

BULLETIN



BRITISH SOCIETY OF RHEOLOGY

1981, Vol. 24, No. 4

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Hon. Editor:

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



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OFFICERS AND MEMBERS OF COUNCIL, 1981-1982

President: PROFESSOR J. R. A. PEARSON, Department of Chemical Engineering and Chemical Technology, Imperial College of Science and Technology, Prince Consort Road, London SW7 2AZ. (Telephone: 01-589 5111, ext. 1998)

Treasurer: MR. T. A. STRIVENS, Physics Section, Research and Development Department, ICI (Paints Division) Limited, Wexham Road, Slough, Berkshire SL2 5DS. (Telephone: 0753-31151, ext. 3244)

Membership Secretary: DR. D. C.-H. CHENG, 191 Icknield Way, Letchworth, Hertfordshire SG6 4TT. (Telephone: 0438-3388—work, 04626-72146—home)

Editor of the Bulletin: DR. C. R. DIMOND, Morgan Thermic Ltd., Technological Centre, Bewdley Road, Stourport-on-Severn, Worcestershire DY13 8QR. (Telephone: 02993-2271)

Editor of Rheology Abstracts: DR. D. R. OLIVER, Department of Chemical Engineering, University of Birmingham, P.O. Box 363, Birmingham B15 2TT. (Telephone: 021-472-1301, ext. 3575)

President of the Australian Branch: MR. B. D. DIXON, Gilbert Chandler Institute, Werribee, Victoria 3030, Australia.

Secretary of the Australian Branch: DR. S. N. BHATTACHARYA, Department of Chemical Engineering, R.M.I.T., Box 2476V G.P.O., Melbourne, Victoria 3001, Australia.

MR. J. ASTIN, Department of Applied Mathematics, University College of Wales, Penglais, Aberystwyth, Dyfed SY23 3BZ. (Telephone: 0970-3111)

DR. H. A. BARNES, Unilever Ltd., Port Sunlight, Cheshire. (Telephone: 051-645-2000, ext. 8349)

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DR. T. E. R. JONES, School of Mathematical Sciences, Plymouth Polytechnic, Drake Circus, Plymouth, PL4 8AA. (Telephone: 0752-264657)

DR. M. R. MACKLEY, Department of Chemical Engineering, University of Cambridge, Pembroke Street, Cambridge, CB2 3RA. (Telephone: 0223-58231)

MR. B. ROBERTS, Pafra Ltd., Bentalls, Basildon, Essex SS14 3BU. (Telephone: 0268-280606)

MINUTES OF THE 41st ANNUAL GENERAL MEETING

Minutes of the 41st Annual General Meeting, held in the J.C.R., Havelock Hall, Castle Leazes, Newcastle upon Tyne, on 9th September, 1981, beginning at 18.15.

The meeting was advertised for 17.45, but at that time only 16 members were present. The quorum of 20 was finally achieved at 18.15 when the President took the chair and called the meeting to order. (The half-hour was spent in a discussion of item five on the agenda and an account of this is included after the Secretary's report to the meeting.)

1. **The Minutes** of the 40th Annual General Meeting, held in London, on 9th September, 1980, had been published in the Bulletin. The President signed these as a correct record of that meeting.

2. There were no **matters arising from the Minutes**.

3. **The President** had no matters he wished to raise as chairman of the meeting.

4. **The Secretary's report** was tabled and questions invited. There were no questions or discussion.

5. **A discussion of future meetings** and meeting organisation had been held before the meeting became quorate, and this was not reopened. Council will take note of the views expressed, and reported below.

6. **The Treasurer** tabled the balance sheet and revenue account and highlighted some features of these. Expenditure rises inexorably, while income fluctuates quite markedly from year to year, being down in the year ending 30th June, 1981, compared with the previous year. Reserves are still about £20 per member. In answer to a question the Treasurer stated that the large increase in Council expenditure was caused (in part) by holding five Council meetings in the financial year compared with three in the previous one. (A meeting is usually held at the end of June or beginning of July and so may fall in either of two financial years.) The need for large reserves was questioned, and in answer to a question the Secretary stated that to date our commitment to European collaboration had cost the Society nothing extra. It was stated from the floor that the Society should be prepared to spend money on this, perhaps by paying for delegates at European meetings.

The motion that the auditors, Alfred Simmons & Co. (of Redhill, Surrey) be reappointed was carried nem. con., and the meeting agreed that the fee should be similar to this year's fee.

The Treasurer concluded by wishing his successor well.

7. The motion was put to the meeting that the subscription be raised from £2 to £5 starting from 1st October, 1981. The subscription was last raised, from £1 to £2 in 1971. The amount of the increase was queried. One of the main reasons for that was the desire to avoid frequent changes in subscription which are inconvenient both to members and to officers. The motion was carried *nem. con.*

8. **The Membership Secretary's** report was tabled. Dr. Cheng had sent his apologies for absence and the Secretary highlighted one or two features of the report, including the acceptance of Honorary Membership by four members. There were no questions.

