

BULLETIN



BRITISH SOCIETY OF RHEOLOGY

1977, Vol. 20, No. 4

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Hon. Editor:

M. CAMINA,

Paint Research Association,
Waldegrave Road,
Teddington,
Middlesex.



FOREWORD

The successful Edinburgh Conference held in September attracted just over 100 delegates. This was greater than the financial break-even number. Congratulations to the organisers for a well conducted congress and also for the large number of overseas visitors they managed to allure. The Poster Sessions were well attended, so well, in fact, that large queues formed.

A rare election for Council places was held at the A.G.M. We welcome Dr. C. J. Petrie to the committee and also Mr. J. Astin who is to become the Editor of Abstracts. Dr. R. Oliver, past treasurer, and Dr. D. Marshall, past Abstracts Editor, remain on the Council to lend their experience to the new officers. They have laudably worked over the last four years; Dave Marshall introducing the new and cheaper method of producing abstracts, and Ralph Oliver with his clear exposition of book-keeping.

Ken Beazley has retired after serving the Council for a decade. He was secretary from 1970-74 and organised several excellent conferences. His efforts for the Society are recognised and his knowledge of B.S. affairs will be missed.

OFFICERS AND MEMBERS OF COUNCIL 1977-1978

President: DR. J. J. BENBOW, I.C.I. Ltd., Agricultural Division, Billingham, Teesside.

Secretary: MR. F. N. COGSWELL, I.C.I. Ltd., Plastic Division, Welwyn Garden City.

Treasurer: MR. A. EVANS, Department of Surgery, Royal Victoria Infirmary, Newcastle upon Tyne.

Membership Secretary: DR. T. E. R. JONES, School of Mathematical Sciences, Plymouth Polytechnic, Plymouth.

Abstracts Editor: MR. J. ASTIN, Department of Applied Mathematics, U.C.W., Penglais, Aberystwyth.

Bulletin Editor: MR. M. CAMINA, Paint Research Association, Teddington, Middlesex.

Ordinary Members:

DR. D. C-H. CHENG, Warren Spring Laboratory, Stevenage.

MR. T. C. DAVENPORT, B.P. Research Centre, Sunbury-on-Thames, Middlesex.

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

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

DR. D. R. OLIVER, Department of Chemical Engineering, University of Birmingham, Birmingham.

DR. C. J. PETRIE, Department of Engineering Mathematics, University of Newcastle upon Tyne, Newcastle upon Tyne.

The British Society of Rheology
MINUTES OF THE THIRTY-SEVENTH ANNUAL
GENERAL MEETING OF THE SOCIETY

The 37th Annual General Meeting of the Society was held at the Pollock Halls, Edinburgh on Thursday, September 8, 1977. The President, Dr. Benbow, took the chair at 1800. Thirty-four members were present.

The Minutes of the 36th A.G.M. held in London on October 1, 1976 were read, approved as a correct record and signed.

Arising from the minutes Professor Walters enquired if Council had considered providing funds for distinguished overseas rheologists to visit and lecture to the Society. Council had done so but had not considered it appropriate for the present year's activities.

Dr. Petrie enquired of the fate of the proposed joint meeting with the American Society of Rheology. This proposal had foundered on the inability of the two societies to find a date which was mutually compatible and did not disrupt other commitments of the two societies. Members of the Society of Rheology would always receive a warm welcome to meetings of the British Society.

Reporting on the *activities of the Society* during the past year, the Secretary noted that the year had opened with an informal dinner organised at the last Annual General Meeting. The dinner had emphasised the informal spirit for which the Society is justly renowned. The Spring meeting with the title "Polymer Processing and Rheometry" had been a joint meeting with the Dutch and Italian Societies with the Italian Society acting as host at Pisa. Dr. Oliver and Dr. Marshall had attended as the representatives of Council and ten members of the Society had taken advantage of a package tour, organised on behalf of the Society by Canterbury Travel. A travel grant of £50 had been awarded to one research student. Eighty-four delegates had attended the meeting and 53 papers had been read. The present conference on "General Rheology and Stretching Flows" had been organised by Dr. Ferguson with the assistance of Dr. Petrie and Dr. Hudson. This meeting included 35 papers and was attended by 105 delegates and 20 of their ladies. A common feature of both meetings was their international character. The Pisa meeting included contributions from eight countries while no less than 11 were represented at Edinburgh. This international character emphasised both the universal language of rheology and the responsibilities of the Society to an international community.

