

THE BRITISH SOCIETY OF RHEOLOGY

Meeting on Theoretical Rheology
Corpus Christi College, Cambridge, 16-19 September 1974

S T O P P R E S S
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Members will be interested to know that the programme for the meeting on Theoretical Rheology is nearly complete. The programme covers five important topics in rheology and each topic will be introduced by a distinguished speaker (or speakers) in a one-hour lecture. The introductory papers will be followed by shorter contributions. Ample time will be allowed for discussion.

The following have agreed to contribute :-

A. Microrheology of Suspensions

Introduction by : Dr. E. J. Hinch (Cambridge)

Short papers by : G. Evans (Cambridge)
 M. R. Mackley (Bristol)

B. Converging Flows

Introduction by : Professor J. R. A. Pearson (London)

Short papers by : A. L. Halmos & D. V. Boger (Monash U., Australia)
 S. Zahorski (Warsaw)
 J. R. Black, M. M. Denn & G. C. Hsiao (U. Delaware, USA)
 J. Strauss (Dortmund)
 J. L. White (U. Tennessee, USA)

C. Rheometry

Introduction by : Professor R. I. Tanner (Brown U., USA)

Short papers by : B. Warburton (London)
 M. C. Phillips (Amsterdam)

D. Thermomechanics

Introduction by : Professor R. S. Rivlin (Lehigh U., USA)

Introduction by : Professor J. G. Oldroyd (Liverpool)

Short papers by : M. Crochet (Louvain)
 G. Astarita (Naples)

E. Composite Materials

Introduction by : Dr. T. G. Rogers (Nottingham)

Short paper by : S. L. Passman (Atlanta, USA)

Application forms will be sent out in the summer. Enquiries to J.R.A. Pearson (Imperial College), K. Walters (Aberystwyth) or J. F. Hutton (Thornton Research Centre).

BULLETIN



BRITISH SOCIETY OF RHEOLOGY

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CONTENTS

	Page
Forword	i
Officers and Members of Council 1973-74	ii
Australian Branch 1973-74 Council	ii
The Non-Newtonian flow behaviour of Poly (vinylchloride) Plasticsols. (G. P. Pearson and L. G. Hartley)	19
Rheology in France (D. W. Hadley)	22
Rules and conditions for the award of a Whitworth Fellowship	25
Future B.S.R. Meetings:	
Theoretical Rheology	27
Rheometry—Methods of Measurements and Analysis of Results	29
Polymer Rheology and Plastics Processing	29
Seventh International Congress on Rheology	30
Groupe Francais de Rheologie—Annual Conference	30
B.H.R.A. Conferences—Drag Reduction, Mixing/Separation	31
Plastics Institute Conferences:	
Reclaim, Recycling and Reuse of Polymers and Plastics	31
Polypropylene Fibres in Textiles	32
Recent Elections	34
Diary	34

Hon. Editor:

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FOREWORD

The Flixborough disaster must have exposed many plastics and polymers to a fire situation far worse than anyone could have dreamed of a few months ago. Even though the true cause has not yet been established, there are already many lessons to be learned from this experience. It has also raised important questions of safety, environmental protection and the interdependence of various sectors of British industry.

Although stringent safety precautions were enforced at Flixborough and matches etc. banned from the factory area, other means of ignition cannot be ruled out. It would indeed have been a cruel twist of fate if the devastation had been initiated by discharge of static electricity generated by the very nylon the complex had helped to produce. Absurd though this may seem, there was evidently no ban on nylon clothing!

The destruction of local houses and the severe blast damage to buildings some three miles away is an alarming possibility in other areas. It is already making officials think again about possible sites for future petrochemical plants, especially adjacent to existing nuclear power stations. This is of course strengthening the arguments of environmentalists who didn't want the nuclear station in the first place, but nevertheless dislike power cuts even more.