9. **The Bulletin Editor's** report was read by the Secretary in the absence of Dr. Dimond who had sent his apologies for absence. In addition it was reported that the issue of the Bulletin due to go out then (volume 24, number 3) was about three weeks late.

10. **The Editor of Rheology Abstracts** read his report, commenting on the bumper volume for 1981. He expressed his thanks to the Abstractors and wished his successor well. The President remarked on the importance of Abstracts as a contribution to the Society's income and to the rheological community.

A motion of thanks to the President and Council was proposed and carried before the next item.

11. **Election of Officers.** The list of nominations received to date was read out. Further nominations were invited but none was forthcoming. Since the number of nominations exactly equalled the number of vacancies the President put the list to the meeting for election as a whole, and this was agreed unanimously.

Council for 1981-82 is therefore:

Secretary: Dr. C. J. S. Petrie

Treasurer: Mr. T. A. Strivens

Membership Secretary: Dr. D. C.-H. Cheng

Editor (Abstracts): Dr. D. R. Oliver

Editor (Bulletin): Dr. C. R. Dimond

Ordinary Members: Mr. J. Astin

Dr. H. A. Barnes

Mr. A. Evans

Dr. T. E. R. Jones

Dr. M. R. Mackley

Mr. B. Roberts

together with Professor Pearson who continues as President for the second year of his term of office.

12. In concluding the meeting, the President thanked the retiring officers, A. Evans who has been Treasurer for four years, having

previously served as Editor of Rheology Abstracts and on Council where he continues for another year at least, and J. Astin who has been Editor of Rheology Abstracts for four years. The meeting expressed its support for these thanks, on behalf of the Society.

The problem of rheologists who have difficulty obtaining Sterling (or other hard currency) for payment of the subscription was raised by Dr. Lenk. The meeting supported the undertaking that Council would view sympathetically any case where this difficulty arose, and the Secretary drew attention to the discussion at last year's A.G.M. of this same issue. Dr. Lenk's suggestion that members might sponsor (and pay for) East European rheologists was noted for consideration by members.

The President stated that the Annual Award would be presented at the Conference Dinner, but did not disclose the recipient's or recipients' name(s).

There being no further business, the meeting closed at 18.55.

Discussion on future meetings

The President introduced an informal discussion before the meeting attracted enough members of the Society to be properly called the Annual General Meeting. There were 18 members present at the start of this, when the President summarised Council's plans for the next two years. These are reported in the Secretary's written report to the A.G.M.

Views expressed from the floor were that meetings on specific (specialised) topics inhibit attendance, and the contrary view that people cannot afford either the time or the money to attend general meetings. European collaboration is intended to help this by giving organisers a larger number of potential participants for specialised meetings. The choice of single topic meetings was felt to be important but no suggestions were made. It was important that the Society should play a leading part in European activities, and also Council was urged to inform everyone of plans for meetings.

REPORTS OF OFFICERS

Report of the Secretary, 1980-81

Last year's Annual General Meeting was combined with a one-day conference in London shortly after the VIIIth International Congress on Rheology in Naples. Both these events were mentioned in last year's report and accounts of them have appeared in the Bulletin. It is pleasing to note the wish of the Secretary of the International Committee on Rheology to use the report of the Naples Congress from our Bulletin in the ICR Newsletter (and for ICR records) — our thanks are due to Dr. Oliver, with help from the President and Secretary, for producing this report.

Meetings held this year have included the present meeting, on "Stretching Flows and General Rheology" (held jointly with the Italian Society), and another joint meeting, with the Belgian Society in Liège on the "Rheology of Rubbery Materials and Rubber Compounds — Theory and Practice". Both meetings have experienced difficulty in attracting support — the attendance of under 50 may be compared with twice that number at the Edinburgh meeting (four years ago with the same themes). The Australian branch was said to be holding its second national meeting in May at Sydney, but reports of this have not yet reached the Secretary.

Future plans include meetings in September 1982 in Cambridge, on Rheology and Microstructure, organised jointly with the Statistical Mechanics and Thermodynamics Group of the Faraday Division of the Royal Society of Chemistry and in September 1983 in London, on Engineering Rheology, to be organised jointly with the German Society of Rheology. In the same spirit of holding joint meetings, the Society participates in a small way in the series of "Deformation, Yield and Fracture of Polymers" meetings, the next being due in March 1982, and is supporting (theoretically at least, if not in any obvious practical way) the European meeting in Graz in April 1982, organised by the Austrian and German Societies. In Spring 1982 a joint meeting on "Flow problems in the oil industry" is being discussed, and 1984 will see the IXth International Congress in Mexico.