For 1978, Dr. Roberts, on behalf of the Faraday Division of the Chemical Society, was organising a meeting to be held at Cranfield with the title "Molecular interactions, microstructure and rheology".

This meeting would be held on January 4-5 and members would receive a reduction in fees equal with that applicable to members of the Chemical Society. Dr. Oliver is concerting a rheology colloquium within a conference organised by the Institute of Chemical Engineers to be held at Birmingham on April 6-7. Next September 6-8 the principle scientific meeting of the Society will be held at Plymouth with the title "Rheology and Rheometry of Multiphase Systems" for which Dr. Jones and Dr. Beazley are preparing the ground. A joint meeting with the Cybernetics Society on "Measurement and Control of Rheological Processes" is planned for January 1979.

Council is always concerned that the Society may be overlooking the interests of some members. Recent conferences had tended to be broad based seeking interactions between science and technology or across technological boundaries. Short highly specific meetings have been held in the past and could be held again if the membership feel that a particular topic warrants a thorough airing.

Council is concerned at the possible ways in which the environment of the Society and the needs of its members may change in the next 15 years and would like to initiate appropriate action rather than being forced to respond at short notice. To assist in appreciating such changes Council will be seeking the collective wisdom of the Society by a questionnaire next year. Some evidence of such changes is indicated by membership which has remained constant during the last ten years while interest in rheology, as evidenced by publications, has increased. The Secretary expressed a personal concern that the Society was not holding the interests of general scientists with peripheral interests in rheology and that as a result it was losing flexibility in its approach to those areas of rheology where a rigorous approach is not yet available. Professor Walters felt that the Secretary was taking an unreasonably pessimistic view and that members were happy with the Society as it is: Dr. Lenk supported him in this view. Dr. Petrie enquired if it would be justified to seek professional help in conducting the proposed consultation. The Secretary agreed that he could use all the help that he could get but doubted that the Society should commit extensive funds to the exercise.

During the year several members of the Society, including Dr. Beazley, Dr. Cheng and Mr. Davenport from Council, had served on a rheometer design panel under the chairmanship of Professor Wilkinson as part of the activities of the Non-Newtonian Flow Panel of the Science Research Council. The objective of this panel is to achieve co-ordinated advances in certain areas of rheometry. The activities of the panel had recently been reviewed in the Bulletin.

It is a pleasure to note the continuing success of the Australian Branch of the Society. During the year Dr. Enyiegbulam had sought

and received the blessing of Council to form a Nigerian Branch of the Society.

The incoming correspondence of the Society, other than that pertaining to conferences, was 5 kg. last year. The bulk of this correspondence is with other organisations. The most interesting part is that which deals with the news and views of members and their technical problems.

The Treasurer noted that the net assets of the Society had increased by £570 last year and now stood at £6,961. This was a remarkably successful result in view of the lack of major conference income during the year and was largely due to increases in income from Rheology Abstracts and from investments. Income from subscriptions was now a low proportion of the Society's revenue but there are no plans to increase the Annual Subscription at present. The publication costs of the Bulletin continued to rise and alternative methods of presentation would be considered. The Treasurer had recently consulted the V.A.T. inspectors who advised that there is no need, nor advantage, in registering the Society for V.A.T. The Treasurer, who was completing four years in that office, remarked that the healthy financial position of the Society was largely due to those who had organised conferences, to the Editor of Abstracts and those who served the Society as abstractors and thanked them for making his task such a pleasant one.

Professor Walters proposed a vote of thanks to Dr. Oliver for his stewardship of the Society's finances during the last four years. The proposal was greeted with acclaim.

Dr. Whorlow proposed and Mr. Evans seconded that Alfred Simmons and Co. be appointed auditors for the coming year. The proposal was carried without dissent.

The Membership Secretary reported that during the year membership had increased by three to 578. This total included 368 U.K. members and 210 domiciled overseas. Twenty-six new members had been elected during the year of whom five were from abroad. Four voluntary resignations had been notified and there had been 18 enforced resignations. Forty-nine members are currently in arrears with 1976/77 subscriptions.

