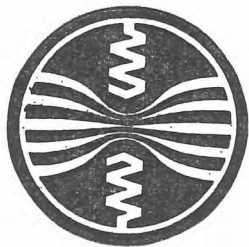


BULLETIN



BRITISH SOCIETY OF RHEOLOGY

1972, No. 4, Vol. 15

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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

Once again the time has come for us to say farewell to a retiring President of our Society and welcome his successor. After two years in the "hot seat", Professor Lamb has stepped down and we are indeed fortunate to have Professor P. Feltham, of Brunel University, join us.

The past two years have seen a number of quite important changes in the Society and among Professor Lamb's main duties have been those of a diplomat. He has guided us through the problems of disbanding the Research Committee and doubling our subscriptions. The Gold Medal Competition, one of the responsibilities of the Research Committee, has been widened in scope and a panel of three past Presidents of the Society appointed to recommend possible candidates for the award to Council annually. Overseas the New South Wales Branch has been formally closed. The Victorian Branch has been renamed the Australian Branch and invited to cater for the interest of former New South Wales members. In addition to this sort of administration Professor Lamb played a full part in the various Scientific meetings of the Society and at other international gatherings. We extend to him our gratitude and hope that he will continue to give the Society the benefit of his expertise.

Professor Feltham is no stranger to Council having served as both ordinary member and secretary some time ago. Also an academic, he is well qualified to take over Presidency for the 1972-74 term.

If they have not already done so members, or their wives, will be perusing masses of literature from travel agents to decide upon a suitable venue for their annual holidays. The Society can be of help here as we are fast approaching the joint meeting with the Dutch Society. Later in the year the second meeting of the Italian Society of Rheology is being held in Siena, one of the most beautiful medieval towns in Italy. Social and ladies' programmes will be organised. Full details of these and other meetings appear elsewhere in the *Bulletin*.

As is customary the last number of this volume contains the reports of the various executive officers of the Society. The next issue beginning a new volume will hopefully present a more varied diet of news and some scientific matter.

COUNCIL 1972-73

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

Hon. Secretary: DR. K. M. BEAZLEY, English China Clays, St. Austell.

Hon. Treasurer: MR. R. W. WHORLOW, Department of Physics, University of Surrey.

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

Abstracts Editor: MR. A. EVANS, Department of Surgery, University of Newcastle-upon-Tyne.

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

Ordinary Members:

MR. F. N. COGSWELL, MR. J. F. HUTTON, DR. B. S. NEUMAN,
DR. D. R. OLIVER, DR. P. SHERMAN, DR. K. WALTERS.

1971-72 COUNCIL, AUSTRALIAN BRANCH

Chairman: MR. O. DELATYCKI, Department of Industrial Science, University of Melbourne, Parkville, Victoria 3052.

Secretary: DR. J. STEARNE, Footscray Institute of Technology, P.O. Box 64, Footscray, Victoria 3011.

Treasurer: DR. E. J. DICKINSON, Road Research Board, 60 Denmark Street, Kew, Victoria 3101.

Abstracts Editor: DR. R. FOX, Central Labs. I.C.I.A.N.Z. Ltd., Newson Street, Ascot Vale, Victoria 3032.

Ordinary Members:

MR. W. H. COPLEY, H. B. Selby & Co. Pty. Ltd., 352 Ferntree Gully Road, Notting Hill, Victoria 3168.

MR. J. D. GIBSON, Sidney Cook Chemicals Ltd., 98 Cromwell Street, Collingwood, Victoria 3066.

MR. A. V. RAMAMURTHY, c/o Division Chemical Engineering, C.S.I.R.O., P.O. Box 312, Clayton, Victoria 3168.

SECRETARY'S REPORT 1971-72

1. **Conferences**

The conferential highlight of the year was the 6th International Congress at Lyon, held concurrently with the 1st International Congress of Biorheology. The proceedings of these meetings will be published in "Rheologica Acta" during 1973. Several criticisms were levelled at the Lyon congress and suggestions were made. These will be discussed by Council with the intent of avoiding such pitfalls at the 7th International Congress, which will be held at Prague in 1976 or, as an alternative venue, in Sweden. Following the International Congress, a further International meeting on "General Rheology" was held in Prague. This was well attended and the discussion lively. We also acted jointly with the Institute of Petroleum in the presentation of a successful conference on Lubricants, held in Nottingham on July 6th-7th.

Future meetings are one on "Yield, deformation and fracture of polymers", to be held in Cambridge, March 26th-29th, 1973; again we are acting jointly with several Societies in the organisation of this. A joint meeting with the Dutch Society will be held near Utrecht on April 26th-27th, 1973. Topics to be dealt with are "Rheology in Industry" and "Composites". Our own Autumn Conference will be held from September 18th-21st, 1973, with Shrivenham as the first choice of venue.

2. **Liaison**

Liaison with other scientific societies, both at home and overseas, has been at its usual cordial level—the joint meeting with the Dutch is, we hope, a measure of that cordiality. On the International level, the International Committee on Rheology (on which we are represented) has affiliated with the Unions of Theoretical and Applied Mechanics, and Pure and Applied Chemistry, though your Council felt that such a move was not really necessary.

3. **Australian Branch**

Following the last A.G.M. the New South Wales Branch has been disbanded and the Victorian Branch renamed the "Australian Branch".

4. **Gold Medal Competition**

Council unanimously accepted the recommendation of the appropriate sub-committee that a Gold Medal be awarded to Professor L. R. G. Treloar. This medal was presented at a scientific meeting held immediately before this A.G.M.

5. **B.S.I. Glossary Committee**

After much effort, the first draft of this glossary has been hammered out, but there are still rough edges to be smoothed off and

surfaces to be polished. Terminology is never a topic on which universal agreement can be reached simultaneously, as those who move from one part of Britain to live in another often discover quite rapidly. . . .

6. Publications

Firstly, we have been unable to obtain the agreement of the powers that be for "Rheologica Acta" that the appointment of a second Executive Editor to deal with papers in the English language is necessary, though Dr. Pearson would have accepted the post. As far as we know at present, and this information is not definite at the time of writing, it seems possible that the present Editor, Dr. Meskat, will retire in the foreseeable future, and that his successor will be Dr. Giesekus.