Council wishes to encourage discussion of these and other plans, and it is hoped to get some consumer opinion at this meeting. Members who read this report in the Bulletin are invited to send suggestions, opinions and offers of help to the Secretary. The organising of conferences is one of the main reasons for the Society's existence and it must serve its members satisfactorily. It is hoped that the present lack of support is associated with the economic climate rather than a lack of interest in meetings. Small meetings can be more enjoyable and scientifically useful than large ones, and perhaps the Society should plan smaller (more select) meetings.

The report of the 1981 Annual Award will appear elsewhere, as will notes of changes in the composition of Council.

Your Secretary's view of things is very much conditioned by his correspondence, and the continuing stream of requests for conference papers makes him wonder why Shrivenham 1967 is so popular. It is sad to disappoint eager researchers who want copies of papers presented there when no proceedings were published, some authors did not supply abstracts or, apparently, leave their addresses with the organisers. One feels somewhat smug on turning up some handwritten notes made at a meeting — what automated information retrieval system could manage that?

Council has met four times in the year, as required — its principal business is that described above, namely the organisation of conferences, and support of the officers, who carry out their allotted tasks. It seems to have been a fairly quiet year, but whether that is a fair assessment or just the view from an ivory tower is for others to judge.

DR. C. J. S. PETRIE

Report of the Treasurer

BALANCE SHEET as at 30th JUNE, 1981

						£	£
ASSETS							
INVESTMENTS							
Redbridge 10% Bond	...	...	...	...	...	2,500	
Trustee Savings Account	...	...	...	...	...	1,783	
							4,283
CURRENT ASSETS							
Cash at Lloyds Bank:							
Deposit Account	...	...	...	...	...	5,993	
Current Account	...	...	...	...	...	934	
							6,927
Sundry Debtors	...	...	...	...	...		229
							11,439
LIABILITIES							
CURRENT LIABILITIES							
Sundry Creditors	...	...	...	...	...		835
NET ASSETS	...	...	...	...	...		£10,604
REPRESENTED BY:							
General Fund as at 1st July, 1980	...	...	...	...	...		10,899
Add: Trustee Savings Bank Interest	...	...	...	...	...		140
							11,039
Less: Excess of Expenditure over Income	...	...	...	...	...		435
							£10,604

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

We have not inspected the Membership Records.

Anthony Evans
Hon. Treasurer
The Market Hall
Redhill, Surrey

7th September, 1981

Alfred Simmons & Co.
Chartered Accountants

REVENUE ACCOUNT for the year ended 30th JUNE, 1981

1978	1979		1981	1980
		<i>EXPENDITURE</i>		
800	1,233	Council Expenses	1,595	624
765	1,168	Bulletin Production Costs	1,808	1,860
		Expenditure by Officers:		
45	93	Secretary	31	7
2	18	Treasurer	13	8
329	413	Membership, Secretary and Circulation	544	594
			588	609
36	68	Professional Fees	90	93
20	20	Insurance	26	22
—	111	Conference Travel	35	50
—	285	Annual Awards	749	306
—	678	Miscellaneous	4	103
<u>£1,997</u>	<u>£4,087</u>	Total Expenditure	<u>£4,895</u>	<u>£3,667</u>
		<i>INCOME</i>		
1,166	1,072	Annual Subscription and Entrance Fees	1,401	1,229
1,989	1,343	Publisher—Rheology Abstracts	1,443	1,568
35	50	Bulletin Subscriptions	70	49
		Investment Income:		
30	76	Bank Deposit Account Interest	319	237
208	211	Wandsworth Bond	221	221
55	167	Redbridge Bond	175	179
253	187	Inland Revenue (Tax Repayments)	165	170
			880	807
1,352	309	Conferences: Net Surplus per Account ...	541	989
—	50	Miscellaneous	125	74
<u>£5,155</u>	<u>£3,465</u>		<u>£4,460</u>	<u>£4,716</u>
<u>—3,158</u>	<u>622</u>	Excess of Expenditure over Income ...	<u>435</u>	<u>—1,049</u>
<u>£1,997</u>	<u>£4,087</u>		<u>£4,895</u>	<u>£3,667</u>

CONFERENCE ACCOUNT

Loss: London less Expenses	(117)
Surplus: Loughborough less Expenses	658
	<u>£541</u>

Report of Membership Secretary

Annual General Meeting, 9th September, 1981

The current membership stands at 671, composed of 426 home, 75 Australian Branch and 170 overseas members. This compares with last year's total of 630. The changes are as follows:

	1980/81			1979/80	
	Australian				
	home	Branch	overseas	total	total
New members	41	20	12	73	46
Resignations	7	7	4	18	15
Deaths	1	0	0	1	5
Membership ceased					
by Rule 4(d)	8	0	5	13	15
Net gain in members	26*	12*	3	41	11

* an Australian Branch member has transferred to the UK

Included in the total membership are 47 in arrears with the 1980/81 subscription, compared with 36 last year.

The following Honorary Members have been elected: Mr. A. Axon, Mr. R. J. Cole, Dr. M. van den Tempel and Mr. H. J. Ward.

