flow reversal effects with viscoelastic liquids".

A word must be said at this point on the discussions. Ample time was allowed for the discussions which were lively and, on occasions, hard hitting. Dr. Duckham, in particular, was called upon to answer a particularly direct question—which was afterwards discovered to refer to another paper!

On 20th September Mr. C. A. Street opened the morning session by giving us "Some thoughts on the flow of melted chocolate" together with free samples of one of his firm's products. This welcome gesture did not however placate some of his critics, who evidently did not share his thoughts, or so they said, during the ensuing discussion. Dr.

W. M. Jones' paper "Displacement of one fluid by another in naturally occurring porous media" was of considerable interest. In such displacements, the fluids flow quickly through the more permeable regions causing early breakthrough of the displacing fluid. Dr. Jones examined a good deal of data relating to the flow of dilute polymer solutions through porous glass filters and suggested physical principles which should assist in increasing the relative flow in the less permeable regions.

Two excellent papers by continental authors followed. Dr. S. Boucher's work on the "Effective moduli of isotropic two-phase composites" contained a very comprehensive mathematical treatment of his subject and was well illustrated by slides. Dr. Andrew Plochocki's name has been a familiar one in the literature of polymer processing for a number of years and it was pleasant to hear him deliver his paper on the "Composition dependence of the viscoelastic behaviour of binary blends of polyolefins". This was highly specialised work but of great interest to the many polymer scientists among us and it was evident that Dr. Plochocki spoke from a wealth of experience. Formal proceedings for Day Two were concluded by a paper describing experiments on the characterisation of viscoelastic fluids by Mr. P. Langborne and Mrs. S. C. McKay.

The afternoon of 20th September was spent on visits. Your reporter visiting the Norwich factory of Reckitt & Colman, Food Division, learnt a great deal about the products of this versatile firm and came away armed with a sample of goodies to placate the better half. Other visits were to the Norvic Shoe factory and to Blickling Hall. The Conference Dinner at the Castle Hotel, Norwich, was (to your reporter) somewhat of a disappointment. The meal was excellent but after it was announced that "... by established custom there will be no speeches" an awkward silence fell. What custom, I thought, and who established it? We certainly wanted no long-winded effusions but a few words from some of our distinguished participants would not have been amiss. As it was, one disgruntled delegate was heard to mutter "Say something, even if it's only good night!"

The sessions on the first two days having been devoted to multi-phase systems, the emphasis of the conference changed somewhat, the session on 21st September being devoted to elongational flow.

The session began with a paper on the rheology of wet fibre spinning delivered with characteristic vigour by Professor Vinogradov. The Professor described a very interesting set-up, using a leverage system and flexible connections to the solution guide and spinnerette. This enabled the stresses in stream stretching to be measured. The materials investigated were solutions of polymers and copolymers of vinyl chloride and acrylonitrile.

Dr. N. Hudson described an interesting elongational viscometer developed at the University of Strathclyde when he read a paper by

Ferguson and Mackie. The viscometer is designed to measure the viscosity of fluids with steady shear viscosities below about 500 P. The method was not without its critics and a lively discussion followed.

Dr. R. Bragg was not present to read his interesting paper, "Flow patterns upstream of orifices" but this was ably done for him by Dr. D. R. Oliver, who then read his own and complementary paper "Prediction of flow patterns in the flow of a viscoelastic liquid into an orifice". The latter used a very simple theory to explain the variation of the cone angle with orifice size, viscosity and polymer concentration. The predicted cone angles agreed approximately with those measured by photographs.

A very useful paper was that of Cogswell and Moore, "A comparison between simple shear, elongation and equal biaxial deformation". General Electric's biaxial deformation data on a polyisobutylene was combined with the authors' data from simple shear and tension and dynamic measurements on the same material. A simple theory was evolved which related the different measurements up to instability over a wide range of time scales.

A new and fascinating research tool to most of us—the laser anemometer—was described by Dr. W. MacSporran, who had used it to obtain velocity profiles in connection with "Velocity measurements in a falling liquid jet" (a joint paper with D. D. Goulden).