Secondly, Council have been giving careful scrutiny of the long list of recipients of gratis copies of our publications, to ensure that we are not depriving ourself of revenue. We appear to have been surprisingly generous, and that list has been severely pruned. Members are asked to note that, in the reverse direction, we now receive the Ukrainian Journal of Physics (English Abstracts) and the "Synthesis and Physical Chemistry of Polymers", which is in Russian. Translated titles of relevant papers from the latter will appear in *Rheology Abstracts*; the Secretary holds the copies of the Journals, which are available to Society members on request.

K. M. BEAZLEY.

REPORT OF TREASURER FOR THE YEAR 1971-72

Last year I was regrettably forced to recommend an increase in subscription and as you will see from the attached accounts this has increased the income from this source by about £500. Income exceeded expenditure by £165.21, but there would have been a substantial deficit if subscriptions had not been raised. Income from investments dropped due to a general fall in interest rates; the Brentwood 9½% Bond matured and 7% was the best return obtainable from a local authority at the time of reinvestment. However, income from our share of profits of *Rheology Abstracts* increased, correspondingly increasing our debt to the Editor and abstractors who provide not only a scientific information service to members but also a financial contribution to the Society.

Expenditure by committees and journal production costs fluctuate according to the number of meetings and the number of pages respectively and there are no exceptional changes to be reported. The large increase in expenditure under the heading "Membership Secretary" is in no way the fault of Dr. Ferguson, in fact much of the increase

occurred before he took over. It represents to a large extent the cost of circulation of information to members and is inflated by several factors including a special circulation of information about the Lyon Congress, a circulation by first class post after the last A.G.M. in the hope that members would be able to alter Standing Orders before they were paid on October 1st, and late submission of an account for expenditure in 1970-71. There was also an abrupt increase in the charges by the printers of *Rheology Abstracts* for posting copies direct to members. We have now stopped this arrangement and there should be a substantial drop in circulation costs in the coming year because Pergamon Press have kindly offered to use their computerised circulation system for despatching copies to members.

R. W. WHORLOW, Honorary Treasurer.

BRITISH SOCIETY OF RHEOLOGY

Balance Sheet as at 30th June, 1972

ASSETS							
Brentwood U.D.C. 7% Bond	...	...	...	...	...	...	1500.00
Debtors	...	...	...	...	...	...	55.94
Cash at Lloyds Bank Ltd.	...	...	...	...	...	...	
Deposit Account	...	...	...	...	...	1387.67	
Current Account	...	...	...	...	...	188.61	
						<u> </u>	1576.28
							3132.22
<i>Less</i>							
CURRENT LIABILITIES							
Sundry Creditors	...	...	...	...	...	...	159.45
							<u> </u>
NET ASSETS	...	...	...	...	...	...	2972.77
							<u> </u>
Represented by:—							
GENERAL FUND							
As at 1st July, 1971	...	...	...	...	...	...	2807.56
Add Excess of Income over Expenditure for the year							165.21
							<u> </u>
							£2972.77
							<u> </u>

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.
22nd September, 1972.

BRITISH SOCIETY OF RHEOLOGY

Revenue Account for the year ended 30th June, 1972

EXPENDITURE

Committee Expenses (mainly travel):—			
312	Council	247.05	
107	B.S.I. Committee	98.76	
6	British National Committee on Materials ...	10.55	
			356.36
504	Bulletin—Production Costs		562.07
113	Abstracts—Production Costs		98.59
Expenditure by Officers:—			
41	Secretary	41.99	
15	Treasurer	15.67	
246	Membership Secretary	595.90	
			653.56
25	Professional Fees		25.00
7	General Expenses		18.00
			£1713.58
—141	Excess of Income over Expenditure for the year ...		165.21
			£1878.79

INCOME

596	Annual Subscriptions and Entrance Fees	1013.84	
550	Publisher—Rheology Abstracts	640.83	
1	Bulletin Subscription	14.25	
—	Donations	1.83	
Investment Income—Gross:—			
42	Bank Deposit Interest	27.46	
142	Brentwood 7% Bond	123.75	
			151.21
29	Conferences—Net Income		56.83
			£1878.79

REPORT OF MEMBERSHIP SECRETARY 1971–72

During the year about 45 new members have joined the Society and 30 have resigned, mainly because of change of work or retirement. No resignations had been received because of the increased subscription rate. Present membership stood at 627 with 418 U.K. members and 209 from overseas, including 55 Australians.

Some delays had occurred in getting copies of the *Bulletin* to some overseas members by surface mail. If any overseas members would like to pay a little extra for air mail this can be arranged. Anyone interested should contact the Membership Secretary.

J. FERGUSON.

REPORT OF HONORARY EDITOR, RHEOLOGY ABSTRACTS

The production of *Rheology Abstracts* continues to proceed uneventfully. In the four issues which have appeared over the past year there have been about 900 entries, which is much the same as last year. These are largely due to the efforts of the members who read the primary journals, and supply me with abstracts. The Society is greatly indebted to everyone who helps in this way, and if any other member feels that he or she could devote a few more hours per quarter to maintaining this invaluable service I should be glad to hear from you. Remember—I am only as far as your nearest letterbox!

The first issue of the new volume is always much fatter than the others. This year not only did it include my author index and Dr. Mardles' meticulous subject index for Volume 14, but also details of the codes for the classification of abstracts concerned with solids. Now that both the fluids and the solids schemes, which employ many of the same numbers, are in use, each numerical classification is preceded by either *F* or *S*. I have also taken the opportunity to shorten the printed classification by eliminating the superfluous section letters (A), (B), (C), etc. The information is still there, but the sections are now separated by semicolons only.

Finally, could I suggest that any member who finds a paper which might be of general interest in a journal which we are not likely to cover should let me know, either with the reference or better still an abstract for publication. In this way we can offer a really comprehensive service.

A. EVANS, October 1972.

List of Abstractors 1971-72

- Mr. D. M. Bancroft (Welwyn)
- Dr. H. A. Barnes (Port Sunlight)
- *Mr. M. Bayliss (Strathclyde)
- Dr. K. M. Beazley (St. Austell)
- Dr. C. E. Chaffey (Canada)
- †Dr. C. F. Chan Man Fong (Reading)
- (B) Dr. M. F. Culpin (Stirling)
- *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)
- 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 (St. Thomas')
- †Dr. J. R. A. Pearson (Cambridge)
- 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 (Queen Mary)
- Mr. G. R. Sothern (Brunel)
- *Dr. J. Ulbrecht (Salford)
- †Dr. K. Walters (Aberystwyth).
- (B) Also co-ordinator of book reviews.
- † Resigned.
- * New abstractor.