Report of Bulletin Editor

I would like to thank all members who have contributed to the Bulletin this last year. Further to my requests for articles last year, the response has been good, thus making the editor's job a lot easier. The special issue, published to mark the 60th birthday of last year's Gold Medal Winner, Professor Oldroyd, included articles by Prof. Walters and Bird, the effort co-ordinated by Mervyn Jones and I would like to thank them for their efforts.

CONFERENCE REPORT

Stretching Flows and General Rheology

Newcastle, 8th - 11th September, 1981

This was a good meeting that seemed to be enjoyed by those who attended. Newcastle proved to be an interesting venue and although the total number of participants was only about forty-eight, the quality of most papers, together with lively and intense debates made this a memorable meeting.

Stretching flows seems to have now passed its glamorous stage and the meeting appeared to realise the genuine areas where stretching flows were relevant. Wild claims were not evident and the subject

now seems to have found its correct level of importance within the general field of rheology.

The Conference started in an excellent way by the presentation of experimental observations relating to the manner in which droplets of a polymer solution deform and break up when emerging from a capillary tube. The observations were made using a high speed camera. During the question time some members of the audience asked if there were explanations for some of the remarkable effects reported. Dr. Jones, who gave the paper, would not commit himself to any particular model and this was supported by Professor Pearson who was chairing the session. Professor Pearson argued that the presentation of interesting results was an honourable thing in itself and should not necessarily be accompanied by detailed explanations. It would appear that this is a very valid point, as over the years conferences have come to expect reported observations always to be accompanied by explanations. Dr. Jones' results certainly stimulated a useful debate and we await with interest further findings in the future.

There was a strong European flavour to the meeting with notable presentations on elongational viscosity experiments by Professor Meissner, Dr. Munstedt, Drs. Raible and Wagner. The last paper caused something of a stir when Professor Marrucci questioned the value of the work. The argument appeared to reduce to whether there was any point to fitting rheological data to constitutive equations using variable parameters that had no physical meaning. In the opinion of this reviewer there are many ways in which rheological problems can be approached, indeed it is relatively rare to find any two rheological groups approaching a particular problem in the same way. If work is carefully and well done it is usually of value to tackle problems in different ways certainly until it has become clearly evident that one particular approach is the most valuable. As yet we have not reached that position in handling elongational viscosity data.

Whilst it cannot be claimed that the food eaten in the hall where most delegates were resident was of the highest standard, it was noticeable how hospitable everyone appeared to be. This was highlighted on the evening where we were taken to the Lord Mayor's mansion house. To the surprise of many they were formally announced and introduced to the Lord Mayor and other celebrities. Drinks appeared from all directions and a merry time was had by all as we enjoyed the opulence of our surroundings. Contrary to many a tale heard about the North East, the weather was glorious throughout our stay and this was particularly enjoyed by those that took a trip to Hadrian's Wall on our afternoon off. A small band of dedicated rheologist or fermentation experts examined the Newcastle Breweries — I am glad to report they survived.

Returning to the papers, perhaps one general theme was apparent in that strain and strain rate history are parameters that in most

stretching flow situations are very important. This aspect came up in several papers and subsequent discussions. Presentations by Munstedt, Checker, Mackley and Mead, Mewis and De Cleyn, Raible and Wagner specifically emphasised this point. Whilst most of the papers were concerned with polymers there were lively and interesting contributions on fluids such as solutions of uranium salts, biological mucus, liquid crystals and motor oils. It is important that the rheology group maintain and encourage this diversification to different fluids as it is here that we can expect exciting new systems to appear.

Finally Anthony Evans and Chris Petrie are to be congratulated and thanked for their efforts in making the conference a relaxed and intimate meeting and a forum for such a good scientific debate.

M. R. MACKLEY

ANNUAL AWARD, 1981

It is particularly appropriate that a conference whose principal theme is extensional flow should be the occasion of the announcement that the Annual Award of the British Society of Rheology is made for work in the development of elongational rheometry. It is a measure of the importance of work in this field that much of the work recognised by the making of this award was initiated in an industrial laboratory. It is pleasing to note also that no less than three universities in three different countries have associations with the work. A final aspect of the 1981 award to be noted with pleasure is that it is the first to go "overseas". A glance at the Society's membership figures, or at the list of conference participants here or at any other recent conference, will show that this is to be expected statistically.

However it must be made clear that in making this award, Council has not sought deliberately to recognise the Society's debt to its members in the rest of Europe, nor to find work in an area related to the conference theme, but has sought without any such constraint for worthy recipients of its Annual Award. There is no doubt that, for experimental and theoretical work of the highest quality, the team of Meissner, Münstedt, Laun and Wagner is an excellent catch to display at the conclusion of the search.