Perhaps the most serious consequence is the almost total dependence of other British industry on a single processor of raw material. Thus shortages of nylon fabrics will be inevitable as also will price increases when alternative supplies are procured. What we need now are some fast breeding silk worms!

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DR. P. SHERMAN, Department of Food Science, Queen Elizabeth College, London W.8.

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

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

THE NON-NEWTONIAN FLOW BEHAVIOUR OF POLY (VINYLCHLORIDE) PLASTISOLS

G. P. PEARSON* AND L. G. HARTLEY**

Summary

Poly (vinyl chloride) plastisols are widely used in the coating of various substrates particularly in the manufacture of belting for the mining and food industries. In the textile industries they find use as adhesives in the manufacture of laminated fabrics. In all instances it is necessary that the plastisols employed should be characterized with respect to their viscosity and flow behaviour under varying shear rates, and that wherever practicable shear rates and shear stresses developed during application should be known. Only when the plastisols have been fully characterized at the shear rates operative can the coating and spreading techniques be operated at maximum rheological efficiency.

A recent review by Chiu-Hsiung Hwo and Johnson¹ has collected together modern researches on the flow properties of P.V.C. in the melt and in plastisol form. The present authors work has been quoted^{2,3} and this paper gives additional information not previously reported.

This paper gives the results of the measurements of the non-Newtonian index of a variety of plastisols, of differing P.V.C. content at 25°C. In all cases, as the percentage of P.V.C. is increased, the system developed greater departure from Newtonian behaviour becoming increasingly pseudoplastic in character. An Epprecht Rheomat 15 was used for the determinations within a shear rate range of 3–550 sec.⁻¹ at 25°C.

Experimental

All plastisols were prepared using a Z-blade mixer, the most concentrated being prepared initially, and the lower concentrations obtained by suitable dilution.

The rheometer used was the Epprecht Rheomat 15, which was calibrated at 25°C using silicone fluids of known Newtonian viscosity. The appropriate shear rate corrections were made when measuring the viscosity of the non-Newtonian plastisols.⁴

As a measure of the departure from Newtonian behaviour, use was made of the Ostwald-de Waele power law,

$$\tau = K\dot{\gamma}^n$$

where τ = shear stress

$\dot{\gamma}$ = shear rate

K = equation constant

n = non-Newtonian index.

n has a value of unity for a Newtonian fluid and less than unity for a pseudo-plastic fluid.

Results

Using nine plastisols at 25°C, the following values of n were obtained at the stated concentrations. The polymer was Breon 121 P.V.C. supplied by B.P. Chemicals (U.K.) Ltd. of $\overline{M}_v = 100,000$. All plastisols were stored at ambient temperature of 18°C for 24 hours before use.

Di-butyl phthalate	40	0.66
	50	0.60
Di-heptyl phthalate	50	0.90
	55	0.79
	60	0.61
Di-octyl phthalate	40	0.91
	50	0.87
	55	0.82
	60	0.75
Di-nonyl phthalate	50	0.97
	60	0.66
Di-ethyl sebacate	40	0.94
	50	0.64
Di-butyl sebacate	40	0.86
	50	0.69
	60	0.39
Di-octyl sebacate	50	0.88
	60	0.76
Di-octyl adipate	50	0.87
	60	0.34
Tri-octyl phosphate	50	0.93
	60	0.85
	65	0.75
	70	0.48

Conclusions

All systems investigated showed increasing pseudoplastic behaviour as the concentration of P.V.C. was increased. It is of interest to note that one of the most widely used commercial plasticizers, namely di-octyl phthalate, gave values of n which did not appear to be very concentration dependent. On the other hand, di-butyl sebacate, di-octyl adipate, and particularly tri-octyl phosphate at the higher concentrations showed marked shear thinning, and could be eminently suitable in situations which call for high concentrations but relatively low viscosities of the plastisols.