The morning closed with a description of a parallel plate tackmeter developed at the Graphic Arts Research Laboratory, Helsinki, Finland. The paper was read by the charming Miss P. T. Oittinen, who dealt very competently with some difficult questions in the ensuing discussion.

The final afternoon of a conference often tends to be poorly attended but in this case a fair number of delegates stayed to the end to listen to three good papers and to watch an equally fine film.

Dr. C. J. S. Petrie presented "Studies in filmblowing"—a follow-up to theoretical work previously reported at Lyon. This was essentially a study of a steady biaxial extension process and a careful mathematical treatment led to very useful conclusions.

R. Worth and J. Parnaby's study of post extrusion swelling, read by the latter, was easily the most thorough treatment of this subject of recent times. The authors suggested that swelling was due to the elastic recovery of the deformed strain ellipse and that the elastic properties of the materials could be described by a principal stress/principal strain law.

A formidable list of authors M. J. Barron, R. H. Peters, G. S. Senior, M. J. Sleeman and G. H. West contributed to the last formal paper of the conference, entitled simply "Injection mould flow". Dr. West explained that the object of the work was to improve the understanding of the flow occurring in runners, gates and cavities of injection moulds. The paper certainly did this and produced a few

surprise results into the bargain! Increasing the number of elbows in a runner actually decreased the total runner pressure drop for a given geometric runner length. This was due to the deviation of the high velocity centre region near a bend which reduced the geometric path length.

The final item in the programme was a remarkable film dealing with "Crystallisation during elongational flow" by Keller and Mackley of the University of Bristol.

How does one sum up a conference like this? For solid technical content this one would have been hard to beat. Dr. Beazley and his helpers are to be congratulated on having devised a programme which held the interest of delegates all the way through. There was something for everybody, experimentalist and theoretician alike.

The conference arrangements went, on the whole, very smoothly. The only complaint seemed to be the cell-like character of delegates sleeping accommodation. One delegate solemnly averred that he was wakened one morning by the cold grip of a manacle on his ankle and another suggested that a Mr. Albert Pierrepont lived in one of the small rooms at the end of a corridor. As to the first phenomenon, we have no explanation but we understand that the latter suggestion is untrue. The gentleman in question keeps a pub in Altrincham!

"RHEOLOGY IN FOOD PROCESSING AND FOOD QUALITY"

ZURICH—OCTOBER 1973

The symposium was held over three days in the impressive building of the Swiss Federal Institute of Technology in Zürich.

The Plenary session was opened by Dr. P. Sherman who will be well known to members. He outlined the need for testing materials under the correct conditions of stress and strain and the need for visco-elastic measurements on many semi-solid systems. He demonstrated how creep, stress-relaxation and dynamic measurements could be made on different substances using different geometries and showed how the analysis of different substances could be compared.

C. R. Elson (Leatherhead) gave a comprehensive survey of current designs of viscometers, and indicated the vast number of instruments available for testing solid foods.

R. Zangger (Contraves) pointed out the many pitfalls in Rheometry which many rheologists either are ignorant of or ignore. He pointed out the necessity of careful temperature measurement and control and told the story of how he discovered one thermometer he had been using had eleven divisions between 10 and 20°C and nine between 20 and 30°C!

The necessity of identifying the correct phenomena responsible for producing particular observed results was pointed out.

In the final plenary lecture J. Prihoda (Prague) described a capillary extrusion viscometer capable of a continuously variable flow-rate. A specially developed/linear strain gauge was used to measure the pressure. The results showed excellent agreement between this rheometer and conventional viscometers.

P. Walstra (Wageningen) talked about particle size distribution produced by various viscometers. After briefly outlining the theory, and introducing some mathematics he demonstrated that the viscosities of both continuous and disperse phases affect the particle size produced. Additives and the type of homogeniser also affect the particle size, and distribution.

J. M. Smith (Delft) gave a comprehensive review of methods of mixing high viscosity solutions and suspensions. He emphasised that both shear and elongational flow are useful and maximum efficiency may be obtained by a combination of both. A plea was made for more knowledge of the hydrodynamics of complicated materials and geometries.