The Editor of the Bulletin reported that the Bulletin is now issuing promptly but that the three months between issues and six weeks between compilation and despatch meant that news was inevitably slow in reaching members. Questioned by Professor Ulbrecht the Editor outlined the advantages and problems associated with different methods of production. The Editor drew the attention of members to a new feature which he had introduced entitled "Technical Enquiry", an information format for snippets of low key information. In response to the Editor's enquiry whether the

membership felt that the Bulletin was worth the £800 it cost each year, the meeting expressed a clear indication of satisfaction with the journal.

Dr. Petrie noted that the Bulletin frequently carried news of the activities of the Plastics and Rubber Institute which is of value to many members. Unfortunately that institute did not reciprocate—in particular in respect of the present meeting. Information had been passed to them in good time and a verbal assurance had been received that the meeting would be promoted. Council noted and would consider this problem area.

The Editor of Abstracts noted that during the year he had caught up on two issues and was now one behind. The number of abstractors had remained constant during the year at 31. The Editor was sorry to note that the proportion of abstracts arriving ready typed was declining; for his successor's sake he hoped that this trend would be reversed. Mr. Whorlow noted that there is precedent for the Society paying for typing of abstracts by the abstractors so that they could do their own proof reading.

Professor Ulbrecht asked if the Editor was satisfied with the quality of abstracts. Mr. Evans asked if abstracts should be purely factual or opinionated, he felt that opinion was of value. The Editor felt that in both respects the balance was about right and recorded the great debt of the Society to those members who acted as abstractors.

Dr. Petrie asked about the cost of preparing camera ready copy and the Editor confirmed that this, and the cost of indexing, was born by the publishers.

The President thanked Dr. Marshall on behalf of the Society for his four years' service as Editor.

Dr. Cheng introduced a motion that "The Society should institute an *Annual Award* to be made to an individual or group of individuals or an institution for significant or promising contributions and/or services to the advancement of rheology in all its aspects". Before discussion Professor Walters moved and Dr. Beazley seconded that since the views of the Society were to be solicited on a wide range of topics that such an important item would benefit from discussion within that format. The meeting concurred and if appropriate the matter will be called again in 1978.

Election of Officers and Council

The President continues in office for the second year of his elected term. There were no nominations for Officers of the Society other than those nominated by the retiring Council and the following were elected to serve for the next year:

<i>Treasurer</i>	Mr. A. Evans
<i>Membership Secretary</i>	Dr. T. E. R. Jones
<i>Editor of the Bulletin</i>	Mr. M. Camina
<i>Editor of Abstracts</i>	Mr. J. Astin
<i>Secretary</i>	Mr. F. N. Cogswell

Nine nominations were received for the remaining six places on Council: Dr. Beazley, Dr. Cheng, Mr. Davenport, Dr. Dimond, Dr. Ferguson, Dr. Marshall, Dr. Oliver, Dr. Petrie and Dr. Sherriff. Mr. Cross and Mr. Whorlow acted as tellers for the vote, as a result of which

Dr. D. C-H. Cheng
 Mr. T. C. Davenport
 Dr. J. Ferguson
 Dr. D. E. Marshall
 Dr. D. R. Oliver
 Dr. C. J. S. Petrie

were elected to serve.

On behalf of the Society the President thanked Dr. Beazley who was retiring from Council after serving the Society as Secretary and as an ordinary member of Council for ten years. He also thanked Dr. Sherriff for his service on Council in the last year.

There being no further business the meeting closed at 1930.

F. N. Cogswell,

September 11, 1977.

REPORT OF THE HON. TREASURER FOR THE YEAR 1976-77

The year has been remarkably successful in view of the lack of major Conference income, with an excess of Income over Expenditure of £569.79.

The Conference Account includes £200 from the Faraday Division of the Chemical Society as our share of the profit on the joint meeting held at Bristol in April 1976 and not included in last year's

accounts. The joint meeting of the British, Italian and Dutch Societies of Rheology held at Pisa in April 1977 is currently shown as breaking even, but the meeting was well attended and it is possible that we may receive a proportion of the gain from this meeting which will assist next year's accounts. Likewise, we have incurred expenditure on the Edinburgh meeting in September 1977; this pump priming may also bring just rewards!