References

1. Chiu-Hsiung Hwo and J. F. Johnson. Polym. Eng. Sci. Vol 13 No. 5 Sept. 1973.
2. C. Cawthra, G. P. Pearson, and W. R. Moore. Trans. Plast. Inst. 33 p. 39-41 1965.
3. W. R. Moore and L. G. Hartley. Polym. Syst. Proc. Annu. Conf. Brit. Soc. Rheol., 285 (1966).
4. L. G. Hartley, W. R. Moore, and G. P. Pearson. Rheologia Acta 8 2 July (1969).

Present Addresses

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** L. G. Hartley,
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Cleckheaton,
Yorkshire,
U.K.

RHEOLOGY IN FRANCE

D. W. HADLEY

The President of Groupe Français de Rhéologie is now M. Habib, and the Secretary M. E. Absi, CEBTP, 12 Rue Brancion, 75737 Paris Cédex 15.

The Groupe's Bulletin for February 1974 contains a four page article about some of the rheological work of Henri Tresca (1814–1885), written by Dr. J. Weber. (A copy may be borrowed from D.W.H. at J. J. Thomson Physical Laboratory, Whiteknights, Reading RG6 2AF).

A conference on the rheology of concrete was held in Paris on 10–11 December 1973. Summaries of the papers presented may be borrowed from D.W.H.

Work on the dictionary of rheological terminology is continuing, and it is hoped that an English translation of the first section will be published during the course of 1974. Translations of the latest provisional definitions are given below. Any comments should be sent to Dr. J. D. Weber, Université de Metz, Ile du Saulcy, 57 Metz, France.

Terminology

109. **Striction** (Necking)

The transverse narrowing of a specimen undergoing a tensile test that occurs along [only] part of the length of that specimen.

110. **Résilience de rupture** (Breaking resilience [specific shock resistance])

A mechanical characteristic defining the resistance to shock. It is equal to the ratio W/S of the work W needed to fracture the sample through shock, to the initial surface area S of the right section where fracture occurs. The test is performed under defined conditions.

111. **Résilience de rebondissement** [Coefficient of restitution]

A mechanical characteristic expressing the extent to which an impacted body restores to a moving rigid body the kinetic energy received [at impact]. Most frequently used in elastomer technology, it is then determined by the ratio of the height of rebound of the moving body to the height of fall. The test is performed under defined conditions.

Modèle de Kelvin—Voigt [Kelvin, or Voigt model]

A rheological model consisting of a spring and a dashpot in parallel.

Modèle de Maxwell [Maxwell model]

A rheological model consisting of a spring and a dashpot in series.

Modèle de Bingham [Bingham model]

A rheological model consisting of a spring in series with a parallel arrangement of a dashpot and a slider.

Modèle de Burgers [Burgers model]

A rheological model consisting of a Kelvin-Voigt model in series with a Maxwell model.

Modèle de Zener [Zener model]

A rheological model consisting of a spring in parallel with a Maxwell model (its behaviour is equivalent to that of a Poynting-Thomson model).

Modèle de Poynting-Thomson [Poynting-Thomson model]

A rheological model consisting of a spring in series with a Kelvin-Voigt model (its behaviour is equivalent to that of a Zener model).

Energie spécifique de rupture (Specific fracture energy)

The energy expended in the neighbourhood of a crack front in the course of a controlled fracture, referred to unit area of the newly created surface.

Rhéologie (Rheology)

The science of the relations between the stresses (2) and strains (9) of a volume element, including where necessary their history (67) and the present values of their time derivatives.

Fissure (Crack)

The empty space between two extremely close but non-adhering surfaces of a solid body; that is to say incapable of locally transmitting stresses in which the normal component is a tension (6).

26. Fluide (au sens large) [Fluid: in the wide sense]

The actual text is not modified; but add:
see (X) for **comportement fluide strict** [strict fluid behaviour].

X. Fluide strict [strict fluid].

For an equilibrium configuration, that is to say one in which the stress is not evolving, a body is said to be a strict fluid if, from that configuration, each isothermal and very slow constant volume transformation (géométrique isochore) (11) has an evanescent effect on the rheological properties including the equilibrium stress.