Mrs. Boyd gave an interesting account of the importance of the interfacial rheological properties and the bulk properties of food emulsions, and other foods, and indicated the importance of interfacial viscoelasticity in predicting, and explaining, emulsion stability.

The first day's session was suitably rounded off with aperitifs provided kindly by Nestlé Ltd. The wine obviously had a low viscosity since there was very little resistance to flow, consequently tongues began to show elastic properties.

Tuesday morning offered little change in the Zurich weather, one might have been in London. H. Thijssen (Eindhoven) started the morning proceedings with a talk on aroma retention in spray drying. Most aroma compounds are more volatile than water, however, if water concentration is low, aroma retention is high.

Large droplets take longer to decelerate, therefore, they dry more rapidly. Internal circulation promotes aroma loss, therefore higher viscosities are desirable. However, this causes problems in the atomiser and care must be taken in choosing the optimum conditions.

Y. Malkki (Finland) described some experiments on deep frozen bread. It would appear that differences in storage temperature are masked by variations in batches.

When cans of food are heat treated the transfer of heat is effected chiefly by convection. A. Mynott (Weybridge) has attempted to examine the little known theory of heat flow in an enclosed space. Specially prepared cells have been made to observe this effect.

Gels and polymer solutions can be treated to the rubber theory using a concentric cylinder instrument designed by Nijenhuis (Delft)

for dynamic measurements. For polymers G' reaches the rubber region only after 100 hours. Gelatins however take less than one hour. The story for the loss modulus is much more complicated.

J. Rasmussen (Denmark) has used Instron curves to define some textural parameters of gels. Big differences are observed between different agents. The effect of sugar and salt, and the pH is very varied.

The weather had by now improved and the afternoon trips were enjoyed in pleasant sunshine. The trip round Lindt chocolate factory proved interesting in spite of the language problem. We were shown the new process by which it is no longer necessary to stir for "three long days". It will probably be some time before some of us want to eat any more chocolate.

The evening trip (trips) round the lake proved very pleasant with an excellent lunch! (At 7.30 p.m.?) The plentiful supply of alcohol ensured that most participants slept well.

Wednesday morning showed that most people had recovered sufficiently to hear R. Stefanovic from Yugoslavia describe his measurements of hardness and elasticity on cheese. Maturing at 75°C produces a softer cheese than at higher temperatures and also less elastic.

A light breadcrumb is desirable in bread. High viscosity doughs retain more gas and hence provide light crumbs. A. Bloksma (Wageningen) explained how this is enabled by adding small amounts of oxidants, thus affecting disulphide cross links between the protein molecules.

C. Street (Rowntrees) did not disappoint us and brought plenty of samples, although some were still suffering from a surfeit of Lindt (or was it something stronger). When sucrose solutions are injected into moulds to make sweets they must have the right viscosity and elasticity otherwise "tails" form and make the product unacceptable. Correct parameters are obtainable on a "Weisenberg" using oscillatory modes.

"The consumer doesn't like better meat". That seemed to be the cry from A. Hawkins (Unilever). By taking unacceptable cuts of meat, comminuting and retexturising it a product can be obtained which resembles rump steak in many physical respects, but it is still unacceptable to the consumer.

Eggs are a substance little studied by rheologists, B. Erdtsieck has found that fresh whole egg white is thixotropic but can be reduced to a Newtonian by homogenisation. The viscosity is not important in cake manufacture but the viscosity temperature behaviour of whole egg is important in the manufacture of Advocaat!

M. Sambuc (Marseille) has correlated spreadability of margarine with extruder studies and the relationship between firmness and solid-liquid ratio.

R. Pollit (Lyons) has formulated a theory to relate the rheological behaviour of shortening to its crystal structure and solids content.

In introducing the final session Dr. Sherman outlined the relationship between the textural and rheological properties. He emphasised that texture is a combination of many properties. He also emphasised the importance of choosing the correct conditions to perform a measurement.