Subscriptions and Entrance fees appear low because last year's figures included two payments from our Australian branch whilst the payment currently due has not yet arrived.

Our share of the profits from the publication of Rheology Abstracts has risen from £612 to £1,026.71, which shows the financial effect of a full year of production using the photolithographic process. As part of the new arrangements, "overhead costs" charged by Pergamon are reduced from 50 per cent to 25 per cent of direct production costs and certain production costs paid previously by the Society are now paid by the publisher. These sometimes amounted to over £100 per annum. We thank the Abstracts Editor for his great efforts in making the changeover to the new system.

Our third major fixed source of income has become "Investments", which now raise £603 per annum (see also "Trustee Savings Bank Interest" on Balance Sheet) and provide excellent insurance against overall loss in the event of a bad financial year.

Expenditure has risen significantly in the last year, from £1,769 to £2,049.98. Council meetings are not unreasonably expensive, since in the last year when four were held (1975) the cost was £476 and the Secretary has made an effort to improve the venues in the current year. The Bulletin production costs continue to rise; the Bulletin secretary is currently examining the options open to us.

Under "Payments for Conference Travel" we paid £50 for a student and £50 each for two members of Council to attend the meeting at Pisa in April, compared with £40 each for six students attending the meeting at Gothenburg taken in the previous financial year.

The V.A.T. inspectors have recently examined the society's accounts and state that there is no legal need, nor advantage to us, in registering the Society for V.A.T.

The overall financial position of the British Society of Rheology is a sound one, due largely to the voluntary efforts of its officers.

Dr. D. R. Oliver,
Hon. Treasurer.

July 11, 1977.

BRITISH SOCIETY OF RHEOLOGY

BALANCE SHEET as at June 30, 1977

ASSETS

Brentwood U.D.C. 12% Bond	1,500.00
Wandsworth Borough Council 12 $\frac{3}{8}$ % Bond	2,500.00
Trustee Savings Account	1,718.78
Cash at Lloyds Bank	
Deposit Account	833.27
Current Account	441.61
	1,274.88
	£6,993.66

Less

CURRENT LIABILITIES

32.40	
	32.40
	£6,961.26

NET ASSETS

Represented by:

General Fund as at July 1, 1976	6,280.63
Add Excess of Income over Expenditure for year ...	569.79
Add Trustee Savings Bank Interest	110.84
	£6,961.26

CONFERENCE ACCOUNT

Gain on Spring 1976 (Bristol) Meeting	200.00
Income from Autumn 1976 (London) 1-day Meeting	26.00
Payment from Italian Society Rheology Spring 1977	
(Pisa) Meeting	97.74
	323.74
<i>Less</i> Expenses Autumn 1976 (London) Meeting ...	72.28
Expenses Spring 1977 (Pisa) Meeting	97.74
Expenses for Autumn 1977 (Edinburgh) Meeting	
including Cash Float	101.24
	271.26

Net Income shown in Revenue Account	52.48

July 11, 1977

smd

REVENUE ACCOUNT for the year ended June 30, 1977

EXPENDITURE

1976	Committee Expenses (mainly travel)	1977	
379	Council	679.13	
39	Polymer Processing Sub-Committee ...	18.14	
2	B.N.C.M.	0	
24	Lunch (Director of Polymer Engineering) ...	0	
444			697.27
614	<i>Bulletin</i> —Production Costs		846.33
83	<i>Abstracts</i> —Production Costs		0
	Expenditure by Officers:		
42	Secretary	57.66	
20	Treasurer	15.28	
278	Membership Secretary and Circulation ...	221.04	
340			293.98
32	Professional Fees		32.40
16	Insurance		20.50
240	Payments for Conference Travel		150.00
0	Miscellaneous		9.50
1,769			2,049.98
925	Excess of Income over Expenditure for year		569.79