After a sufficiently long time interval the body will be in another equilibrium configuration, but in the same physical state that it maintained in the first configuration.

Consequently:

- (1) for a strict fluid in an equilibrium configuration the density at a given temperature is the same in all configurations. One can refer to a strict fluid (at a given temperature and density) without specifying the configuration.
- (2) for a rotation at constant volume a strict fluid is isotropic in all equilibrium configurations. In particular, at equilibrium the state of stress is isotropic.

Rupture [rupture, fracture]

The separation of a body into disconnected parts. For a body which is not simply connected (e.g. by links or straps) a reduction in the extent of connection.

Résistance [resistance]

The ability of supporting without rupture and without excessive deformation a system of stresses the exact nature of which must be defined.

Endurance (Fatigue resistance)

Resistance to fatigue, that is to say to the application of a system of loads repeated a very large number of times.

Domaine d'élasticité (Elastic region)

The aggregate of those states of stress or strain for which a solid exhibits complete elasticity.

Cercles de Mohr (Mohr circles)

To each infinitesimal element of a material under stress is associated a point in a plane referred to axes ov , $o\tau$, that point having for abscissa the normal stress v and for ordinate the tangential stress τ exerted on the element.

The geometric site of these points is a planar region ov , $o\tau$, limited by three circles known as Mohr circles. They are centred on the axis ov , which they intersect at points having abscissae σ_2 , σ_3 ; σ_3 , σ_1 ; σ_1 , σ_2 .

Courbe intrinsèque (Intrinsic curve)

A rheological criterion expressed as a function of the extreme principal stresses σ_1 , σ_3 , without the intervention of the intermediate principal stress σ_2 , perhaps represented by the envelope of the largest of the three Mohr circles, for the states of stress satisfying the criterion: that envelope is called the intrinsic curve of the material.

N.B. Expressions in round brackets () occurred in the initial French version; expressions in square brackets [] have been added by the translator.

RULES AND CONDITIONS FOR THE AWARD OF A WHITWORTH FELLOWSHIP

Awards Offered

1. The Secretary of State for Education and Science (in these Rules referred to as "The Secretary of State") is offering one annual Fellowship on the Foundation of Sir Joseph Whitworth to conduct an approved project in a specific engineering topic. Within the overall limits of engineering, the scope and range of the topic is in no way limited and may, for example, include study, teaching, research or a survey or appraisal of any field of engineering, including such associated skills as technical marketing, production management and economics as well as the normal technical aspects. The value of the Fellowship will not normally exceed an annual rate of £5,000 (taxable) but may be supplemented by travelling expenses. The award is competitive and will only be made to a candidate of high quality.

Eligibility

2. To be eligible for the award a candidate must, at the time of application:—
 - (a) be a British or Commonwealth subject normally resident in the United Kingdom;
 - (b) have achieved standing in the engineering profession by virtue of his personal qualities and working experience;
 - (c) not have previously held a Whitworth Fellowship.

Procedure

3.
 - (a) Application must be made on the prescribed form, obtainable from the Science Research Council, State House, High Holborn, London WC1R 4TA not later than 31st January.
 - (b) Each candidate will be required to submit with his application a paper not exceeding 2,000 words enlarging on his selected project and giving his reasons for wishing to undertake it.
 - (c) Not later than 31st May a short list of candidates will be called for interview before a Panel appointed by the SRC.
 - (d) The award will be made and the amount determined on the recommendation of the Panel subject to the approval of the SRC and the Secretary of State.
 - (e) The Secretary of State reserves the right to make no award if there is no candidate of sufficient merit.

Tenure of Award

4.
 - (a) The award will normally be made for one year but this period may be varied to suit the needs of the approved project.