REPORT OF THE EDITOR OF THE BULLETIN

During the past year the *Bulletin* has continued to fulfil a wide range of purposes, steering a course somewhere between a news bulletin and a technical journal. This has the advantage that short technical notes can be published relatively quickly, while news items can still be up-to-date. However, in the case of certain features, notices of meetings, for example, sometimes there is not time to incorporate them before the meeting takes place. Frequently it is only possible to publish vague information about forthcoming events as details are not available when the material goes to press.

To correct this defect it is proposed to try once again the use of "stop press" news sheets which can be inserted when the *Bulletin* is distributed. In this way we should have the best of both worlds.

Another feature that we would like to strengthen is the personal news of members and of other Societies. By this it is not intended to run a gossip column, but to pass on to the membership as a whole more factual news such as changes of address, employment, new interests, etc. With the move towards closer co-operation between Societies it is desirable that we follow their activities with interest and perhaps take a more active part in them. For all this to be effective the Editor must rely, to a large extent, on being fed with information from members. It is hoped that the benefits obtained will amply reward the trouble taken in sending items.

In conclusion the Editors past and present wish to thank all members of the Society who have contributed articles and assisted with the production of the *Bulletin* in the last twelve months.

PROFESSOR LESLIE R. G. TRELOAR, O.B.E., B.Sc., Ph.D., D.Sc.

At a Scientific meeting held in London on Tuesday, October 31st, 1972, Professor Treloar was presented with a B.S.R. Gold Medal for his significant contribution to the solution of major industrial problems by the application of fundamental rheological knowledge.

Professor Treloar's interests cover a wide range of physics and physical chemistry. In addition he has worked closely with mathematicians and has been very successful in unifying the work of experimentalists and theoreticians, especially in the field of rubber elasticity. His book on this subject, now in its second edition, and his many published papers, are well known. His research has continued actively over many years in several laboratories; the General Electric Company (1929-38), the British Rubber Producers' Research Association (1938-49), the British Rayon Research Association (1949-61), the Cotton, Silk and Man-Made Fibres Research Association (1961-63), and more recently as Reader, and later Professor, in Polymer Physics at the University of Manchester Institute of Science and Technology. Throughout his research career he has been in close contact with the problems that arise in industry and his work has made an important contribution towards solving such problems. He was, therefore, well qualified to receive the B.S.R. Gold Medal which can take its place beside his other awards—the Colwyn Medal of the I.R.I. which he was awarded in 1961 and the Plastics Institute Swinburne Medal which he received in 1970.

PERSONAL NOTES

Professor P. Feltham, Ph.D., D.Sc., President 1972-74

Paul Feltham came to Britain after "Munich" in 1939 having to leave his parents in Czechoslovakia. He went to work as an apprentice in a London factory, studying by evening classes at the same time. Later he spent a few years in industrial laboratories and continued his studies by stages, being awarded the Ph.D. of the University of London in 1953 for a thesis on high-temperature creep of steel. While at the British Iron and Steel Research Association he was introduced to the B.S.R. and took part in meetings and attended courses organised by the Society. He still values the knowledge gained from Reiner, Scott-Blair, Oldroyd, Treloar, Ward and other members of the "Old Guard" of rheologists.



In 1954 he moved to Leeds to become a lecturer in the Metallurgy Department of the University. As a result of his work on the plasticity of crystals, up to that time mainly metals, he was awarded the D.Sc. of Leeds University in 1959. Three years later he became Reader in Physics at the Brunel College of Advanced Technology and in 1970 was appointed to the chair of Applied Physics at Brunel which had by then become a university.

His researches are still mainly concerned with crystal plasticity, while extra mural activities include sociology and painting. The former he admits is entirely self-taught, while in the latter, he had the benefit of tuition at the Leeds College of Art. He is happily married, has a daughter, and likes animals.

Dr. D. R. Oliver

Ralph Oliver is one of the new members of Council. Since joining the Society in 1957 he has become well known to many members and frequently takes part in our meetings. He lectures in the Chemical Engineering Department of the University of Birmingham where his interests include suspensions, heat transfer to non-Newtonian fluids, elongational flow and jet thrust measurements of normal stress. In his spare time he is Warwickshire tennis captain (has played at Wimbledon) and also plays squash and golf. He used to be a pilot in the R.A.F.V.R. and is interested in air travel.

Mr. F. N. Cogswell

Neil Cogswell, the other newcomer to Council, has been a member of the Society for about eight years. In his mid-thirties, he works in I.C.I. Plastics Division at Welwyn and is concerned with the application and exploitation of rheological principles in polymer melt processing. He has presented papers at recent meetings of the Society on some aspects of this work. His current areas of research include simple, elongational and converging flows.

Dr. J. R. A. Pearson

After serving his term on Council and as chairman of the Research Committee, Dr. Pearson "retired" at the A.G.M. He has given valuable service to the Society both by his personal frank contributions to meetings and by, for example, his share in organising the successful meeting on Theoretical Rheology at Aberystwyth. It is gratifying to learn that he has recently been appointed to the chair of Chemical Engineering at Imperial College. Therefore in expressing our appreciation for past service we can add our congratulations and good wishes for future success.

REPORT ON THE SIXTH INTERNATIONAL CONGRESS OF RHEOLOGY HELD IN LYON, SEPTEMBER 4th-8th, 1972

By J. M. HOBBS

For five days the peaceful surroundings of the Institut National des Sciences Appliquées (I.N.S.A.) Lyon were somewhat perturbed by the various tongues of the six hundred or so delegates dispersed over the campus. Such a gathering of experts and enthusiasts from all parts of the world is held every four years and the sixth was possibly the largest so far.

Lyon was an excellent choice for this congress, being less congested than Paris, but still affording excellent facilities, especially for the plenary sessions of the first day. For ladies, and others who took time

off for sightseeing, it was a place of considerable interest and great beauty. The twin rivers, the Rhône and the Saône, threading their way majestically through the city are crossed by several graceful bridges which carry some of the heaviest traffic in the south of France. In complete contrast to the flyovers of modern Lyon can be found narrow picturesque streets of mansions built in the 15th and 16th centuries and archaeological treasures dating back over two thousand years.