R. Lasztity (Budapest) made some observations on the relationship between composition and rheological properties of foods. With solids this is not easy. Fluids, however, do show quite good correlation with some properties.

In the final lecture B. Drake (Sweden) introduced us to the very new, and complicated field of Psycho-Rheology. The interaction between instrumental rheology and sensory rheology needs much more research.

WOLFE AWARD 1972

Another member of the Society has won the Wolfe Award for the most outstanding contribution to the research work of the Department of Trade and Industry. He is Dr. D. C.-H. Cheng of Warren Spring Laboratory, Stevenage.

The 1972 Wolfe Award was made for Dr. Cheng's investigation into the problem of pipeline flow of non-Newtonian fluids and high viscosity materials. The work involved studies on the measurement of non-Newtonian viscosity and the characterisation of thixotropic behaviour; the development of pipeline design procedures for non-Newtonian fluids and start-up flow of thixotropic materials, and a novel pneumatic method of pipeline transportation of thick pastes. The results have been widely applied in industry.

Dr. Cheng joined the Society in 1964 and is a frequent contributor to scientific meetings of the Society and the Bulletin. He was an Abstractor and undertook a survey of the B.S.R. Membership in 1966. He was a member of the joint I.C.E.-B.S.R. Working Party on Non-Newtonian Flow and, subsequently, secretary to the B.S.R. Working Party on the classification of Rheological Research on Solids. His work in the field of applied rheology was noted during the 1969 Gold Medal Competition, when his entry on "The design of pipeline systems for non-Newtonian fluids" was commended by the adjudicators and Council.

THE KARL WEISSENBERG 80TH BIRTHDAY CELEBRATION ESSAYS

Copies of the above work are available from:

The East African Literature Bureau,
Ngong Road,
P.O. Box 30022,
Nairobi, Kenya.
(Mrs. R. Mwangi.)

Price Kshs. 40/- (approx. B£2.25). Postage (Surface or Air Mail) Extra

NEW JOURNAL

An international quarterly, "Reviews on the deformation behaviour of materials", is now published by the Freund Publishing House, P.O. Box 35010 Tel-Aviv, Israel.

The first few issues will deal with glass, cermets, composites, concrete and clays, stress relaxation, collective dislocation models, etc.

Prospective contributors should write to the editor: Professor P. Feltham, Brunel University, Uxbridge, Middlesex, England, UB8 3PH. For specimen copies and other enquiries the publishers should be contacted.

FUTURE MEETINGS

Second International Conference

**CARBON FIBRES: THEIR PLACE IN MODERN
TECHNOLOGY**

18th-20th February, 1974

In February 1971 the Reinforced Plastics Group of the Plastics Institute mounted the first international conference on "Carbon fibres" which discussed their composites and applications. That conference served as a focal point for all those engaged or interested in the field and brought them together for meaningful discussion not only on the science and technology of carbon fibres and their composites but also on the possibilities for commercial exploitation in the future.

This second conference takes up the above final theme and, in addition to highlighting new work that has taken place in research, materials development, processing technology and the evaluation of composite structures, it will discuss the areas in which carbon fibre technology has been successfully applied. The final session in the programme will, in open forum, take a critical look at the whole field of carbon fibres and their future potential.

The conference will be held at the Institution of Electrical Engineers, Savoy Place, London WC2. Registration fees, inclusive of pre-

prints and refreshments (but not lunches) are £33 (including V.A.T.) for P.I. members and £44 (including V.A.T.) for non-members. Registration forms are now available from Mr. D. H. Cohen, Assistant Secretary (Activities), The Plastics Institute, 11 Hobart Place, London SW1W 0HL (tel.: 01-245 9555).

Conference on
STRUCTURAL PLASTIC FOAMS

27th and 28th February, 1974

This conference, being organised by the Yorkshire Section of the Plastics Institute, will critically review recent advances in structural plastics foams. The programme will appraise global markets for these foams and discuss current and future application areas as seen by the consultant, the custom moulder, the industrial designer and the materials supplier. (Details of the programme are given in the enclosed registration form).

