

THE BRITISH SOCIETY OF RHEOLOGY

BULLETIN



September 1995

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THE BRITISH SOCIETY OF RHEOLOGY

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EDITORIAL

The summer conference season is now past and our AGM has been held. The reports of the Officers of your Society to the AGM are presented in this issue. The Accounts have yet to be audited and will be presented later. There were two changes in the Council membership at the AGM. Mike Webster has taken over as our Treasurer, succeeding Roy Carter who has stepped down due to pressure of business. Steve Robinson replaces Roger Burley as an ordinary member of Council. A profile of Steve appears elsewhere in this issue. We welcome them both to Council.

The AGM was held at the University of Wales, Aberystwyth, during the Polymer Melt Rheology Conference. Two contrasting reports on this conference have been received by your Editor and are published here. The first is by Rulande Rutgers, a student with Malcolm Mackley in the Department of Chemical Engineering at the University of Cambridge. The BSR gave her a travel grant to help her attend the conference. The second report appears to come from one Dr Watson who has twice before reported contentious discussions with one Holmes (Sherlock?) in these pages about the mysterious case of "The Missing Industrialist" at our conferences. This report was allegedly found by a surfer of the Internet, who then forwarded it to me.

Should any other readers find anything by this route which they think would be off interest, I would welcome it if they would forward it to me, by the old fashioned Post Office method, for possible inclusion in a future issue of the Bulletin. If anybody else has views which support either those of Holmes or Watson, please drop a letter to your Editor. It is perhaps as well at this point to remind readers that due to the diverse origin of material published here, the views expressed are not necessarily those of Council, who should not be held responsible for them.

In news gleaned from the Society of Rheology's Rheology Bulletin, July edition (see page 104), we hear that Dick Buscall and his team at ICI have been given the 1995 Journal of Rheology Publication Award. Our hearty congratulations to them.

The final copy date for the next issue, which should reach members by mid-February 1996, is December 20th, 1995.

COMMENTARY ON 282nd COUNCIL MEETING

4-9-95 at Penbryn Hall

This council meeting was a working lunch during the first day of the Aberystwyth conference. A later than expected start (some lecturers overran their allotted time, most unusual) required a short dash from the lecture theatre. Unexpectedly, the weather was wet, wet, wet. A council meeting is not easy always at the best of times and with a crowded table to contend with (food) as well as last minute paper shuffling, it did not make for a relaxing time. But then council officers don't complain, soldiering through despite all.

The European Society issue was again discussed, chiefly with regard to the Bulletin and its distribution. Whatever the consequences of forming such a society, it appears that there will be a financial burden for some to carry. Should the BSR increase its membership subscription! Returning to the Bulletin, the possibility of going up market and using colour was raised. Nick Hudson then got out his photos and it was decided that picture number five was the best for the next Bulletin. What about redesigning the front cover of the Bulletin., get a fresh look. All agreed that Carole, with her various contacts, should produce suggested designs for consideration at the next council meeting. Sadly, Peter Anderson couldn't be with us to discuss such matters, as he was on jury service.

Finance is never far from the lips of Council and it was agreed to award student grants and expenses for Council representation at the forthcoming Bordeaux meeting. Would this break our pockets? Well, the Treasurer had not yet arrived, but we went ahead anyway. Looking back on past meeting, we all agreed that the working party, well Paul at least, should organise the next 'Young Rheologists Day', sometime during the first week of September next year. Howard agreed to approach our nominee for next president of the BSR and with a last plateful of chocolate cake, we quickly closed the meeting to dash back outside. This time it was not just raining, but pouring down. Ever sat in a lecture theatre in wet clothes?

COMMENTARY ON 55th AGM OF THE BSR.