- (b) The award is not tenable concurrently with any other award without the approval of the SRC.
- (c) A candidate will not be permitted during the tenure of his award to undertake paid employment save with the prior approval of the SRC.
- (d) A candidate will be expected to take up his award within 12 months of its announcement.

Payment of Grant and Progress Report

- 5. (a) In the case of an award for a period of at least a year payment of grant will normally be made in equal quarterly instalments. Arrangements for the payment of grant to an award holder whose award is of less than one year's duration will be made individually.
- (b) The award holder will be required to submit progress reports. The award may be withdrawn if the SRC after consultation with the Secretary of State is not satisfied with the progress being made.

Conferment of Fellowship

- 6. At the end of the tenure of the award the holder will be required to submit a full report showing the use to which the award has been put, and the results achieved, and to recommend any action which might be taken in the interests of engineering. The report will be considered by the examiners who will decide whether to confer the title "Whitworth Fellow". The successful Fellow will receive a certificate and a bronze medal. The name of the holder will be engraved on the edge of the medal, followed by the words "Whitworth Fellow" and the year of the award. He would be entitled to use the subscript after his name.
- 7. The decision of the Secretary of State on any question arising in connection with the granting or withdrawal of the Fellowship to which these Rules refer shall be final.

FUTURE B.S.R. MEETINGS

THEORETICAL RHEOLOGY

A residential scientific Conference and Annual General Meeting of
THE BRITISH SOCIETY OF RHEOLOGY

to be held at

CORPUS CHRISTI COLLEGE, CAMBRIDGE

16th-19th September, 1974

PROGRAMME

Introduction

J. R. A. Pearson, Imperial College, London.

Creeping flow of a viscoelastic liquid through a contraction: a numerical perturbation solution

J. R. Black, M. M. Denn and G. C. Hsiao, University of Delaware, Newark, Del., U.S.A.

Deceleration of viscoelastic liquids

A. L. Halmos and D. V. Boger, Monash University, Clayton, Victoria, Australia.

Plane entry flows of viscoelastic fluids

S. Zahorski, Polish Academy of Sciences, Warsaw.

Stability of the plane flow of a simple viscoelastic fluid in a converging channel

K. Strauss, University of Dortmund, W. Germany.

Applications of lubrication theory to polymer processing

J. L. White and B-L. Lee, University of Tennessee, Knoxville, Tenn., U.S.A.

Thermomechanics

R. S. Rivlin, Lehigh University, Bethlehem, N.Y., U.S.A.

Rheological equations of state and thermodynamic principles

J. G. Oldroyd, University of Liverpool.

A non-isothermal theory of viscoelastic materials

M. Crochet, Catholic University, Louvain, Belgium.

Thermomechanics of compressible materials with entropic elasticity

G. Astarita and G. C. Sarti, University of Naples, Italy

Finite deformations of strongly anisotropic materials

T. G. Rogers, University of Nottingham.

Mixtures of structured continua

S. L. Passman, Georgia Institute of Technology, Atlanta, Ga., U.S.A.

Mechanical properties of semi-crystalline polymers regarded as composite materials

L. Nicolais, University of Naples, Italy.

Progress in experimental rheology

R. I. Tanner, Brown University, Providence, R.I., U.S.A.

The start-up of steady elongational flow of viscoelastic materials

M. C. Phillips, Koninklijke/Shell Laboratorium, Amsterdam.

Some new validity tests of the Bird-Carreau type of constitutive equation

H. A. M. van Eekelen, H. E. van Es and M. C. Phillips, Koninklijke /Shell E. & P. Laboratorium, Rijswijk, and K/SLA, Amsterdam.

The theory of a simple universal oscillatory instrument for the measurement of linear viscoelasticity where the resonant condition can be shifted, restored or sharpened externally

M. Sherrieff and B. Warburton, University of London.

Hydrodynamic factors affecting the solution growth of extended chain polymer fibrous crystals

M. R. Mackley, University of Bristol.

Suspension mechanics

E. J. Hinch, University of Cambridge.

The behaviour of rigid-rod suspensions in several flow geometries

G. Evans, University of Cambridge.

The effect of the non-Newtonian properties of polymer solutions on flow fields

G. Astarita and M. M. Denn, University of Delaware, Newark, Del., U.S.A.

The inclusive Conference Fee for members of the British Society of Rheology is £26.00. For non-members the fee is £28.00.