The conference will be held at the Norfolk Gardens Hotel, Bradford BD1 5SH. Registration fees, inclusive of preprints, lunches, conference dinner and refreshments are £22 (inc. V.A.T.) for PI members and £28.60 (inc. V.A.T.) for non-members. Registration forms can be obtained from Dr. D. Clayton, P.I. Yorkshire Section, c/o bld Plastic Tools Ltd., 32 Union Street, Heckmondwike WF16 0HH (tel.: Heckmondwike 6621).

CHARACTERISATION AND PROPERTIES OF POLYMERS
IN SOLUTION

24th-29th March, 1974

A one-week course for members of the rubber and plastics industry. Details from: Dr. R. E. Wetton, Department of Chemistry, University of Technology, Loughborough, Leics. LE11 3TU. Phone: Loughborough 63171, ext. 368.

CONFERENCE ON THE CONSERVATION OF MATERIALS

Harwell, 26th and 27th March, 1974

The natural resources from which engineering materials (i.e. plastics, ferrous and non-ferrous metals, bricks, timber etc.) are made are being used up at ever increasing rates. Some forecasts predict shortages arising within the foreseeable future. Are these predictions correct? If so, what are the implications for industry? Are we extravagant in the use of some of our materials? Do we always select the best material? How important are the related energy factors?

The two-day Conference will discuss how we can select and use engineering materials more wisely, how in fact to apply a policy of materials conservation which might include measures such as:

- widening the resource base
- more recycling of scrap materials
- greater economy of materials usage in the design of articles
- increasing the life of article by improved design
- substituting existing materials with different materials based on more abundant resources.

The Conference will be opened by Sir Alan Cottrell, F.R.S., Chief Scientific Advisor to the Cabinet. *Six key-note papers will be presented:*

- “Non-Renewable Mineral Resources”, by Sir Kingsley Dunham, F.R.S., Director of the Institute of Geological Sciences.
- “The Future of the Iron and Steel Industry in relation to the availability of its resources of materials”, by Dr. H. M. Finniston, F.R.S., Chairman and Chief Executive of British Steel Corporation.
- “Recovery and re-cycle”, by Dr. A. J. Robinson, Director of Warren Spring Laboratory.
- “An Industrialist’s View of the Conservation and Recycling of Materials”, by Dr. J. B. P. Williamson, G.K.N. Ltd.
- “Substitution—for Communal or Sectional Benefit?” by Mr. J. Crowther, B.N.F.M.R.A.
- “Management Policies for Non-Renewable Material Resources”, by Professor F. Roberts, Brunel University.

Other papers include:

- “Recycling, Storage and Dumping of Liquid Industrial Wastes”, by Dr. A. V. Bridgwater, Dr. J. W. Gaskarth, Aston University.
- “Ceramics—Materials with an Engineering Future?” by Dr. R. W. Davidge and Mr. R. A. J. Sambell, A.E.R.E. Harwell.
- “Energy Costs of Producing Copper and Aluminium from Primary and Secondary Sources”, by Mr. P. F. Chapman, Open University.
- “Efficient Utilisation of Materials—One Answer to our Balance of Payments Problem”, by Mr. B. H. Dyson.
- “Conservation of Building Materials and the Future of the Built Environment”, by Professor J. K. Page, Sheffield University.
- “Models of Materials Consumption”, by Mr. H. H. Inston, Programmes Analysis Unit.
- “The Use of By-Product Materials in Concrete”, by Dr. W. Gutt, Building Research Establishment.
- “Impact of Plastics on Materials Resources”, by Dr. E. S. Narracott.
- “An American View of Problems of Materials Conservation”, by N. Promisel, U.S. Materials Advisory Board.

Abstracts of all the papers will be preprinted and issued with the final programme to all registered participants about two weeks before the Conference. The full text of all the papers presented will be published as a Conference Proceedings shortly after the Conference, and a copy sent to each participant at no extra charge.

A Conference Dinner will be held in the Harwell Restaurant on Tuesday evening, 26th March. No additional charge is payable by registered delegates. Guests may also attend at a charge of £5 per head, inclusive of wines.