4-9-95 at Penbryn Hall

Some council members had assembled in the foyer of the lecture theatre, waiting for the last talk of the day to finish with expectations high. Surely, with a meeting such as this, there would be no problems of getting a quorum (20 people). But, as we stood there, now joined by Mervyn Jones, the

double doors opened and out rushed the rheologists showing all the signs of extensional flow. Even the inducement of a free BSR tie to stay was unsuccessful. When the AGM did start, at 17.50, there were exactly 24 people but regrettably, no Treasurer, Bulletin Editor or Abstracts Editor. Rapidly, the more formal part of the meeting was underway, with the audience well spread.

Having accepted the minutes of the last meeting we went straight into council officers reports. These are published elsewhere in the Bulletin but without the accompanying comments from the floor. For those used to such meetings, public participation is always relatively low level, it's often good going to get a nod. And so it was here. No comments to the President; the Treasurer had not managed to attend the meeting and his report had not arrived. (It was received just too late, but is published here with the other Officers' reports -Ed). Nick Hudson reported on the membership and Geoff Brownsey presented both his report, and those of Peter Anderson and Gerry Meeten (in their absence).

Chris Petrie asked if Council were aware of the financial implications to the Society of Elsevier pulling out of Rheology Abstracts. Yes, of course they did and were grateful to the publishers for providing their mailing list. Chris also asked why the accounts for last year had been so late in appearing in the Bulletin. Had this anything to do with the auditors; should they be reappointed? Certainly no blame rested with the auditors, problems with our bank had exacerbated the situation. The meeting did agree to reappoint them for the coming year.

Question time over, the meeting moved onto the election of Council Members for 1995/6. This resulted in a ballot for the ordinary members of council, with seven people proposed and only six vacancies. After a paper ballot there was a tie for one place. Since both potential council members were absent, they could not speak for themselves. After a short word or two, or three, or four, ... from the floor about the two candidates, another vote was taken, this time by a show of hands and the matter resolved.

Amid the confusion someone had forgotten to propose that the meeting accept the nominations for the Council Officers and this was quickly spotted, Chris again. All were elected en bloc.

The meeting had now been going for 35 minutes and the next matter discussed was the European Society. A short discussion initiated by Morton Denn, (speaking for Art Metzner) followed. He wished to point out the concern of a fragmentation of our (rheology) discipline by such a move. What was needed, he said, was a single society of rheology. Now, that's a familiar phrase, an SoR! Russell Davies said that this was a way towards this ideal whilst Prof Wagner asked that we should not drag our feet any longer. And so it was proposed that 'the BSR becomes a founding member of the European Society of Rheology'. This was carried unanimously.

The President, Howard Barnes then moved on to the finale of the meeting, presenting the Annual Award to Mervyn Jones. The Secretary was then seen to be making all the movements for taking a picture, but without a camera! Mervyn thanked the meeting and the BSR for this tribute and amid applause and congratulations, the meeting was brought to a pleasant end. We all moved out into the damp evening, some moved towards the bar, others left for a night on the town, or at least that's what I was told.



Prof. Marcel Crochet receiving the BSR Gold Medal Award from the BSR President, Prof. Howard Barnes at Rossett in April 1995

OFFICERS' REPORTS TO THE 55th AGM OF THE BSR
4th September at University of Wales, ABERYSTWYTH

PRESIDENT'S REPORT, 1995

In the kind of world we live in, our Society is not immune from change. The challenge to us is how we keep the kind of Society we have all liked and wanted to belong to, while at the same time responding positively to the changing environment in which we find ourselves. First in terms of changes at a national level, we have seen the emergence of other rheology-oriented groups. The University of Wales Non-Newtonian Institute which now runs regular and successful meetings at a national and international level. However, all its members are also members of the BSR and are keen to see both move forward successfully. Then the Institution of Chemical Engineers has set up an Applied Rheology Subject Group, which, along with the existing Non-Newtonian Club - which at the moment is under the aegis of the IChemE's Particle Technology Subject Group - represents another group in the rheology realm. The BSR has to find a role for itself in co-ordinating and complementing these various interests, while maintaining its separate identity.