Joachim Meissner, working at BASF in Ludwigshafen am Rhein, developed a novel elongational rheometer more than twelve years ago. The principle of the rotary clamp allows, for example, a 10 cm specimen to be stretched a thousand times without the need for hundred-metre long constant temperature bath, or even a hundred-metre long laboratory and remains to date the only way of generating accurately controlled large strains in the elongation of highly viscous molten polymers. As well as refining this experimental technique and using it

in investigations of polymer melt rheology, Dr. Meissner collaborated with A. S. Lodge at Wisconsin in furthering work on the theoretical interpretation of his results.

The steady flow of papers on elongational rheometry (and on other rheological topics) was mildly perturbed by the appointment of Dr. Meissner as Professor in the technical chemical laboratory of the Eidgenössische Technische Hochschule (ETH) in Zürich. In fact this perturbation was the less apparent because Helmut Münstedt, soon to be joined by Hans Martin Laun, maintained the flow of papers from BASF. These papers describe both the achievement of ever greater elongations and of careful studies of the accuracy and reproducibility of results with the rotary clamp type of instrument and the development of a constant stress instrument using a suitably shaped cam — an idea which can be traced back through Cogswell and Leaderman to Andrade. The complementary development of the two instruments and the mutual consistency of their results lends weight to the claim that here are two scientific instruments of high accuracy.

Theoretical analysis of results from these instruments brings in the fourth member of the “team”, Manfred Wagner who has offered a number of ideas on the choice of a constitutive equation to fit elongational and shearing flow data. This contribution started while he was completing a doctoral dissertation involving experimental and theoretical studies of the film-blowing process at the University of Stuttgart, and continued with his move to join Professor Meissner at the ETH in Zürich. The work at ETH Zürich, from Meissner, Wagner and several colleagues continues unabated, including in recent years the demonstration of stress overshoot in uniaxial elongation at constant strain rate, and the extension of the rotary clamp idea to biaxial elongational flows, as has been seen on film at this meeting.

Before concluding, some research into the background of the quartet may be permitted. The use of the term “team” earlier may be questioned — since no publication involves more than two of the four, and some of the links that have been drawn may seem a little tenuous. However, it may now be revealed that, just as in this country a “Manchester Mafia” has been evident in high polymeric circles, there is a network of Stuttgart physics graduates who have dominated elongational rheometry in German-speaking countries. Not only this, but we find that dissertations of three of our four award-winners are on the deformation of single crystals of metals. When we discover that Professor Meissner’s doctoral dissertation, which perhaps he thought safely forgotten, cites Andrade whom we have already mentioned in connection with the technique which Meissner did not develop (and who was President of this Society from 1944-1947), have we found too many coincidences? If not, consider that the same thesis cites one M. Yamamoto who is surely the same Japanese physicist who, with A. S. Lodge (also mentioned above), is the originator of the network theory for polymer melts.

This is, of course, rather irrelevant to the purpose of making the 1981 Annual Award of this Society. We do this to four representatives of a number of team efforts which have brought the art of elongational rheometry to its present advanced state. On the framed certificates Professor Meissner is named first, since he is clearly the senior member of the quartet and has been a member of this Society for longer than the other three put together. The three junior members are named in alphabetical order.

In recognition of their joint contributions to the development of elongational rheometry, the British Society of Rheology's Annual Award for 1981 is made to:

PROFESSOR JOACHIM MEISSNER

DR. HANS MARTIN LAUN

DR. HELMUT MUNSTEDT

DR. MANFRED WAGNER

ANNUAL AWARD 1982 — CALL FOR NOMINATIONS

Members are reminded that nominations for this award should be made in writing to the Secretary. Nominations should be sent to the Secretary as soon as possible, for consideration by Council in time for the 1982 A.G.M. Consideration is not restricted to those formally nominated but all nominations received within a month of receipt of this Bulletin will be carefully considered.

C. J. S. PETRIE

RHEOGONIOMETRY COURSE

First Circular

May 18th to 20th, 1982

The Fourth Ross Priory Course on Rheogoniometry, sponsored by Sangamo Weston Controls Ltd., manufacturers of the Weissenberg Rheogoniometer, will be held at the University of Strathclyde's Staff Educational and Recreational Centre, Ross Priory, on the banks of Loch Lomond, Scotland. The course will be concerned with rotational rheometry, and is aimed at users and potential users of the Weissenberg Rheogoniometer and similar instruments. In addition techniques for measurement in the rapidly expanding field of Elongational Viscosity will be dealt with.

The programme will include the following lectures:

Fundamentals of steady shear; fundamentals of oscillatory measurements; new developments in rheometry; specialised techniques for

polymer melts, biological materials, suspensions, solutions, and other industrial fluids; data treatment; elongational flow techniques and their interpretation.

Group Clinic sessions will also be held to discuss particular flow problems.

Those attending the course will meet in Glasgow on the morning of Wednesday, May 18th, 1982, and be taken to Ross Priory by bus. The house itself is situated in 55 acres of policies at the south end of Loch Lomond. Part of the building dates back to the 14th century. The facilities include a bar, squash court, six-hole golf course and fishing on the Loch.