INCOME

1,269	Annual Subscriptions and Entrance Fees ...	976.40
612	Publisher— <i>Rheology Abstracts</i>	1,026.71
49	<i>Bulletin</i> Subscriptions	31.71
65	Advertising and Assistance in Circulation ...	25.00
	Investment Income	
71	Bank Deposit Account Interest	26.35
114	Brentwood Bond	117.00
48	Wandsworth Bond	205.16
0	Inland Revenue (Tax Repayments)	143.96
446	Conferences—Net Gain	52.48
20	Miscellaneous Income	15.00
2,694		£2,619.77

July 11, 1977
smd

AWARDS

Professor Arthur B. Metzger, Dept. of Chemical Engineering, University of Delaware, has been named the 1977 Bingham Medalist of the American Society of Rheology. He has also received the W. K. Lewis Award of the American Institute of Chemical Engineers.

EDINBURGH CONFERENCE REPORT

Some discussion of stretching flows

The first day of the Edinburgh Conference was devoted to the field of stretching flows. Extended Abstracts of the papers are available from Dr. Ferguson (University of Strathclyde, price £2) and the full contributions in this field will be published in the Journal of Non-Newtonian Fluid Mechanics. Rheological interest in stretching flows has gathered pace rapidly over the last ten years. The enthusiasm of the authors for their subject meant discussion periods were quite dramatically curtailed in some cases—a great loss to the conference proceedings as a whole. The papers were divided into three groups: complex flows with strong stretching flow components, stretching flow applications like fibre spinning and film blowing, and precise measurements.

In the area of complex constrained flows the very high stretching rates achieved, by comparison with those in free surface flows, was the major subject of note. Interpretation in this important field is still contentious. The areas where stretching flows are important received a new addition at the meeting as Oliver's work on squeeze films appears to be applicable to the coalescence of droplets in emulsions. Mackley presented the results of his latest experiments in a six roll mill, surrendering to all challenges from the mathematical schools on the precise description of his results, the audience was nonetheless left with the impression of a new and very important tool in rheology. One conclusion which Mackley left us with was that simple shear flow is a degenerate flow which is very easily destabilised into combinations of persistently extensional flow and vortices. A statement, the full implications of which have yet to surface in my consciousness, but which I am certain we shall hear more of in future.

In the area of film spinning McKay presented the latest results of the Strathclyde group on wet spinning of block copolymer solutions. Ferguson concluded that the flow mechanism of such systems included a domain structure and a possible liquid crystal state. A problem which seems to require some definition arose in papers by Moore and Rallison on the latest work of the Cambridge group: just how much chain extension occurs during a stretching flow. Sir Sam Edwards' contribution on the theory of rubber-like elasticity may be

a key for answering this but there still seems to be a long way to go. Meanwhile the continuum mechanics analysis of flow continues: though some of us may have felt the influence of inertia to be excessive as Petrie's equations grew to 15 terms, nevertheless, we were forced to recognise that only by examining every detail can we safely simplify to the more tractable system by which Pearson was able to represent a film flowing process in the rubbery state.

Dealy, White, Laun and Wagner all presented new data on extensional flow and extensional flow rheometers for polymer melts. The most important single conclusion is the overwhelming data which now exists that the elongation viscosity of low density polyethylene does not increase without bound but rather finds a maximum (less than an order of magnitude above the low stress value) and thereafter decreases. For *most* other polymers the fact that elongational viscosity decreases as stress increases can now no longer be ignored. Extensional rheometry remains a problem which continues to give birth to both elegant solutions and monsters. Vinogradov and Acierno turned our attention from flow to rupture—or the ultimate properties of polymers: here indeed is an area where neither experimental technique nor theory is established and we must treasure all the more those few contributions that exist.

There may be more discussion of stretching flows at future conferences on rheology but will anyone be able to answer Mackley's challenge—does simple shear exist in non-Newtonian systems?

F. N. Cogswell

PROCEEDINGS OF THE CONFERENCE ON STRETCHING FLOWS

A number of the full papers presented in the stretching flow sessions of the Conference of the Society in Edinburgh (September 7-9, 1977) are to be published in a special issue of the Journal of Non-Newtonian Fluid Mechanics to be edited by C. J. S. Petrie. Copies of this issue will be available separately from the journal and orders should be sent to

Miss R. M. Burke
Elsevier Scientific Publishing Company
Jan van Galenstraat 335
P.O. Box 330
Amsterdam
The Netherlands

The cost of the special issue is not yet known, but if the issue runs to 200 pages, as expected, it will be Dfl. 30 plus postage costs. Contents of the special issue will be announced in the next Bulletin (or so the editor of the special issue hopes).