Then at an international level there have been other changes also. We have - after some initial hesitation - moved forward with the proposal to form the European Society of Rheology. We have reached the stage where a draft constitution has been presented to the Society members and Council. We are being looked to by other European Rheology Groups to spearhead the proposal, and if we are happy with things, others will follow, and the ESR will be formed with the BSR taking a leading role. At the same time, the Federation of European Chemical Engineers have formed an Industrial Rheology group to encourage interest and interaction in this area across Europe. The European Society - when it is formed - will then itself have to work with this in mind.

Financially, things might change for us in that our substantial income from Rheology Abstracts could be endangered, and we are currently studying the implications of the change in information technology, with on-line searching being the norm rather than the hard-copy that we currently cooperate in producing.

As I move into my second and final year in office I will try to steer the Society on a steady course which maintains the balance between all these interests and our traditional position.

Lastly, there are a good number of Rheology training courses now running in the country with possibly more in the pipeline. This is a good sign for our subject, and reminds us that interest is growing. In the light of this, I think it is time we took positive steps to increase our membership. We have all had copies of the Society application form, and I hope we will use them to encourage others to join. I cannot see why the number of members could not be over 1000 if we all made the appropriate effort.

Professor Howard A. Barnes
Unilever Research
Port Sunlight.

HON. SECRETARY'S REPORT, 1995

The year started with a new President and three new council members. As you may be aware, Council meets every three months and have been involved in a variety of tasks, all of which we hope promote the charitable nature of our Society. A major concern, initiated during the last term of office of the previous Council, has been the constitution of a 'European Society of Rheology'. As you may have discovered, from the commentary of our Council meeting that appears in each issue of the Bulletin, the formation of such a society brings with it many implications. In fact, we considered that it was essential to have a European Liaison Officer, this task falling on our Bulletin Editor. This role is developing, and is initially re-establishing contacts with our fellow rheologists in Europe.

You will also be aware of Council's forward looking role concerning one of the flagships of the BSR, namely Rheology Abstracts. It has been clear, for many years, that electronic publishing, together with commercial pressures, would cause problems for the small circulation specialist publications such as RA. Indeed, through our Abstracts Editor, we have had lengthy discussions with Elsevier, the outcome of which is that they will cease to publish this, on our behalf, from January 1996. For the short term, we have been able to make alternative arrangements, securing its publication for next year. Changes to our printers for the Bulletin have also been put in place. It is my view that this will streamline our operation here.

Our 'Young Rheologists Day', deemed to be such a success last year is planned for next September and we are grateful for Paul Doody, the youngest member on council, to help organise this event.

Our outside activities, in promoting rheology include sponsoring meetings, such as those which we hope will take place during the early part of 1996 as part of the package put together by the Isaac Newton Institute-Dynamics of Complex Fluids. There is also the French Society meeting next week. But overall, Council felt that our meetings calendar could benefit from being given a higher profile and so a working group was set up to look at least two years ahead, this including conferences which have been listed accordingly in the Bulletin. Council has also been pleased to have awarded a number of student grants during the year but in doing so, it recognised the pressure that the BSR will increasingly be under. Universities are just one such funding source where less financial aid is available.

Finally, this Council was pleased to have presented two awards this year, the 'Annual Award for 1994 to Gareth McKinley and the Gold Medal Award for 1994 to Prof. Marcel Crochet at the 9th International Workshop on Numerical Simulation at Rossett in April. Such awards establish the truly international status of rheology and I, for one, look forward to next year and our increased European role. The past year has been successful due to the great effort of my fellow members on Council and I believe that we have developed the necessary groundwork that will enhance our standing here and, more importantly, support our members.

Geoff Brownsey

TREASURER'S REPORT, 1995

This report was faxed to Aberystwyth, but too late for the AGM - Ed.