Accommodation for the congress was arranged in either the University Residence at I.N.S.A., a few miles out of the city, or hotels near the city centre. The relative fortunes of the delegates therefore depended largely upon their initial choice. Those staying in hotels were provided with a special free bus service to and from the working sessions which, except that on the first day, were all held at I.N.S.A., and could enjoy the best of both worlds. The others in the University Residence were conveniently close to the lecture theatres used for the specialised sessions, but the distance from the city centre was a disadvantage as public transport was very infrequent. Other drawbacks at the University Residence were the absence of hot water and the rather chaotic breakfast arrangements on the first morning.

The first day's plenary lectures and official reception were held in the recently built Palais des Congres. This comprises a magnificent 1,500-seat auditorium, several smaller rooms and restaurant. In addition there were facilities for banking, bureau de change, posting letters, etc., but no provision for the purchase of postcards or stamps. The Palais was delightfully situated overlooking the Rhône across the Parc de la Tête d'Or. The latter extends over 290 acres and features a unique rose garden containing some 100,000 plants. Regrettably in September they were a little past their best but nevertheless were enjoyed by the many who took an after-lunch stroll.

In the auditorium it is claimed that "simultaneous translation is ensured in six languages." We found that most, but not all, seats could offer the three official languages of the Congress, English, French and German.

There were good projection facilities for slides and film, although one would question the need to remove all chairs, etc. from the platform before showing the latter.

The specialised sessions from Tuesday to Friday were held in the Science block at I.N.S.A. Here the facilities were generally good, lacking only in detail. In the one building were five identical adjacent lecture theatres, each capable of seating about 400 people, together with ample space for the exhibition of equipment, secretariat, bar, cloakrooms and telephones. Again there were some curious anomalies—a bureau de change, but only a hand-labelled cardboard box for posting letters with stamps hopefully bought from members of the secretariat! For most other things one had to go into Lyon.

Conditions in the lecture theatres were adequate for practised speakers, but others would have benefited from a microphone. Of course no translation facilities were possible, but fortunately about three-quarters of the papers were in English. The means of communication between speaker and projectionist were crude to say the least. On the other hand great pains had been taken to ensure punctual time-keeping to permit changeover from one to another of the five simultaneous sessions at the end of each presentation. There was a sixth session on Biorheology, but this was housed in a separate building, hence changing over during the programme was less convenient and the time-table was quite independent.

For a specialised subject the scale of the Congress was very impressive with about 600 delegates present from 27 countries. Understandably the French were in the majority numbering about 190, but there were also over 100 American and 65 British participants. Other large delegations (over 20) came from the Federal German Republic, Belgium, Canada, Italy, Japan, Holland and the U.S.S.R.

In the four days following the plenary session, no less than 275 papers on general rheology and 80 on biorheology were presented. Because of the wide variety of topics covered and the fact that there were six simultaneous sessions, it would be impossible to give more than an impression of the contents and the value of the Congress. The vast majority of speakers seemed to be reporting a variety of interesting phenomena or the measurement of fluid properties for characterisation purposes. Some were describing measurements that would be useful in practice but not necessarily related to industrial problems. One example that came to light evoked no satisfactory solution from those present!

Prior to travelling to Lyon, delegates had received brochures giving general information on the organisation of the Congress and topics to be covered, but no details or titles of the actual papers. A programme and five volumes of summaries were available to some on arrival while others did not receive them until the Monday. While it would have been impracticable to send out summaries in advance, details of the titles, programme and some local information would have been helpful.

The proposals for publishing proceedings of the meeting have been modified from time to time. In the pre-Congress brochure it was stated that "all the communications will be published in full after the Congress." During the Congress the organising committee circularised delegates to the effect that any "proceedings" would be a mammoth publication of some ten volumes. Consequently it was proposed to publish initially the plenary lectures and section conferences in two volumes of 500 pages early in 1973. The final form of publication for the complete papers was undecided and a very approximate estimate of cost was quoted as £50.

Since then we have heard that it is proposed to publish the proceedings in *Rheologica Acta*! If this is so with six issues per annum, each containing about 20 papers, it will be nearly time for the next congress before the last paper appears. We may not have heard the end of the matter.

Trying to put everything in perspective is rather difficult as extremes of good or bad tend to be remembered. It is hoped that some good resulted from queuing each day for lunch and listening for an hour to votes of thanks in three languages *before* the closing banquet. Certainly the excellent timekeeping played an important part in the smooth running of the sessions, though the speakers would have appreciated longer than ten minutes. It was good that one could attend lectures on various branches of rheology, including biorheology, exponents of which are no different from other mortals, yet they seemed to prefer their own company at dinner! The range of knowledge of different topics also varied extremely, ranging from all about nothing to nothing about everything. This was best illustrated in the discussion on thixotropy when one speaker commented "our ignorance in this subject is almost complete"!

Considerable expertise and hard work was evident at Lyon and few of the delegates could fail to be a little more knowledgeable and much wiser after the experience.

PROCEEDINGS OF THE FIRST MEETING OF THE ITALIAN SOCIETY OF RHEOLOGY

The Secretary has a copy of the papers presented at the First Meeting of the Italian Society of Rheology which was held in Siena, May 13th-15th, 1971.

Main Lectures

- G. Pezzin: Rheology: an interdisciplinary science.
- G. Astarita: Thermodynamics of rheologically complex materials.
- F. R. Schwarzl, C. W. Van Der Wal, H. W. Bree: On the shear behaviour of a polyurethane rubber in the rubber-like and in the glass-like transition region.
- L. G. Napolitano: Heat transfer in rheologically complex fluids.
- E. Butta: Molecular motions and structure of organic polymers.
- G. Marrucci: Phenomenological and structural approaches to the rheology of polymers.
- U. Bianchi: Elasticity of rubbers.