Accommodation is limited and those attending will be expected to share a room as all the bedrooms are double.

Lectures will be given by Professor K. Walters, Dr. J. Ferguson and Dr. H. Barnes. Representatives of Sangamo Controls Ltd., will also be present.

The course will disperse after breakfast on Thursday, May 20th, when members will be returned to Glasgow.

The course fee will be £95 including full board. Those wishing further details should complete the form below and return it to:

Dr. J. Ferguson
Department of Pure and Applied Chemistry
University of Strathclyde
Cathedral Street
Glasgow
Scotland G1 1XL

I wish (a) more information*, (b) to attend* the Rheogoniometry Course.

Please send Course details to:

NAME (Mr., Mrs., Miss, Dr., etc.*)

ADDRESS

.....

POST CODE TEL.

* Delete whichever is inapplicable.

APPLICATION OF ROLLER COATING TECHNOLOGY

Twenty-two roller coating specialists from companies in the paint, plastics, confectionery, chemicals and other industries attended a recent meeting at Warren Spring Laboratory to discuss the application of WSL research to their current industrial coating problems. Dr. David Cheng outlined research progress and discussed how the findings on the prediction of film thickness, control of ribbing, prediction of rib number and the onset of filamentation and fly, could be applied to minimise coating problems experienced by those attending. The industrial participants identified control of ribbing, air entrainment and filamentation and fly as the priority topics for future design guides to be produced under the TLP Programme. Details of this and other areas covered within WSL's multi-client programme on TLP — Thick Liquids and Pastes: Processing and Flow, can be obtained from Dr. P. L. Bransby who is the Head of the Materials Handling Division at Warren Spring Laboratory, P.O. Box 20, Gunnels Wood Road, Stevenage, Hertfordshire SG1 2BX.

FUTURE CONFERENCES

Numerical Methods in Industrial Forming Processes

University of Swansea, 12th - 16th July, 1982

Objectives

In recent years there has been a substantial increase in research activity related to numerical methods applied to forming processes. The objective of this conference is to establish the state of the art of such methods with respect to research and practice. It is intended that the conference be broadly based, encompassing such topics as metal and polymer forming, metal and glass casting and sheet metal forming, etc. The proceedings will be published prior to the conference, and keynote addresses and selected papers will be subsequently published.

Advisory Panel/Keynote Speakers

M. J. CROCHET (Cath. Univ. of Louvaine)
R. T. FENNER (Imperial Coll. London)
S. KOBAYASHI (Univ. Calif. Berkeley)
E. H. LEE (Stanford Univ.)
G. MENGES (IKV, Aachen)
J. C. NAGTEGALL (MARC Analysis Corp.)
A. SAMUELSON (Chalmers Univ.)
E. G. THOMPSON (Colorado State Univ.)
R. I. TANNER (Sydney Univ.)
N-M WANG (General Motors)

Location

The Conference will take place on the campus of University College, Swansea. Accommodation will be available for participants in Halls of Residence on campus. The campus is very attractively situated, being surrounded on three sides by extensive parkland, and on the fourth by Swansea Bay. Just to the West of Swansea is the famous Gower peninsula, which is designated an area of outstanding natural beauty.

Call for Papers

Abstracts are invited on the topics outlined in the provisional programme overleaf. Other papers of merit in related topics will also be considered for inclusion. The abstracts should be approximately 300 words in length and submitted as soon as possible. Final papers will be required by 26th February, 1982, for inclusion in the Conference Proceedings.

Abstracts should be sent to:

Dr. J. F. T. PITTMAN
Department of Chemical Engineering
University College of Swansea
Singleton Park
SWANSEA, U.K., SA2 8PP

Meeting of European Rheologists

Graz, 14th - 16th April, 1982

Travel arrangements for the above conference are being offered by Canterbury Travel of 248 Streatfield Road, Harrow, HA3 9BY (01-206 0411).

Booking forms and full details can be obtained from the office of Canterbury Travel by contacting Adrian Collins or Jane Robinson.

We are operating two tours; one for individual arrangements, whereby delegates may select their outward and homeward dates of travel and our group tour arrangements, which is based on outward transportation on 13th April with homeward transportation on 17th April.

Three categories of accommodation are offered:

First Class — Hotel Weitzer (with private facilities) £234.55 per person in twin room £260.50 per person in single room.

Upper Tourist Class — Hotel Drei Raben (with private facilities) £215.20 per person in twin room £222.50 per person in a single room.

Student Hotel (with private facilities) £201.85 per person in twin room
£122.50 per person in single room.

Included in the price above will be the following services:

- (1) Return transportation London/Vienna-Graz/Vienna/London
- (2) Transportation from Vienna Airport to your hotels in Graz on arrival and from Graz hotels to Graz Airport on departure.
- (3) Four nights accommodation on a room and continental breakfast basis, service charges and taxes included.