I must apologise to the Meeting for my absence at today's AGM, but I am afraid that I have been required at short notice to be overseas on urgent business in my new role as Technical Marketing Manager for on-line rheology systems in Europe for Rheometric Scientific. Similarly, due to my frequent absences abroad on business, I was not able to get the accounts to the Auditor in time to have the Audited Account ready for presentation to the meeting. The Audited Accounts will be ready in time for publication in the Bulletin later this year. Once again, my apologies to the Meeting.

There was a similar problem last year in that I was not able to present Audited Accounts to the Meeting; in this case the delay was due to confusion caused by the Bank. The Audited Accounts were published in the Bulletin earlier this year, and the Meeting needs to vote on hopefully, the acceptance of these Accounts.

The Auditors have written to me pointing out that they have held their fee at the level of £250 for many years. Last year, the actual cost for their work should have been approximately £675, and they ask that we now accept an increase in their annual fees to between £350 and £400. May I ask the Meeting to propose a motion to reappoint Alfred Simmons and Co. as our Auditors, and to approve an increase in their fees for the next year to a maximum of £400. In my experience of professional fees, this is still extremely good value for money and I commend it to the Meeting.

This year, we closed our Leatherhead accounts and moved them to Loughborough on the premise that we were more likely to get satisfaction with our accounts close at hand to the Treasurer. Leatherhead continued to confound us, however, by all of our Standing Order Membership Fees appearing on our Bank Statements anonymously as "Bank Giro Credit". Nick Hudson has done sterling work unravelling the confusion. Our new accounts are interest-bearing "Treasurer Accounts" on which we pay activity charges if we exceed 15 debit transactions per month. These accounts grossed nearly £185 in the last financial year at a cost of only £6 in Bank charges. We did have tax deducted until the correct forms were filled in, but we should be able to recoup the £46 paid.

Overall, the financial state of the Society is very sound, and we show a minor increase in our overall cash position. For the second year running, we had very little income from conferences, but income and expenditure for the two years are remarkably similar. In the next year, we should see some reduction in the costs of producing the Bulletin as advantage is taken of modern data processing technology to produce the Bulletin essentially in-house. The Bulletin Subscription currently stands at £30 per annum, and I suggest that this is progressively increased over the next few years to reflect more accurately the value of the Journal and the administrative costs of producing it. I suggest that with immediate effect the annual subscription fee is increased to £50, and I leave it to Council to decide what the ultimate level of the fee should be.

Finally, due to pressure of work and change in the emphasis of my employment, I have been unable to attend any Council Meetings in the past year. As I have informed Council, I do not consider this fair and reasonable to the Council or the Society, and therefore it is with considerable regret that I am resigning from the Council after two years as Treasurer. I wish my successor well in the position, and will do all possible to make the transition as seamless as possible.

Roy Carter

MEMBERSHIP SECRETARY'S REPORT, 1995

I have now completed my first year in the position, and hope that I have maintained the standards set by my predecessor. A new membership list has been issued, and it is hoped to reprint in about three years time. My intention is that an addenda and corrigenda sheet will be issued every year, so that members may keep their list up to date. You will hear from the Bulletin Editor that the Bulletin is now printed at the University of Strathclyde, and one of our options as regards the Rheology Abstracts is to publish ourselves, and have it printed there as well. As one of my present responsibilities is the posting out of the Bulletin, doing the same for the Abstracts will not be much extra work for my team of helpers.

As you will see, our membership has fallen over the year. Most of the departures have been of people for whom we no longer have a current address, and who have not paid their subscription for at least a year. The figures below now reflect the true current state of the Society. Nevertheless, these figures have been relatively static over the years, and we need to be more positive in attracting new members. We still give some of the best value for money in a Scientific Society.

Membership Information Statistics, 1994-1995

	Total	New members	Resignations, etc
Total membership	601 (611)	35 (38)	45 (22)
UK	413 (425)	22 (25)	
Overseas	193 (186)	13 (13)	

() indicates the 1993-1994 figures.