Communications

- H. C. Halpin, L. Nicolais: Stiffness and thermal expansion of short fibre composites.
- M. Pegoraro, L. Szilagy, A. Penati and G. Alessandrini: Dynamic mechanical properties and structure of polyacrylic acid grafted on polypropylene.
- E. Pedemonte, A. Turturro and U. Bianchi: Mechanical properties of three block copolymers of the type A-B-A.
- G. Pezzin: Influence of the crystallinity on the rheological properties of polyvinyl chloride.
- P. L. Mazzucco and L. Patron: Dynamic-mechanical properties of polyvinyl chloride at different degrees of syndiotacticity.
- S. Eccher: A precursory rheometer: the Marzetti-Pirelli extrusion plastometer of 1920.
- A. Seves and A. Croce: Rheology and paper coating.
- G. Manfre: Rheology of spinning, with particular attention to glass.
- L. Nicolais and D. T. Di Benedetto: Yielding of amorphous polymers.
- R. Greco, D. Acierno and G. Marrucci: Increasing viscosity in transient elongational flow.
- V. Vitagliano, A. Zagari, R. Sartorio and M. Corciome: Dissipative processes and diffusion in a binary system.
- C. Rossi and A. Perico: Rheology of oligomeric chains.
- G. P. Giuliani: Experimental evaluation of a viscoelastic flow theory.
- W. Conti and E. Sorta: Stress relaxation after steady-state shear flow in undilute polydisperse polymers.
- G. Ajroldi, G. Vittadini, C. Garbuglio and F. Visani: Rheological properties of vinyl chloride copolymers.
- C. Garbuglio, G. Ajroldi, T. Casiragni and G. Vittadini: Relationships between mechanical properties and relaxation processes of nylon-6.
- L. Costantino, V. Vitagliano, S. Wurzbarger and G. Nardi: Viscometric characterisation of "octopus vulgaris" haemocynine.
- D. Acierno, R. Greco and L. Nicodemo: Measurements of elongational viscosity for polymer solutions.
- L. Szilagy, V. Barescova and T. Ricco: Determination of physical entanglement density of synthetic and natural polyisoprenes (abstract).
- V. Bianchi: Hydrodynamics of polymers in high viscosity solvents (abstract).
- A. C. Bassi and V. Delle Piane: Rheological measurements on elastomers by capillary rheometer.

- F. De Candia: Compression behaviour of natural rubber vulcanised in swollen state.
- G. Ballini, S. Danesi and L. Baldi: Processability of ethylene-propylene rubbers. I. Investigation of effect of molecular structure on time relaxation spectrum.
- S. Danesi, L. Baldi and G. Ballini: Processability of ethylene-propylene rubber. II. Correlation between mill behaviour and time relaxation spectrum.
- A. Moroni, A. Casale and L. Corbelli: Rheological criterion for ethylene-propylene copolymers, processability

THE RHEOLOGY OF LUBRICANTS

A joint meeting of the British Society of Rheology, the Institute of Petroleum and the Institution of Mechanical Engineers was held on July 6th-7th, 1972, at Trent Polytechnic, Nottingham. The subject of the conference was The Rheology of Lubricants.

Members will be interested to know that the proceedings of this conference are being published as a book having the same title as that of the conference. At the time of writing (November 7th) it was learned that the book is at the printers and is expected to be available in January or February 1973. The publishers are Applied Science Publishers Ltd., London.

RHEOLOGY ABSTRACTS: THE PRESENT POSITION

At the recent Annual General Meeting I promised to provide a list of the journals which are currently abstracted, so that, by elimination, we can spot the gaps. As far as I know, only those journals appearing in List A are covered at present. The total is 92, some eight more than in January 1970, though 16 fewer than in January 1967. In fact the list was slightly more impressive a few months ago, until we weeded out some journals which had not published any relevant papers for some time.

List B gives some journals which we do not cover at present. Those with an asterisk have been covered in the past, and should give a reasonable yield; the others are some suggestions for new journals. If anyone feels a burning desire to abstract (or indeed the slightest inclination), and reads any of the journals which are on list B, or should be, I would be glad if they would get in touch.

A. EVANS. Honorary Editor.

List A

Journals covered for *Rheology Abstracts*: December 1972.

- | | |
|------------------------------------|-----------------------------|
| Acustica | J. Oil Colour chem. Ass. |
| Adv. Polym. Sci. | J. Pharm. Pharmac. |
| Appl. Sci. Res. | J. Pharm. Sci. |
| Archs. ration mech. anal. | J. Phys. Chem. Ithaca |
| Aust. J. Dairy Technol. | J. Phys A, C, D & E |
| Ber. dt. keram Ges. | J. Phys soc. Japan |
| Biopolymers | J. Polmer Sci. A1, A2, B, C |
| Biorheol. | Koll. Z. |
| Brit. Plastics | Lab. practice |
| Bull. Am. Ceram. Soc. | Lubric. Engng |
| Bull. Soc. fr. Ceram. | Macromol. Chem. |
| Cah. Grpe fr. Rheol. | Matl. Res. Stand. |
| Can. J. chem. Engng | Mod. plast. |
| Cem. Conc. Res. | Nature (London) |
| Cereal Sci. | Nature phys. Sci. |
| Chem. Engng Albany | Paper Technol. |
| Chem. Engng Sci. | Pharm. acta Helv. |
| Chem. Ing. Technik. | Pharm. weekbl. |
| Clin. Sci. | Phil. mag. |
| C. r. hebd. seance Acad Sci. Paris | Phys. fluids |
| Coll. Czech. Chem. Comm. | Polimery (Warsaw) |
| Colloid J., N.Y. | Polymer |
| Die Starke | Polymer Engng & Sci. |
| Dokl. (Akad. nauk. S.S.S.R.)-phys. | Proc. Am. Soc. Soil Sci. |
| Chem. | Q. Jnl appl. Maths. |
| Food Technol. | Revue Inst. fr. Petrole |
| Gummi asbert kunststoffe | Rheol. Acta |
| Helv. phys. acta | Rubb. Chem. tech. |
| IEEE Trans. SU | Russ. J. Phys. chem. |
| Ind. Eng. Chem. (Fund.) | Russ. Ultrasonics |
| Industrie Ceram. | Silic. Ind. |
| Int. Jnl Engng Sci. | Sov. Phys. Acoustics |
| J.A.S.A. | Sov. phys. tech. phys. |
| J. Am. Ceram. Soc. | S.P.E.J. |
| J. Am. Concr. Assn. | Svensk. Papp-Tidn. |
| J. appl. chem USSR | TAPPI |
| J. appl. mech. Tech. phys. | Trans. Br. ceram. Soc. |
| J. appl. polym. Sci. | Trans. Faraday Soc. |
| J. Chem. engng data | Trans. Soc. Rheol. |
| J. chem. engng Japan | Ultrasonics |
| J. chem. phys. | ZAMP |
| J. coll. int. sci. | Z. Phys chem. (Frankfurt) |
| J. dairy Sci. | Z. Phys chem. (Leipzig) |
| J. fluid mech. | |

List B

Some Journals not covered.