These charges include accommodation and meals at Corpus Christi College and (at a special reduced rate) a copy of the Conference Proceedings which will be published by Applied Science Publishers Ltd. Reduced rates are available for *bona fide* students and for residents of Cambridge who do not wish to stay at the College. Additional tickets for the Conference Dinner at Corpus Christi College are available at an inclusive price of £4.00.

CONFERENCES—ADVANCED NOTICE

RHEOMETRY: METHODS OF MEASUREMENTS AND ANALYSIS OF RESULTS

This meeting is planned for the Spring of 1975. It will provide a forum for discussion and debate about measuring techniques and the interpretation of rheological data. Papers introducing new or improved rheometers would be particularly welcome as would the presentation of rheometric data obtained by a variety of methods. Early notice of intention to submit a paper would be appreciated by:

F. N. Cogswell,
67 Daniells,
Welwyn Garden City,
Hertfordshire AL7 1QT.

POLYMER RHEOLOGY AND PLASTICS PROCESSING

A joint three-day meeting, organised by the British Society of Rheology and supported by the Plastics Institute, is planned for the Autumn of 1975. The objectives of the conference will be:

1. To review, at an international level, the state of knowledge and technology relevant to polymer processing.
2. To discuss new developments in this field.
3. To describe those areas where new knowledge is desirable to enhance technology and where new technology could exploit existing knowledge.
4. To provide a forum where delegates from the processing, raw material, and machinery industries and from universities and research institutes can discuss their work.

The conference will include sessions on: Plastics Processing Practice, Analysis of, and Engineering Design of Processing, Rheological Properties of Polymers and the Fundamentals of Polymer Rheology. Publication of the Conference Proceedings is intended.

The organisers would welcome early notice of intended contributions to this meeting: please send a synopsis to

F. N. Cogswell,
67 Daniells,
Welwyn Garden City,
Hertfordshire AL7 1QT.

SEVENTH INTERNATIONAL CONGRESS ON RHEOLOGY
CHALMERS UNIVERSITY OF TECHNOLOGY
GOTHENBURG, SWEDEN

23rd-27th AUGUST, 1976

The Seventh International Congress on Rheology will be held at Chalmers University of Technology, Gothenburg, Sweden, 23rd-27th August, 1976.

The Congress will be organized by the Swedish Rheological Society, a special section of the Swedish National Committee on Mechanics. It will be held under the auspices of the International Committee on Rheology with Dr. Robert S. Marvin as Honorary President.

The first circular concerning the Congress will be issued in the autumn of this year.

Organizing Committee: Prof. J. Kubát, Chairman,
Prof. E. Forslind
Prof. L.-E. Gelin
Prof. F. K. G. Odqvist.

Address: Professor Josef Kubát,
Chalmers University of Technology,
Fack,
S-402 20 Gothenburg,
Sweden.

Gothenburg. May 1974.

GROUPE FRANÇAIS DE RHEOLOGIE
ANNUAL CONFERENCE

December 1974 (dates to be announced) on

“INTERVENTION DE L'ENERGIE SUPERFICIELLE
EN RHEOLOGIE”

All proceedings to be in French.

Any British rheologist wishing to submit a paper or attend the meeting should get in touch with Dr. E. Absi, 12 Rue Brancion, 75737 Paris Cedex 15, France.

BHRA CONFERENCES

DRAG REDUCTION

September 4th-6th, 1974

ST. JOHN'S COLLEGE, CAMBRIDGE

MIXING/SEPARATION

September 9th-11th, 1974

CHURCHILL COLLEGE, CAMBRIDGE

The main purpose of these meetings is to bring together leading authorities from industry, government establishments and academic institutions on a world-wide basis for the discussion of the latest advances and to suggest guidelines for future developments.