Nick Hudson

RHEOLOGY ABSTRACTS EDITOR'S REPORT, 1995

Number 1 and 2 (1995) are issued; Number 3 is awaiting an index before going to Elsevier as camera ready copy. Number 4 is currently being typed, so we are well up in schedule. This is needed to get all 1995 issues to Elsevier before Jan 1996, which is when Rheology Abstracts will no longer be published by Elsevier. The Rheology Abstracts working party set up this year by Council (Phil Banfill, Nick Hudson and Gerry Meeten) explored other avenues, but, following discussions, the GeoAbstracts option which Elsevier suggested did not materialise, and time did not allow the follow-

up of other possible publishers. The working party thus decided that the Rheology Abstracts should be published by the BSR. The realities of Rheology Abstracts publication by the BSR is being handled by Nick Hudson, and the mechanics of printing, distribution etc., will be done by Strathclyde University.

The Rheology Abstracts working party set up this year have discussed ideas on pricing and policy etc., for the Rheology Abstracts from 1996 onwards, but we should perhaps also discuss these and other issues in Council asap. Elsevier have given the BSR their distribution lists.

Abstracts for Issue 1 (1996) are complete, with about 50% of abstracts for Issue 2 (1996) already present. So we are in good shape to begin the new era of RA publication by the BSR

Gerry Meeten

BULLETIN EDITOR'S REPORT, 1995

I have now completed my first year as Bulletin Editor and, with Vol. 38 No 2, four numbers have been issued more or less on schedule. Despite my fears, copy has been forthcoming, even if often at the last moment. I am particularly conscious that the Bulletin often appears to reach our members late. This is actually just a function of the date which we put on the cover. They do appear regularly every three months and I am looking into changing this date to the months when the copies are received by the members. This would not actually change the publishing schedule at all, but it might make users more aware of when members would get announcements.

With the most recent issue we have changed our printers from Fletchers (Marlborough Press) in Farnborough, who have done the Bulletin for almost the last fifty years, to the Printing Unit at the University of Strathclyde. This should significantly reduce our printing costs and increase the efficiency of distribution which is handled by our Membership Secretary, Nick Hudson, from Strathclyde.

I must also apologise for my poor proof reading. It shames me the number of errors I find (or have pointed out to me) after an issue has appeared. In some cases I find them only after they have persisted for a number of issues. I was even told that the Logo on the cover was back to front (or upside down). This was corrected from Vol. 37/4.

I hope that next year we may be able to include even more news on the activities of our colleagues in the various societies throughout Europe. With the ongoing discussions of the formation of a European Society of Rheology, we are trying to establish more regular contacts in each country for the exchange of information.

May I thank all the contributors to the Bulletin over the last year and I look forward to your further support next year; without you there would be no Bulletin.

Peter Anderson

THE ANNUAL AWARD 1995, DR MERWYN JONES

The ANNUAL AWARD this year was presented to Dr Merwyn Jones at the Annual General Meeting held at Aberystwyth on Monday the 4th of September. The President, Professor Howard Barnes, presented the award and explained to those present why Dr Jones richly deserved the honour, after a lifetime of research in rheology at Aberystwyth and his service to the Society as President.

He noted that Dr Jones had been studying flow for many years, beginning in his student days when he examined the flow of radioactive gases, through to his years at Aberystwyth when he lead a research group looking at various aspects of flow of viscoelastic fluids between rotating concentric cylinders. Latterly he had been studying novel and simple ways of measuring extensional viscosity of polymer solutions. His teaching work at the university covered the fields of thermodynamics.

Dr Jones recently retired from the Physics department at the University of Wales, Aberystwyth, where he attained the position of Reader. He was President of our Society from 1978 - 80, during which time his wise and steady influence was of great value.

The President, on behalf of the Society, congratulated Dr Jones and wished him a long, healthy and happy retirement.

PROFILE OF NEW COUNCIL MEMBER

Steve Robinson

Steve graduated in 1987 from Trent Polytechnic, Nottingham, with a degree in Applied Chemistry. During three years spent in and (often) out of lectures the term "rheology" was never uttered, despite the fact that the course aimed to be as varied as possible. In fact the concept of simple viscosity measurement was only touched on once. This is a situation that has frustrated those of us in the know for some years but may have improved over the time that has passed since Steve's graduation.