PROCEEDINGS OF THE EDINBURGH CONFERENCE ON GENERAL RHEOLOGY AND STRETCHING FLOWS

A booklet containing summarised proceedings of the above Conference is available for sale, price £2.15 including postage. The 106 page booklet contains summaries, mostly 1,000 to 1,500 words in length, with figures and references. It is a valuable work of reference on the present state of rheology, particularly on elongational flow.

If you wish a copy send a cheque or money order made payable to "The British Society of Rheology" to Dr. J. Ferguson, Fibre Science Dept., University of Strathclyde, Glasgow, G1 1XW.

CALL FOR PAPERS

Fourth international conference DEFORMATION, YIELD AND FRACTURE OF POLYMERS

Churchill College, University of Cambridge

April 2-5, 1979

Following the successful conferences on the physical and structural basis of yield, deformation and fracture of polymers held at Cambridge in 1970, 1973 and 1976, a fourth conference is being organised. It will be held at Churchill College, Cambridge, from April 2-5, 1979 and is being organised by a committee representing the following British societies:

British Society of Rheology
Chemical Society—Macromolecular Group
Institute of Physics—Materials and Testing Group
—Polymer Physics Group
Institution of Metallurgists
Materials Science Club
Plastics and Rubber Institute (providing the secretariat)
Society of Chemical Industry—Plastics and Polymer Group

The programme will consist of a limited number (approx. 30) of papers on original research, arranged in six sessions allowing 20-25 minutes for presentation and 10-15 minutes for discussion of each paper.

Those interested in submitting papers for presentation at the conference are asked to write to the Secretary, The Plastics and Rubber Institute, 11 Hobart Place, London SW1W 0HL, stating

their intentions and indicating very briefly the nature of the work to be presented. Detailed outlines of 300-500 words will be required not later than *August 1, 1978* and the committee will choose the papers for inclusion in the programme on the basis of these outlines.

Brief scripts of selected papers (about 2,500 words) including the main results and major illustrations will be required by December 1, 1978 in a form suitable for photo-litho reproduction, and the reproduction will be circulated to all members of the conference in advance. These brief scripts will constitute only a minor publication and will in no way prejudice subsequent full publication of the work.

Contributed papers should describe new and important investigations of deformation, yield or fracture of polymers. Papers will be particularly welcomed on the following subjects:

- 1 Deformation and fracture of polymer crystals
- 2 Composite materials
- 3 Environmental effects
- 4 Fracture mechanics, with particular reference to applications
- 5 Bio materials and applications

Novel work within the scope of the conference title but not falling under the above headings will be given favourable consideration by the committee.

Molecular Interactions, Microstructure and Rheological Behaviour Cranfield—January 4/5, 1978

Provisional List of Contributed Papers

Conformational transitions of Poly Acrylic Acid in mixtures of water, monohydric alcohol and HCl.

Z. Priel and A. Silberberg.

Weitzmann Institute of Science, Rehovot, Israel.

Absorption of a homologous series of alkyl sulphate surfactants on a clean polystyrene latex.

D. Eagland.

Dept. of Pharmaceutical Chemistry, University of Bradford, BD7 1DP.

Alginate-gelatin interactions.

E. L. Wilson and G. Stainsby.

Procter Dept. of Food Science, The University of Leeds, LS2 9JT.

Studies on the gelling process in polyvinylalcohol/congo red systems using rheological and inelastic light scattering techniques.

G. C. Maitland and S. Sayegh.

Dept. of Chem. Eng. and Technology, Imperial College, London, SW7 2A.

Binding and viscosity studies on the precipitation of polyvinylpyrrolidone from aqueous solution by phenolic cosolutes.

P. Molyneux.

Dept. of Pharmacy, Chelsea College, Manresa Road, London, SW3 6LX.

The phase separation of binary copolymers of styrene and methylmethacrylate from solvent/non-solvent mixtures in relation to copolymer structure and polymer solvent interactions.