In each of them some 35 papers will be presented and the programmes giving final lists of papers will be sent to all delegates in advance of the meetings.

All delegates will receive preprints. Wherever possible, these will be mailed to delegates in advance of the meetings.

Proceedings of each of the Conferences will contain a full record of all discussions, and will be published by B.H.R.A. early in 1975.

The B.H.R. laboratories and offices are situated at Cranfield, Bedford, and enquiries about the Conferences should be addressed to:

Conference Organising Secretary,

B.H.R.A. Fluid Engineering,

Cranfield, Bedford MK43 0AJ,

England.

Tel.: Bedford 750422

Telex: 825059

PLASTICS INSTITUTE CONFERENCES

CONFERENCE

**RECLAIM, RECYCLING AND REUSE OF POLYMERS
AND PLASTICS**

Spring 1975 in London

CALL FOR PAPERS

Background

The Plastics Institute has become increasingly aware of the need to conserve resources, and the current shortage of materials, allied to the spiralling price of oil, serves only to reinforce this view.

Purpose

A two-day conference on the subject of Reclaim, Recycling and Reuse of Polymers and Plastics has been planned, and will be held in London in the Spring, 1975. It will aim to bring together experts on the various reclamation and recycling techniques from the industrial, commercial and research fields throughout the world.

Programme

Contributions are invited on the following subjects:

Urban Waste

- Separation of polymer materials from waste
- Use of mixed plastics
- Segregation of plastics from pulp
- Reclamation of plastic milk bottles
- Design for recycling.

Industrial Waste

- In plant v. specialised systems for reclamation of industrial waste
- Advantage of making finished product direct
- Polymers and other waste
- Mixed polymer waste
- How to improve properties of reclaimed polymers
- Polymer manufacturers' comments.

Government attitudes

Government attitudes and incentives to encourage reclamation of plastics waste materials.

Consideration will also be given to contributions on associated subjects.

Anyone interested in participating should contact: Miss S. M. Keeble, Executive Officer (Meetings), The Plastics Institute, 11 Hobart Place, London SW1W 0HL. (Telephone 01-245 9555).

CONFERENCE

"POLYPROPYLENE FIBRES IN TEXTILES"

CALL FOR PAPERS

Background

In 1971, the Plastics Institute held a very successful international conference entitled "Textiles from film II", when all new aspects of polyolefin fibres were examined. Since that conference, there has been a great deal of activity in the textile sector with polypropylene in particular, with the emphasis on new melt spinning techniques, new product fabrication methods etc. It appears that polypropylene will

become a major synthetic fibre over the next two years, and it is therefore considered that by 1975 the new developments will require a major international conference on this topic.

Purpose

This conference will aim to discuss applications, processing techniques, polymer and additive aspects for the entire range of polypropylene fibres, with the emphasis on textile fibres. An opportunity will also be afforded for highlighting the latest developments in the well established film fibre area.

Venue

The conference will be held in Manchester in summer/autumn 1975.

Programme

The programme consists of four sessions:

Applications and usages

- Yarns for tufted and woven carpets
- Furnishing fabrics
- Upholstery
- Wall covering
- Apparel
- Industrial fabrics (packaging and technical).

Raw materials and additives

- Polymer and additive developments
- Dyeable polypropylene fibres
- Flame retardancy.

Processing

- (a) Fibre manufacture
 - Mechanical fibrillation
 - Embossing
 - Melt spinning—staple or continuous filament.
- (b) Textile product manufacture
 - Non-woven fabrics
 - Polypropylene fibres in conventional short spinning processes.

Future market potential

Projection of potential development (tonnage and economics) in worldwide and competitive fibres.

Consideration will also be given to contributions on associated subjects.