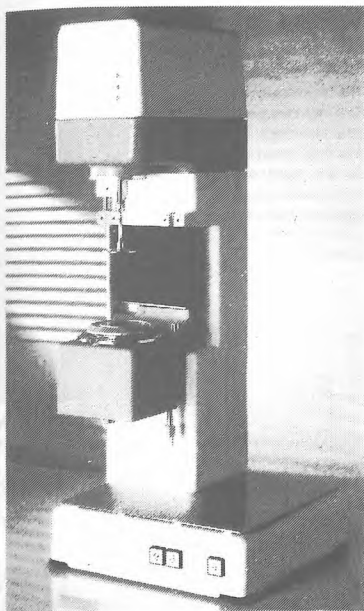
During four years in Nottingham, Steve experienced the joys of student accommodation at its most basic. Little did he know at the time but this was to prove an invaluable grounding for what he would experience "on the road" in the name of rheological instrument sales. The tastes he developed for fried breakfasts and late night take-aways were also revisited as his career developed. In fact, as I write this, the similarities between the life styles of an undergraduate and a salesman become striking.

ICI Paints offered Steve his first opportunity to pay back that invaluable student bank loan when he joined their research facility in Slough as an HPLC specialist. It was here that Trevor Strivens introduced him to rheology. Steve was amongst a group of graduates herded into his lab during their induction tour. I doubt Trevor remembers the occasion with the same clarity.

Steve's move into sales came within 12 months when he joined LDC Analytical, selling HPLC and Spectrophotometry throughout the south of England. Three and a half years on he joined Carri-Med and was introduced to "real" rheology. Under the guidance of Derek Bell, Steve soon acquired the enthusiasm for his subject that is vital to all instrument sales people. In the pursuit of valuable instrument sales, Steve has visited countless organisations in the UK and Europe, covering a wide industry range. This has given him an appreciation of the rheological requirements of many very different industries etc.

In October 1995 Steve joined Bohlin Instruments as Northern Europe Sales Manager. This new position will allow him to share his knowledge and experience with distributors and their clients in Scandinavia, France and Benelux. As the BSR considers the possibilities of cooperation with similar societies within continental Europe Steve will be well placed to further those contacts already made and look for new contacts at exhibitions, seminars etc.

MADE TO MEASURE RHEOLOGY



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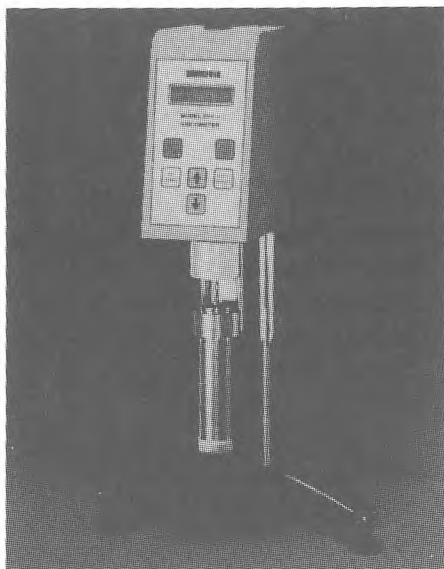
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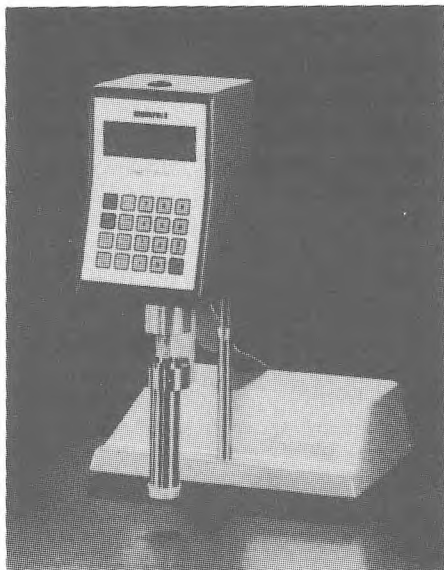
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THE CASE OF THE MISSING INDUSTRIALISTS, PART 3:

Parkinson's Law

It had been with some trepidation that I had suggested to Holmes that we once more take up the "Case of the Missing Industrialists". However, since the programme for the meeting suggested a strong emphasis on stretching flows - which had originally drawn the deplorable situation to our attention (1) - I ventured to suggest it. To my great pleasure, Holmes responded that he did feel that, in Aberystwyth, some vital clues might indeed be located. However, as usually happens on such occasions, whilst I determinedly sat through all the lectures, Holmes went about his own business. Thus, it was not until we finally took our seats on the Shrewsbury Express that we were able, finally, to compare notes.

"Well Watson," enquired my friend, "are you any the wiser?"

"As you predicted Holmes," I replied, "there were very few industrialists present. Indeed, in his opening address, the organiser commented on this lamentable fact. However, he was able to assure us that those who were giving papers are in close contact with industrial companies, so I think we can be assured that the industrial viewpoint was faithfully represented."

Holmes raised an eyebrow. "I wish, Watson, that I shared your confidence. If I am correct, one of the papers was actually presented by an industrialist."

"Yes indeed!" I responded. "That boulder was very firmly put in his place. He actually intimated that everything that you needed to know about polymer melt rheology was contained within a mere 20 pages of his book which described a consistent model for polymer behaviour from absolute zero to the decomposition temperature."

Holmes appeared surprised at my outburst. "Surely," he ventured, "this is the sort of news that should be welcomed."

"Oh no!" I exclaimed. "Had you been there Holmes, you would have heard that the algebra of the most advanced theories is so complex that the computers at our leading scientific institutions can only solve one point a month. Thus, the industrialist's claims could not possibly be based on sound physics. During question time, several professors positively savaged the speaker, who had taken refuge behind the audio-visual

console - indeed, some of the audience were apprehensive that the automated projection screen might go quite out of control as a result."

"What very strange behaviour," commented my colleague as, at 20 m.p.h., we sped past some distracted sheep on our way to the mountain pass. "My understanding was that the author in question was disclosing the system by which one of the leading industrial companies design their new polymers. Surely he might have been accorded a more polite hearing, even if he did not make obeisance at the altar of reptation. In the circumstances it is hardly surprising that the species *rheologicus industrialis* has become so shy."

I tried to expostulate that it was the duty of industrial rheologists to implement the findings of theoreticians instead of taking outrageous short-cuts, but Holmes was not sympathetic. "Whatever the validity of the assumptions underlying the theory advanced by the speaker, your industrialist certainly had one thing right. The truth, when it appears, will be sufficiently simple to be summarised within twenty pages."

We lapsed into silence as the train drew into a halt. The rain beat upon the windows as a score of jolly back-packers invaded the seclusion of our carriage and thrust their dripping burdens into the overhead racks. From there, intermittently throughout our journey, they precipitated rain water, empty crisp packets, and well-worn socks about our heads.

...oooOOOooo...

Once we were again in motion, Holmes continued: "Rather than going into such detail, Watson, let us consider the general perspective of each day. The first day was concerned with theory. Did you notice anything significant about the papers identified as 'keynote' lectures in comparison with the more general contributions."

Knowing that Holmes had heard hardly a word of the formal proceedings, I confidently asserted that, while the general papers had been of a very high standard, the keynote papers had been presented by the most eminent theoreticians and were a quite outstanding record of their achievements.

"Indeed the organizers are to be congratulated on assembling such a formidable battery," commented the great detective; "but, is it not curious that their abstracts did not do them justice."

Sometimes Holmes could be confoundingly obscure, so I asked him to elaborate.