Acta mechanica	*J. appl. Phys.
*A. I. Ch. E. J	*J. Biomech.
*A S. L. E. Trans.	J composite Mater.
Appl. Materials Res.	J. matls. Sci.
*Brit. Chem Engng	*J. Mech. Phys. Solids
Bull. Acad. Polon. Ser. Sci.	J. Paint Technol.
Tech.	Jap. J. Appl. Phys.
Bull. Chem. Soc. Japan	Ko Fen Tza T'ung Hsan
*Cereal Chemistry	Koks i Khim
Chim. Ind. (Milan)	Meccanica
European Polym. Jnl	Plaste u Kautschuk
Ind. Labor.	Polymer Mech.
Indian J. Technol.	*Rev. Sci Inst.
Int. J. Heat & Mass Transfer	Schweizer Archiv
Int. J. Nonlinear Mech.	Sov. Plastics
Int. J. Solids structures	Zairyo
J. appl. Mech.	

REPORT OF THE WORKING PARTY ON THE CLASSIFICATION OF RHEOLOGICAL RESEARCH ON SOLIDS

Last year, the report of the above working party was published in the *Bulletin* (1971, Vol. 14, No. 4, pp. 57-61) and the actual classification was given in *Rheology Abstracts* (1972, Vol. 15, No. 1, pp. 1-6).

Unfortunately the cross index, which was also compiled by the working party, did not appear in either publication. Copies of the complete report (including the cross index) are available and the Editor will be pleased to supply one to any member who wishes to use the system.

INTERNATIONAL COMMITTEE ON RHEOLOGY

Notes on Meetings at Lyon, France—September 1972

Two brief business meetings of the Committee were held on September 5th and 7th. Officers were elected to serve for the next four years. Dr. R. S. Marvin (U.S.A.) is now Chairman and Dr. G. Vallet

(France) Secretary. In addition, a special meeting to give delegates, society officers, and others interested an opportunity to discuss future activities of I.C.R. was held in the late afternoon of Monday, September 4th at the Palais des Congres. About thirty individuals, including most of the delegates, participated in this meeting. Since most of the questions acted on by the Committee on Tuesday and Thursday were discussed on Monday, a summary of this discussion is included here, based on notes of Dr. Marvin and of Professor Eirich.

Monday, September 4th, Special Meeting. Prof. F. R. Eirich presiding

1. Exchange of information about society activities. A general desire for more, and more timely, information about meetings and other special activities arranged by the various member groups of I.C.R. was expressed. It was urged that each national society or group include the secretary (or editor) of all other member groups in its regular mailing of meeting notices, bulletins, and similar announcements of activities. Also that they be sent as early as possible, and by air, to enable the recipients to inform their members before the event. A similar exchange of technical publications was discussed. Though favoured by some, this exchange was thought by most to be less useful, and best left to individual arrangements between editors or libraries.

2. The affiliation of I.C.R. with both I.U.T.A.M. and I.U.P.A.C. was favoured. It was urged that I.C.R. undertake to inform its member groups about international meetings and other international activities of interest to rheologists. E. R. Lee, designated by I.U.T.A.M. as its representative to I.C.R. for this meeting in response to an invitation from Chairman Horio, noted that the 1976 Congress of I.U.T.A.M. will be held in Delft, Netherlands, probably the first week of September. R. S. Rivlin, our invited representative at the Moscow I.U.T.A.M. Congress, noted that I.U.T.A.M. holds various symposia in addition to their main Congress, that many of these include rheological topics, and that I.U.T.A.M. would welcome I.C.R. participation in planning such sessions. (During a further discussion on September 7th, Rivlin noted that I.U.T.A.M. would consider I.C.R. co-sponsorship of appropriate symposia, and would welcome suggestions for additional symposia from our member groups or from individuals. He suggested that I.C.R. circulate a list of I.U.T.A.M. symposia held during the past five years.)

3. Dr. Janáček announced that the rheologists in Czechoslovakia would like to host our Seventh Congress.

4. A number of participants expressed the hope that the national societies could have a greater impact on the technical programme of future congresses than has been the case in the past. It was noted that the host organisation has always been given full responsibility and authority for formulating the technical programme, but that any host organisation would give serious consideration to either general or

specific suggestions. I.C.R. should attempt to circulate information about the next Congress, including a contact to receive such suggestions, well in advance of the Congress.

5. I.C.R. was asked to assume a more active role in various international activities. The only specific field mentioned was that of nomenclature and units. On this topic, it was unanimously agreed that rheologists prefer the continued use of poise and stoke to the Pascal second and metre squared per second of the S.I. system. The continued use of the term "dynamic viscosity" rather than "viscosity" to denote the quantity measured in steady flow was deplored (rheologists use dynamic viscosity to denote a frequency-dependant quantity). I.C.R. was urged to make these views known to the appropriate international bodies, and it was suggested that our member groups might also contact their national representatives on such bodies.

6. There is a growing feeling that our present understanding of rheology could and should be used more effectively in the solution of many major problems. Our societies should give more emphasis in their technical programmes to the rheological aspects of design and processing problems, to the effect of rheological properties on the use of old and new materials (particularly tailor-made polymers and composites), to the area of biorheology, to problems of strength, corrosion, and environmental factors, to geological problems involving earth movements, volcanic activities, movements and strengths of ice, clay, silt, sand layers, etc. The U.S. society plans to add a regular session to its meetings for the discussion of such problems in an attempt to improve interaction between rheologists and those facing problems with rheological aspects who may not be aware of the body of rheological data and theory that is available.

LETTER TO THE EDITOR

Bouncing Putty

Dear Sir,

The short informative article by Cogswell, Gray and Hubbard in the *B.S.R. Bulletin*, 15, 2, 1972, gives details about "bouncing putty" which has been lacking in the press. I should like to add two more items of information which may be of interest to other readers.

1. Over a period of months, Prof. Markus Reiner had a quantity of "bouncing putty" in a glass funnel, and this ultimately flowed into a beaker underneath it to the very last "drop" (although no drops were formed). The viscosity of "bouncing putty" is obviously very high, but there is no evidence of a "yield point" whatsoever. This supports the conclusion given from Fig. 1 that the putty is Maxwell body, and apparently with a single relaxation time.