Please note that, taking timing into consideration, it is most sensible to fly the group to Vienna and transfer by road on arrival, rather than wait for a domestic flight connection. The homeward journey will be by air Graz/Vienna/London.

Please note that arrangements are based on a minimum participation of ten persons travelling out and back together to qualify for the group price. An exchange rate of Austrian Schillings 30 = UK £1.00 has been used and in the event of fluctuation, we would reserve the right to adjust the quoted tour price. Accommodation and flight arrangements are based on prices anticipated to apply in April, 1982.

MEMBERSHIP NEWS

Dr. C. J. S. PETRIE, MA, PhD, AFIMA, AMPRI

**appointed to a Personal Readership in Theoretical and Applied Rheology
from 1st August, 1981**

Christopher James Stewart Petrie was born in 1939 in St. Andrew's, Fife, and brought up in Edinburgh where he attended the Edinburgh Academy and became Dux of the School. He graduated with a degree of Bachelor of Arts at Cambridge University in 1960, completing his Chemical Engineering Tripos in 1961. From 1961-64 he continued as a postgraduate student in the Department of Chemical Engineering, Cambridge, with an Esso Studentship and a Trinity College Senior Scholarship. He was awarded the degree of Doctor of Philosophy in 1965 and held a DSIR Research Fellowship in the same Department from 1964-66.

Dr. Petrie was appointed to Lectureship in Engineering Mathematics at this University in 1966. He was awarded a Leverhulme Research Fellowship in 1974 which he held as a Visiting Professor at the University of Delaware. His research interests lie primarily in the field of rheology, the science of the deformation and flow of matter, both in its theoretical aspects and in its applications in polymer engineering.

He has published a number of papers and is the author of a book "Elongational Flows". He has been invited to lecture on numerous occasions at home and abroad and has been involved with the organisation of several international conferences. He is secretary of the British Society of Rheology and actively encourages international Collaboration, both on a personal basis and between societies, particularly in Europe. Dr. Petrie lectures in engineering mathematics at both undergraduate and postgraduate levels.

The following applications for membership were approved at the October Council Meeting:

M. Z. A. Nasir
BAppSc
feta, BCDE

Gerwyn James George
etsa, DEJK

Ronald A. Behrens
fetsa, B, D
BSChemEng

Loughborough University of
Technology
Institute of Polymer Technology
Loughborough
Leicestershire LE11 3TU
3 Clive Street
Senghenydd
Caerphilly
CF8 2GE

University of Delaware
Department of Chemical Engineering
Newark
Delaware 19711 USA

Resignations

R. Knowles, Sangamo Western Controls Ltd., Bognor Regis.
D. R. Thompson, Preston.

Australian Membership News

As of July 1981, the Australian Branch membership stands at 75, compared with 63 last year. During the year, 20 new members have joined, one member has come to the UK and seven have resigned. We are pleased to see this growth of interest in rheology in Australia.

AUSTRALIAN BRANCH—NEW MEMBERS (as of July 1981)

Mr. R. Bektash
L, F, G

Uncle Ben's of Australia
P.O. Box 153
Wodonga, Vic. 3690

Mr. R. J. Binnington
D, F

Department of Chemical Engineering
Monash University
Clayton, Vic. 3168

Mr. J. E. Boevink
B, G, H

Catoleum Pty. Ltd.
Anderson Street
Botany, N.S.W. 2019

Dr. A. F. Collings
D, M, N

C.S.I.R.O.
Applied Physics
P.O. Box 218
Lindfield, N.S.W. 2070

Mr. J. Dempsey-Joy

Selby Scientific
P.O. Box 121
North Ryde, N.S.W. 2133

Dr. H. D. Ellis

Department of Physics
Queensland Institute of Technology
G.P.O. Box 2434
Brisbane, Qld. 4001

Mr. R. Fish
B, E, adhesive

(A.P.M. Ltd.)
16 Sylvan Street
Balwyn North, Vic. 3104

Mr. M. Keentok
D, N

Department of Mechanical Engineering
University of Sydney
Sydney, N.S.W. 2006

Mr. G. S. Low
D, G

Mr. J. F. Milthorpe
N

Ms. L. Muchic
D, L, M

Mr. A. Pritchard

Dr. L. Pullum
G

Mr. M. Shehata
C, D

Dr. S. E. Stephenson
C, D

Dr. A. D. Thomas
G

Mr. R. C. Warren

Mr. J. B. Watkins
C, D, J, K

Mr. S. M. West
D, F, G, L, N

Dr. R. G. Wylie

Department of Chemical Engineering
R.M.I.T.