T. A. Strivens.

I.C.I. (Paints Division) Ltd., Wexham Road, Slough, Berks.

Observations on the defect structure and rheology of Lamellar liquid crystals.

R. C. Horn and M. Kleman.

Laboratoire de Physique des Solides, Univ. de Paris-Sud, 91405, Orsay, France.

Rheological equations of state consistent with thermodynamics.

A. J. B. Spaul.

School of Chemistry, Brunel University, Uxbridge, Middlesex.

Viscoelastic properties of natural rubber/Beta Pinene resin blends and their relation to pressure sensitive adhesion.

M. M. Sheriff.

School of Pharmacy, University of London, Brunswick Square, London.

Rheology and Microstructure of the continuous phase of semi-solid emulsions.

G. M. Eccleston.

School of Pharmacy, Portsmouth Polytechnic, Portsmouth.

Rheological assessment of interactions between steroids and mucous.

C. Marriott and I. Kelloway.

Dept. of Pharmacy, University of Nottingham, Nottingham.

Effect of cations on the Rheology of Mucociliary transport properties of Tracheal Mucous.

M. Litt, C. Marriott and C. K. Shih.

Dept. of Bio Engineering, Univ. of Pennsylvania, Philadelphia, U.S.A.

The shearing destructibility of Cobalt surfaces coated with Monolayers of Stearic acid.

J. M. Georges and T. Mathia.

Laboratoire de Technologie des Surfaces, Ecole Centrale de Lyon, 36 route de Dardilly, 69130 Ecully, France.

JOURNAL OF RHEOLOGY

Transactions of The Society of Rheology

Editor: Raymond R. Myers

Chemistry Department

Kent State University

Kent, Ohio

This primary reference journal for unsolved problems in industry contains original papers on the science of the deformation and flow of matter. Serves especially those in plastics, rubber, paints, coatings, fibers and structural materials. Coverage extends to the molecular features and morphology responsible for the properties in question, and also to the processes by which the compositions are shaped and made serviceable. Papers range over a wide variety of topics from theoretical to experimental basic studies to applied research, without regard for conventional limitations other than the work be good science. Although this is the official journal of The Society of Rheology, it is not confined to papers presented at the Society's meetings.

Effective with Volume 22, 1978, the *Journal of Rheology* will change its frequency from a quarterly to bimonthly schedule. The increased frequency of publication will better enable the editors to meet the needs of both readers and authors by reducing the time from date of acceptance to date of publication. In addition, the journal will publish more papers in response to the increased activity and growing development of the field, including abstracts from the *Journal of the Society of Rheology, Japan*.

Subscription: Volume 22, 1978, \$65.00.

Published bimonthly.

Outside U.S. add \$8.00 for postage and handling.

APPLICATIONS FOR MEMBERSHIP—SEPTEMBER 1977

Stephen J. Bloomer, B.Sc.
f,e,a,G,H,K.

Dept. of Building Science,
University of Sheffield,
Sheffield, S1 02TN.

Hugh Court, B.Sc.
f,et,sa,N.

Dept. of Applied Mathematics,
University College of Wales,
Aberystwyth.

Keith R. Fisher, B.Sc.
f,et,sa,D,F,G,J,K,M.

Specialities Branch,
B.P. Research Centre,
Chertsey Road,
Sunbury on Thames,
Middlesex.

Steven T. J. Peng, Ph.D.
f,et,sa,B,C,D,F,G,H,M,N.

Jet Propulsion Lab., 67-201,
4800 Oak Grove Drive,
Pasadena, Ca. 91103,
U.S.A.

John Herman Stark, Ph.D., B.Sc.
f,et,sa,F,G,M.

Medizinische Univ.-Klinik
Thromboselabor,
Insepital,
3010 Bern,
Switzerland.

DIARY

1978

January 4-5. "Molecular Interactions, Microstructure and Rheology", Cranfield.

April 6-7. "Production Congress—I Chem. Eng. A.G.M.", Birmingham.

August 28 to September 1. "Non-Newtonian Fluid Mechanics", Louvain-La-Neuve, Belgium.

September 6-8. "The Rheology and Rheometry of Multiphase Systems", Plymouth.