2. Prof. J. Gluklich demonstrated that, contrary to the behaviour of ordinary putty or plasticine, "bouncing putty", will very often fracture into *three* pieces when pulled rapidly. The explanation offered is that the stress wave resulting from the fracture travels along the length of the specimen till it reaches a weak spot. Plasticine, having only a vanishingly small elastic component, will transmit elastic stress over very short lengths only.

Yours truly,

Z. RIGBI,

Technion, Israel Institute of Technology, Haifa.

Conference

YIELD, DEFORMATION AND FRACTURE OF POLYMERS

Churchill College, Cambridge

March 26th-29th, 1973

DRAFT PROGRAMME

Session I. crazing

Monday, March 26th (afternoon)

- 1 The role of organic agents in the crazing of glassy polymers. R. P. Kambour (General Electric Co., U.S.A.).
- 2 Environmental stress crazing of P.M.M.A. E. H. Andrews and G. M. Levy (Queen Mary College).
- 3 Crazing in ultra-thin films of amorphous polystyrene: the effect of molecular weight. S. Wellinghoff and Eric Baer (Case Western Reserve University, U.S.A.).
- 4 Mechanisms of creep in A.B.S. and P.V.C./A.B.S. blends. C. B. Bucknall (Cranfield Institute of Technology).
- 5 Stress-whitening in thermoplastics. P. I. Vincent, F. M. Willmouth and A. J. Cobbold (Imperial Chemical Industries Ltd., Plastics Division).

Session II. Fracture

Tuesday, March 27th (morning)

- 6 Plastic zones around cracks in glassy polymers. N. J. Mills (University of Birmingham).
- 7 Fracture of oriented polystyrene. M. J. Doyle (Massachusetts Institute of Technology, U.S.A.).
- 8 Effect of the molecular weight on the fracture energies of polymethylmethacrylate. W. Döll (Institut für Festkörpermechanik, Freiburg, Germany).
- 9 Fracture of degraded polystyrene. J. W. Hancock (University of Glasgow).

Tuesday, March 27th (afternoon)

- 10 Fracture behaviour of rubber modified acrylic polymers. Lawrence J. Broutman and T. Kobayashi (Illinois Institute of Technology, U.S.A.).
- 11 Fracture energy studies of polyester resin containing glass microspheres. J. C. Hammond and D. V. Quayle (Sheffield Polytechnic).
- 12 Environmental stress cracking of H.D.P.E.—a fracture mechanic's approach. N. H. Linkins, L. E. Culver and G. P. Marshall (Imperial College of Science and Technology).
- 13 The fracture and dynamic fatigue behaviour of unsaturated urethane polymers. H. R. Brown, J. S. Harris and I. M. Ward (University of Leeds).
- 14 An investigation of basic fatigue parameters for an acetal copolymer. R. Crawford and P. P. Benham (The Queen's University of Belfast).

Session III. Low strain deformation Wednesday, March 28th (morning)

- 15 Effect of swelling agents on mechanical properties of solid polymers. R. D. Andrews (Stevens Institute of Technology, Hoboken, U.S.A.).
- 16 The effect of thermoelastic stresses induced by small temperature fluctuations on the creep of crystalline polymers. J. M. Hutchinson and N. G. McCrum (Oxford University).
- 17 Molecular processes at deformation of high-oriented crystalline polymers. U. Gafurov (Institute of Nuclear Physics, Tashkent, Ulugbek, U.S.S.R.).
- 18 The behaviour of natural cellulosic fibres under stress. D. H. Page, F. El-Hosseiny and K. Winkler (Pulp and Paper Research Institute of Canada).

Session IV. Deformation of glassy polymers

Wednesday, March 28th (afternoon)

- 19 A theory for the low temperature plastic deformation of glassy polymers. A. S. Argon (Massachusetts Institute of Technology, U.S.A. Work performed at University of Leeds while on sabbatical leave).
- 20 A dislocation model for yield and flow in glassy polymers. P. B. Bowden and S. Raha (Cambridge University).
- 21 Biaxial stress relaxation in glassy polymers. T. C. Ho, F. A. Myers and S. S. Sternstein (Rensselaer Polytechnic Institute, Troy, New York, U.S.A.).
- 22 Long term deformations of non-linear plastics structures. B. W. Cherry and D. F. Kinder (Monash University, Australia).
- 23 Propagation of shear bands in polystyrene. E. J. Kramer (Cornell University, U.S.A.).

Session V. Crystalline polymers Thursday, March 29th (morning)

- 24 Stress-induced twinning and martensitic phase transformations in polyethylene. E. B. Crellin, P. Allan and M. Bevis (University of Liverpool).
- 25 Deformation of oriented chain-extended polyethylene. D. C. Bassett, D. R. Carder and D. I. Marsh (J. J. Thomson Laboratory, University of Reading).
- 26 Yield criteria and deformation mechanisms of oriented polypropylene. G. W. Groves and D. Shinozaki* (University of Oxford) (*now at H. H. Wills Laboratory, University of Bristol).
- 27 Deformation mechanisms in oriented polyethylene. J. G. Rider and Jennifer M. Ritchie (University of Surrey).

SYMPOSIUM ON THE RHEOLOGY OF PARTICULATE SYSTEMS

This Symposium will be held in the Royal Halls, Harrogate, on Tuesday, March 27th, 1973, as the first event of the Powtech '73 Conference to be held in conjunction with the Powtech '73 International Exhibition. A large international participation is expected.

The Symposium will be concerned with all aspects of flowing systems involving particulates, including powder flow, suspension rheology, pneumatic and hydraulic conveying, separation techniques, flow from hoppers and through processing systems, and similar considerations. Papers already promised include:

- 1 Title to be announced (concerned with fluidised solids). By J. S. M. Botterill et al (University of Birmingham, U.K.).
- 2 Title to be announced (concerned with pneumatic conveying systems). By J. S. Mason et al (Liverpool Polytechnic, U.K.).
- 3 Title to be announced. By C. F. Harwood (I.T.T. Research Institute, Chicago, U.S.A.).
- 4 The Role of Flow Conditioning Agents in achieving Accelerated Blending Performance. By B. H. Kaye et al (Fine Particles Research Institute, Laurentian University, Canada).
- 5 Measurement of Flowing and Static Sand on the Wall of a Model Silo. By J. Smid (Academy of Sciences, Czechoslovakia).
- 6 The Effect of Relative Humidity on the Flowability of Powders. By G. Matei and H. H. Hausner (Work from the Max Planck Institute, Germany).