P.O. Box 2476V
Melbourne, Vic. 3001

130 Duntroon Street
Hurstone Park, N.S.W. 2193

29 High Street
Strathfield, N.S.W. 2136

Selbys Scientific Ltd.
P.O. Box 11
Oakleigh, Vic. 3166

C.S.I.R.O.
Division of Mineral Engineering
Bayview Avenue
Clayton, Vic. 3168

Fletcher Chemical Company
469 Sommerville Road
West Footscray, Vic. 3012

University of Adelaide
Box 498
G.P.O. Adelaide, S.A. 5001

BHP Central Research Laboratory
P.O. Box 188
Wallsend, N.S.W. 2287

Defence Research Centre
P.O. Box 373
Gawler, S.A. 5118

Koppers Aust. Pty. Ltd.
P.O. Box 23
Mayfield, N.S.W. 2304

(Kraft Foods)
143 Cecil Street
Williamstown, Vic. 3016

C.S.I.R.O.
Division of Applied Physics
P.O. Box 218
Lindfield, N.S.W. 2070

Change in location

Dr. R. P. Chhabra is now at the Department of Chemical Engineering, University College of Swansea.

Resignations

W. R. Anderson, Reservoir, Victoria.

L. Barro, Ringwood, Victoria.

Dr. R. Fox, ICI Aust. Operations Pty Ltd., Deer Park, Victoria.

Dr. R. C. Gifkins, CSIRO Nunawading, Victoria.

F. Giurco, Olympic Tyre & Rubber Co Pty Ltd., W. Footscray, Victoria.

Dr. G. Sarmiento, Bogota, Colombia, South America.

Dr. B. Stanmore, Dept. of Chemical Engng, University of Melbourne, Parkville, Victoria.

TECHNICAL ENQUIRY

An enquiry has been received by the editor from the British Ceramic Research Association concerning the rheological properties of ceramic (non-clay oxide) pastes. Mr. D. E. Lloyd is primarily interested in the general rheological behaviour of these pastes up to about 200°C and techniques for measuring their behaviour.

Any person who may be able to help is asked to contact Mr. Lloyd, BCRA, Queens Road, Parknell, Stoke-on-Trent. 0782-45431.

SITUATIONS VACANT

Rheologist

A vacancy exists in our Drilling Technology Group which carries out research on oilwell cements, drilling fluids and rock mechanics. The successful candidate would be based at our Research laboratories at Sunbury-on-Thames, but would be expected to follow up their studies in field operations.

A recent graduate with an interest in rheology or fluid mechanics is required to study the rheological behaviour of drilling fluids and cement slurries. The results of these investigations will be related to drilling operations through consideration of hole cleaning, mud displacement by cement, etc. A candidate with industrial experience is preferred but a new graduate would be considered. Typical age range 20-30 years.

We offer a competitive salary plus non-contributory pension scheme, relocation assistance where appropriate and the usual benefits of a large organisation.

If you feel you meet our requirements and wish to apply, please write with full details of your qualifications and career, to:

Mrs. L. Fuller
BP Research Centre
Chertsey Road
Sunbury-on-Thames, Middlesex TW16 7LN

Robert Gordon's Institute of Technology, Aberdeen School of Mechanical and Offshore Engineering Research Fellow

For major research project on drilling fluid flow (Science and Engineering Research Council — Marine Technology Directorate financed) in collaboration with offshore petroleum industry.

Salary in range £6,070 - £6,880, according to qualifications and experience.

Details from:

Secretary
Robert Gordon's Institute of Technology
Schoolhill
ABERDEEN
AB9 1FR

JOURNAL INFORMATION

Polymer Engineering Reviews has been created to alert the polymer engineers of such new developments through state-of-the-art reviews and critical original papers. In particular, the following subjects will be highlighted to inform researchers and engineers timely of emerging new directions:

- Structural and rheological/mechanical characterisation of single and multiphase polymer systems in the solid, molten and solution states including structure-property investigations and molecular theories of behaviour.
- Fundamental, experimental and theoretical studies of flow and structure development in polymer processing operations. This includes fibre, plastics, rubber and thermoset processing.
- New and unique fabrication and mixing technology as well as polymer products.
- Design of engineering structures from polymer systems including composites, foams and textiles.
- Influence of thermal and mechanical history on properties and performance of polymers.

Authors are invited to submit English language manuscripts (three copies) of state-of-the-art reviews or critical original research papers to the editor:

Professor JAMES L. WHITE
Polymer Engineering Department
University of Tennessee
Dougherty Engineering
Knoxville, TN 37916, USA

Instructions to Authors may be obtained from the editor or the publishers.

DIARY

1981

December 9 - 10. 16th Annual Conference of G.F.R.

December 18. Council Meeting, Port Sunlight.

1982

March 19. Council Meeting, London.

March 29 - April 1. Cambridge. Deformation, Yield and Fracture of Polymers (Plastics and Rubber Institute with the British Society of Rheology and other societies).

April 14 - 16. Graz. See Bulletin article for travel arrangements.

May 18 - 20 Rheogoniometry Course.

September 21 - 24. Rheology and Microstructure. Trinity Hall, Cambridge.