Anyone interested in participating should contact: Miss S. M. Keeble, Executive Officer (Meetings), The Plastics Institute, 11 Hobart Place London SW1W 0HL (Telephone 01-245 9555).

RECENT ELECTIONS

At the meeting of the Council held on 23rd April, 1974 the following applications for membership were received and approved:

- S. M. Asghar, M.Sc., Chemical Engineering Department, University of Birmingham, Birmingham B15 2TT.
- R. C. Ashton, B.Sc., M.Sc., Department of Chemical Engineering, University of Birmingham, Birmingham B15 2TT.
- Dr. G. M. Glass, M.B., B.Ch., B.A.O., M.D., Mater Informorium Hospital, Crumlin Road, Belfast.
- Dr. A. L. Halmos, B.E., Ph.D., Chemical Engineering Department, Imperial College, London S.W.7.
- H. L. Jalink, Ph.D., Garlaeus Laboratoria, Department of Physical Chemistry, University of Leiden, Wassenaarse weg, Leiden, The Netherlands.
- J. L. LeBlanc, Lic.Sc., University of Liege, Chemie Industrielle Minerale, 2, rue Armand Stevert, B-4000, Liege, Belgium.
- B. R. Parker, B.Tech., M.Sc., Department of Chemical Engineering, University of Bradford, Bradford 5.
- Dr. J. C. Snowdon, Ph.D., D.Sc., D.I.C., F.Inst.P., Applied Research Laboratory, The Pennsylvania State University, P.O. Box 30, State College, Pennsylvania 16801, U.S.A.
- A. Syrotaik, B.Sc., M.Sc., Plymouth Polytechnic.
- M. Van Wallendael, Lic.Sc., Centre National de Recherches Scientifiques et Techniques, pour l'Industrie Cimentiere, rue Cesar Franck, 46, 1050 Bruxelles, Belgium.

DIARY

1974

- 26th-29th August.** "Drag reduction in turbulent flow due to additives." Stockholm, Sweden. Contact Professor M. Landahl, Division of Mechanics, Royal Institute of Technology, 10044 Stockholm, Sweden.
- 4th-6th September.** International Conference on Drag Reduction. St. John's College, Cambridge (BHRA).
- 9th-11th September.** First European Conference on Mixing and Centrifugal Separation. Churchill College, Cambridge (BHRA).
- 11th-13th September.** Conference on Chemical Engineering Rheology. Salford (See Vol. 16, No. 4).
- 16th-18th September.** Course on "Solid-Liquid Separation". University of Bradford (See Vol. 17, No. 1).
- 16th-19th September.** B.S.R. Conference on "Theoretical Rheology". Corpus Christi College, Cambridge.
- 17th September.** Annual General Meeting of the British Society of Rheology, 8.15 p.m., Cambridge.
- 23rd-26th September.** "Finite Deformations in Plasticity." Jablonna, Poland. Contact Professor A. Sawczuk, Institute of Fundamental Technological Research, ul. Swietokrzyska 21, 00-049 Warszawa, Poland.

UNIVERSITY OF SHEFFIELD
DEPARTMENT OF BUILDING SCIENCE

Opportunities are available for those wishing to work for the degree of M.A. or Ph.D. by research in rheology.

Present programmes are concerned with

- (i) the rheology of Portland cement pastes
- (ii) measurement of the workability of fresh concrete
- (iii) the rheology of mineral grouts.

In addition to its intrinsic interest this type of work involves close contact with the practical problems of an important industry and provides an excellent basis for future employment.

Grants are available.

Applicants should hold, or expect to obtain, a good honours degree in an appropriate subject, i.e. Physics Chemistry, Materials Science, Ceramics, Civil Engineering, Mathematics.

Further information may be obtained from:

Dr. G. H. Tattersall,
Department of Building Science,
University of Sheffield,
Arts Tower,
Sheffield S10 2TN. Tel. 0742-78555.

WE WOULD LIKE TO HEAR FROM YOU

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

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