All papers will be pre-printed before the meeting and presented in the conventional manner, with adequate free-discussion periods. The papers will subsequently be published.

CHEMICAL SOCIETY

Postgraduate School in Rheology The School of Pharmacy, University of London April 9th–13th, 1973

This course will be of interest to chemists in a wide variety of industries who wish to learn something of the rheology of materials and of experimental methods. The course will be of value to chemists in the ceramics, cosmetics, food, metals, paints, pharmaceutical, and printing ink industries, and will be suitable for those of graduate status.

Information will be supplied by lectures dealing first with basic principles and underlying theory, and with applications of rheological principles later in the week. Lectures will be held during mornings, and in afternoons there will be small-group tutorial sessions enabling participants to solve problems and deal with difficulties arising from lectures. Also during afternoons there will be opportunity to gain practical experience in experiments, and to see demonstrations of many types of available apparatus. A detailed course manual will be provided.

Residential accommodation will be provided at Hughes Parry Hall, a hall of residence near the School of Pharmacy, from Sunday, April 8th until the morning of Friday, April 13th. The charge for accommodation (£15) includes breakfast and dinner.

All participants will be invited to a "mixer" before dinner on Monday, April 9th and to the course dinner on Thursday, April 12th.

The number of places on this course is limited, and applications will be accepted in order of receipt.

Course fee, including the cost of lunch and refreshments:

£70 Members (see below)

£90 Non-members

The accommodation charge (including breakfast and dinner) is £15.

Members of the Chemical Society and of the constituent bodies of the Council of Science and Technology Institutes (C.S.T.I.), i.e. The Royal Institute of Chemistry, The Institute of Physics, The Institute of Biology, The Institution of Metallurgists, and the Institute of Mathematics and Its Applications will be able to attend the course at the lower fee.

Further information: Dr. M. D. Robinson, Education Officer, The Chemical Society, Burlington House, London W1V 0BN.

SECOND MEETING, ITALIAN SOCIETY OF RHEOLOGY

Siena, May 10th-12th, 1973

The Second Meeting of the Italian Society of Rheology will be held in Siena on May 10th-12th, 1973. Presentation of about 40 papers in the following five sessions is scheduled:

- 1 General Rheology.
- 2 Rheology of Polymer Processing.
- 3 Rheology of non-Polymeric Materials.
- 4 Mechanical and Dynamic Properties.
- 5 Measuring and Characterization techniques.

The meeting will be held in Italian and English. No simultaneous translation will be provided. The proceedings will be published by the Italian Society of Rheology.

The registration fee is Lit. 15.000 (approximately \$25.00), which can be paid directly at the registration desk in Siena.

Further information can be obtained from the Scientific Secretary of the Italian Society of Rheology, c/o Istituto di Principi di Ingegneria Chimica dell'Università, Piazzale Tecchio, 80125 Napoli, Italy.

Contributions from non-Italian rheologists are invited and offers of papers should be made, before February 28th, 1973, to the President, Prof. Giovanni Pezzin, Via Delle Palme, 1, 35100 Padova, Italy.

NEW MEMBERS

The following applications for membership have been received:

Dr. Pamela A. M. Armstrong,
Department of Pharm. Tech.,
Strathclyde University,
Glasgow G1 1XW.

Mr. R. Bloch,
California Inst. of Tech.,
Spalding Lab.,
Pasadena,
California 91109.

Mr. L. Boiy,
Agfa-Gevaert N.V.,
Septestraat,
B-2510 Mortsels,
Belgium.

Jean V. Boyd, B.Sc., M.Inst.P.,
Department of Food Science,
Queen Elizabeth College,
Campden Hill Road,
London W.8.

Mr. G. Brindley,
Applied Maths Department,
Physical Sciences Building,
U.C.W.,
Aberystwyth.

Mr. B. A. Cranfield,
S.T.L. Research Ltd.,
London Road,
Harlow,
Essex.

Dr. M. F. Edwards,
Schools of Chemical Engineering,
University of Bradford,
Bradford,
Yorks.

Mr. J. A. Hasnip,
Blundell-Permoglaze Ltd.,
Sculcoates Lane,
Hull HU5 1RU.

Miss E. Honkanen,
AB Karlshamns Oljefabriker,
29200 Karlshamn,
Sweden.

Dr. E. A. Kearsley,
National Bureau of Standards,
Washington D.C. 20234.

Dr. Ir J. M. Kooijman,
Centraal Laboratorium,
Melkunie,
Straatweg 54,
Breukelen,
Utrecht,
The Netherlands.

Dr. G. Kraus,
Senior Scientist,
Phillips Petroleum Co.,
Research Division,
Bartlesville,
Okla 74003.

Dr. C. Marco,
University of Mons,
Facultés Des Sciences,
21 Avenue Maistriau,
7000 Mons,
Belgium.

Dr. P. A. Rochette,
Department of Civil Engineering,
The University of Birmingham,
P.O. Box 363,
Birmingham B15 2TT.

DIARY

1973

20-21 February. Conference: Plastics in Bearings. Solihull. (Plastics Institute.)

26-29 March. Second Churchill Conference: Yield, Deformation and Fracture of Polymers, Cambridge. (Plastics Institute.)

27 March. Symposium: Rheology of Particulate Systems. Harrogate. (Powder Advisory Centre.)

9-13 April. Postgraduate School in Rheology. School of Pharmacy, University of London.

26-27 April. Joint Meeting with the Dutch Society: "Composites" and "Rheology in Industry". To be held at Lunteren.

7-11 May. S.P.E./P.I. Joint Conference. Montreal.

10-12 May. Second Meeting, Italian Society of Rheology.

18-20 June. Conference: Plastics Industries in the Developing World (Plastics Institute.)

28-29 June. The Chemistry and Physics of Fibres and Filaments. (U.M.I.S.T.)

10-14 September. I.U.P.A.C. International Symposium on Macromolecules. Aberdeen.

18-21 September. B.S.R. Autumn Meeting. East Anglia University, Norwich.