On the day following the Conference, Thursday, 28th March, 1974, a tour of selected sections of the laboratories of the British Non-Ferrous Metals Research Association at Wantage, and the Atomic Energy Authority at Harwell will take place, subject to sufficient demand. There will be an additional charge of £1.50 for those making the tour to cover lunch, refreshments and local transport.

The Registration Fee is £30. Members of the Institution of Chemical Engineers will be charged a reduced fee of £25. The fee will include the cost of lunches, refreshments, transport, the Conference Dinner, the book of Abstracts and a copy of the Proceedings. Guests of delegates may attend the Conference Dinner at the additional charge of £5 per head.

Closing date for Registration—10th February, 1974.

Reservations have been made at The Queen's College, Oxford, from the evening of 25th March until Friday morning 29th March. The charge for a single room is £3.30 per night for bed and breakfast. Dinner, if required, will be charged at £1.32. These charges include gratuities and Value Added Tax. Suitable accommodation can be arranged at the College for married couples. These charges must be paid to the Conference Secretary along with the Conference Fee.

Transport will be provided daily between The Queen's College and Harwell, and between Didcot Station and Harwell.

For delegates who prefer hotel accommodation there is a good selection of hotels in the Oxford/Thames Valley district. Reservations must be made direct and not through the Conference secretariat. It is regretted that the Conference cannot provide transport to or from hotels.

A final programme and full details of arrangements will be sent to delegates about two weeks before the Conference. Any further enquiries should be addressed to:

Mr. C. J. A. Preuveneers,
Education Centre,
Building 455,
A.E.R.E., Harwell,
DIDCOT, Berks.
OX11 0QJ.

International Symposium
PLASTICS IN AGRICULTURE AND HORTICULTURE: NEW
DEVELOPMENTS

25th–27th March, 1974

Keen interest has been aroused by the recent Call for papers issued for this conference, being organised by the Plastics Institute London Section and the British Agricultural and Horticultural Plastics Association, at the Wye College (University of London) near Ashford, Kent. A wide range of papers has been offered, including several from overseas, and these will be presented under the following three main headings:

- 1 *Horticulture*—covering developments concerned with crop production and the effect of plastics on the growing environment.
- 2 *Agriculture*—to include the use of composites for construction and developments in drainage.
- 3 *Produce handling and packing*—presenting new ideas on produce handling and material developments.

The opening paper entitled “The challenge of plastics in agriculture and horticulture” will be given by Mr. R. Gardner, Senior Horticultural Officer at the Ministry of Agriculture, Fisheries & Food (a provisional list of the other papers in the programme is given overleaf). Delegates will gather at Wye College on the Monday evening for dinner. The programme, commencing early on the Tuesday morning, will conclude around lunch time on the Wednesday so that, if practicable, local visits can be arranged for that afternoon.

Registration forms will be available around the end of the year but in the meantime, further information about the symposium can be obtained from Mr. J. B. Steel, 38 Fortescue Chase, Thorpe Bay, Essex.

ADVANCE NOTICE

**CONFERENCE ON CHEMICAL ENGINEERING RHEOLOGY
(MOLECULAR AND CONVECTIVE TRANSPORT IN
RHEOLOGICALLY COMPLEX FLUIDS)**

will be held in Salford, September 11th–13th, 1974, organized jointly by the Department of Chemical Engineering, University of Salford (U.K.) and the Institut für Verfahrenstechnik, Technische Hochschule Aachen (Germany).

Papers have been tentatively proposed by the following authors: Professor R. B. Bird (Wisconsin), Dr. S. J. Chen (Kenics Corp.), Dr. D. C.-H. Cheng (Warren Spring Lab.), Dr. M. F. Edwards (Bradford), Professor J. L. Gainer (Virginia), Professor H. Giesekus (Dortmund), Professor W. N. Gill (New York), Professor R. J. Gordon (Florida), Professor C. D. Han (Brooklyn), Dr. W. M. Jones (Aberystwyth), Professor A. V. Luikov (Minsk), Dr. W. C. MacSporran (Bradford), Dr. R. A. Mashelkar (Salford), Professor S. Middleman (Massachusetts), Dr. P. Meissner (B.A.S.F. Ludwigshafen), Dr. C. Koen (Mareuil-Marly), Dr. P. Mitschka (Prague), Professor S. Peter (Erlangen), Professor R. Rautenbach (Aachen), Professor W. R. Schowalter (Princeton), Professor P. Schümmer (Aachen), Professor J. Schurz (Darmstadt), Professor R. I. Tanner (Sydney), Dr. R. Y. Ting (Naval Res. Washington), Professor Y. Tomita (Tokyo), Professor J. Ulbrecht (Salford), Professor U. Werner (Dortmund), Professor J. L. White (Tennessee), Professor W. L. Wilkinson (Bradford), Dr. B. Yates (Unilever, Port Sunlight), Professor J. M. Smith (Delft), Dr. E. Reher (Merseburg).

The Conference will probably be held in two parallel sessions. There is still some room to accommodate a few more papers along one or more of the following lines:

mixing and blending of miscible non-Newtonian fluids, axial and radial dispersion in non-Newtonian flows, two phase systems with at least one non-Newtonian component, molecular diffusion in rheological systems, mass transfer across the interphase and through membranes with at least one non-Newtonian liquid, thermal conductivity and heat transfer in non-Newtonian flows, interaction of turbulence and viscoelasticity, other transport phenomena.

Proposed titles with an adequate synopsis should be sent either to Professor J. Ulbrecht, Department of Chemical Engineering, University of Salford, Lancashire, M5 4WT (U.K.) or to Professor P. Schümmer, Institut für Verfahrenstechnik, RW Technische Hochschule, Aachen (Germany), not later than APRIL 30th, 1974. An earlier notice from intending authors would, however, be greatly appreciated.

BRITISH SOCIETY OF RHEOLOGY

A meeting on "THEORETICAL RHEOLOGY" will be held from September 16th–19th, 1974 (assembling on the evening of the 16th) in Cambridge. Accommodation will be available at Corpus Christi College, Cambridge.

Intending contributors are invited to send a title and short abstract to either Professor J. R. A. Pearson, Department of Chemical Engineering and Chemical Technology, Imperial College, London SW7 2AZ or Professor K. Walters, Department of Applied Mathematics, University College of Wales, Aberystwyth, Cards. before March 15th, 1974.

"PLASTICS IN TELECOMMUNICATIONS"— CALL FOR PAPERS

Conference in London on 20th and 21st November, 1974

A conference on "Plastics in telecommunications" is to be held in London on 20th and 21st November, 1974. The Institute is making a call for papers on the following: Plastics in telephone and repeater stations; plastics in cables and allied products; miscellaneous applications such as the exterior uses of plastics in cabinets, kiosks and allied articles; plastics in aerospace (C.O.M.S.A.T.); and customer equipment such as flame resistant telephones.

Presentation time for papers will be 20 minutes but shorter contributions are also welcome. Synopses of not more than 100 words should be submitted as soon as possible, and in any case not later than 10th January, 1974. Final papers should be submitted during the summer of 1974.

Interested contributors should contact Miss S. M. Keeble, Executive Officer, The Plastics Institute, 11 Hobart Place, London SW1W 0HL.

LETTERS TO THE EDITOR

Dear Sir,

May I comment on two areas of discussion in the latest *Bulletin* (Vol. 16, No. 3).

Firstly with regard to the Foreword. It is true that communications between individuals personally have never been worse. In some firms much time and money has been spent on training people in communications and yet it is freely acknowledged that this aspect of our daily work is at an all time low.

The trouble seems to be partly that firms have grown too big and partly that, in spite of all the talk of increased leisure, people at executive level work harder and under greater pressure as time goes on. Nobody has time to talk to anyone else, even about business, let alone other matters. As firms grow, they develop Divisions, and one does not know what goes on except in one's own Division, and even more important, one is not expected to know.

I have virtually ceased sending out reports except on very routine matters, as I have long since found that no-one ever comments on them, even when invited to do so. In fact, one wonders if they ever reached the people to whom they were sent, so why bother?

The second area is under "Come Together". Why people still believe that pooling resources and merging together will do anything other than increase costs and ruin communications, I do not know. The expressions "The benefits of the merger" and "The economies of

scale" are, in my experience, figments of the imagination to justify the move. Big organisations always tend to be less efficient than smaller ones and always need money (financial support, bottom p. 37) to build bigger offices and headquarters and then more money to staff and run them.

Local Government reorganisation now going on is a shining example which is repeated in almost every change where bigger is said to be better. Where I live, we are threatened with a 50-60% increase in our rates as the first "benefit" resulting from the economies of larger scale operation.

And why has everything to be in London with all its high costs, shortage of hotel accommodation etc.? I am most surprised that the Textile Institute should even consider moving from its home ground. London is too crowded now with the headquarters of every organisation under the sun.

Yours faithfully,
A. HORSLEY.

Sir,

It is a common complaint of rheologists that secretaries and typists new to the field are prone to render rheology as theology, although, thank goodness, they soon learn to distinguish between the two words. However, it must be warned that the equilibrium state is by no means a stable one and fellow rheologists, particularly those with a mathematical bend, must guard against unwittingly driving their secretaries too hard or they will find, as I did recently, that their theoretical endeavour would suddenly become rheoretical!

Yours faithfully,
D. C.-H. CHENG.

RECENT ELECTIONS

The following applications for membership have been received and approved:

Professor G. K. Batchelor, Department of Applied Mathematics and Theoretical Physics, Cambridge University.

Miss S. A. Bullivant, M.Sc., Department of Mathematical Sciences, Plymouth Polytechnic.

Dr. C. Oddou, Ph.D., LoB H P 33 E2 University Paris 7.

M. G. N. Perera, M.Sc., Department of Applied Mathematics, U.C.W. Aberystwyth.

Dr. G. Pierdomenico, Ph.D., Montedison-DIPE, Venezia, Italy.

Dr. E. J. Hinch, Ph.D., Department of Applied Mathematics and Theoretical Physics, Cambridge University.

J. M. Kenchington, M.I.Chem.E., Chemical Engineering Department, Bradford University.

Mrs. S. C. McKay, B.Sc., N.E.L., East Kilbride .

N. M. Pearman, G.R.I.C., Shell Research Ltd., Sittingbourne, Kent.

HONORARY MEMBERS

During the year the following members became eligible for, were offered and accepted Honorary Membership:

Dr. D. Bulgin, Mme. Dobry-Duclaux, Dr. L. Grunberg, Dr. R. W. B. Stephens, Dr. S. G. Ward.

OBITUARY

We have recently been notified of the death of Mr. R. H. Bromley and extend our sympathy to his family and friends.

DIARY

1974

18th-20th February. Second International Conference Carbon Fibres: Their place in modern technology. Institution of Electrical Engineers, London.

27th-28th February. Conference on structural plastic foams. Bradford, Yorkshire.

24th-29th March. Course on "Characterisation and properties of polymers in solution". University of Technology, Loughborough.

25th-27th March. International Symposium—Plastics in agriculture and horticulture: new developments. Wye College, Ashford.

26th-27th March. Conference on the conservation of materials. Harwell.

9th-11th April. General discussion—Gels and gelling processes. University of Essex, Colchester.

17th-18th April. Engineering design of plastics processing machinery. University of Bradford.

24th-25th April. B.S.R. conference on rheology of clays and cement pastes. University of Sheffield.

July. Course on "Non-Newtonian flow and heat transfer". University of Bradford.

WE WOULD LIKE TO HEAR FROM YOU

B.S.R. members are reminded that the Editor of the *Bulletin* is always interested in receiving informative articles, comments, news and other material which would help to make the *Bulletin* one of the more welcome sights in the flood of reading matter to which most of us are accustomed and resigned.

Suggestions of possible improvements in the *Bulletin* would also be welcome. So if you have a thought and a minute to put pen to paper why not let us hear about it?