Patiently he set the abstracts of the meeting before me and invited me to count the number of lines in each. Once I had finished, Holmes observed: "You notice, my dear Watson, that this is one of the rare cases where a statistical analysis can be of benefit: whereas, for the general papers on this first day, the mean number of lines is 14 with a standard deviation of 8, in the case of the keynote lectures, the mean is 1.5 with a standard deviation of 3, allowing the possibility of a negative abstract. From this, I would deduce that some of the keynote speakers did not even address the title that was listed for their lecture. Is this not unusual?"

The train lurched and a half empty cola can deposited its contents across the papers spread out before me. "You are indeed correct in your conclusion about the titles of the talks, Holmes, but I believe that you are being over-critical if you consider this to be a fault. These people are at the very peak of their profession: it would be a downright impertinence to expect them to behave as ordinary speakers. We must let them speak as the spirit moves them, such spontaneity is surely a trait to be welcomed. And, as for providing an abstract - that is totally unnecessary; we all knew exactly what they were . . . going . . . to . . ." My protest faded as the left eyebrow of Holmes disappeared beneath the brim of his deerstalker.

"Indeed, Watson," he observed, "I am relieved to hear you say so. The only other rational conclusion would be too painful to entertain."

For a while we lapsed into silence. Our train pursued its course, winding its way through the beautiful Welsh mountains. A beauty that brought to my mind the elegance of the theories, to which I had so recently been exposed and were soon to be triumphantly verified. Enthusiastically, I advised my companion of the advances that had been achieved in reptation theory, constitutive equations and modelling techniques.

"The advances in reptation theory were quite outstanding," I reported. "The original theory had over-predicted the viscosity of branched polymers by some seven orders of magnitude, now, by the simple expedient of 'taking logs and dividing by a large number' much more realistic values are obtained."

"Ah yes," murmured Holmes "the sight of all those poor branched molecules trapped in the middle of notional tubes of constraint, with their ends waving frantically to attract attention, will for ever be etched on my heart."

"These theories are soon to receive definitive proof. Well characterised branched molecules, including a Cayley tree structure, are presently being polymerised. One speaker showed a graph of the predicted viscosity of such materials extending up to 10^{30} Ns/m². What do you think of that!" I demanded.

Holmes seemed stunned. Taking an envelope from his pocket he hastily scribbled on the back* before observing, in an icy tone: "I think that we may need to wait a very long time for experimental verification of such viscosities."

"Holmes, you have hit the nail on the head," I enthused. "The experimentalists lag so far behind the theoreticians that those poor chaps are obliged to scour the ancient literature to find data that fits in with their predictions. Why, in the case of the critical step strain test, a theoretical group was obliged gallantly to attempt the experiment themselves and, even with the most sophisticated equipment available, the results left much to be desired."

"Excellent!" exclaimed Holmes. "I am pleased that you noticed that. But, where experiment fails, there is always the option of calculation, surely there was much positive evidence on this point."

"Oh yes!" I exclaimed. "The calculations are totally stunning. However, the theories are so advanced that the computer power is simply not available fully to solve the equations."

* Transposed from the back of the envelope

Melt viscosity	10^{30} Ns/m ²	
Melt elastic modulus typically	10^5 N/m ²	
Viscous flow evident on time scale	10^{25} seconds,	about 10^{18} years
Recent reports of age of planet earth		about 10^{10} years
Time scales envisaged by Deborah		- geological
Time scale to verify present prediction		- Cosmic!

"Precisely correct," announced Holmes. "Now Watson," he continued, "am I not correct in thinking that, during the last two decades, the availability, sophistication and reliability of rheological instrumentation has improved dramatically; and am I not also correct in thinking that, during that time, computational power has increased out of all recognition?"

"Yes, yes," I assented.

"Then, does it not seem strange to you, Watson, that the available theories appear to be further away from verification today than twenty years ago?"

My confusion must have been evident, for Holmes continued: "Surely Watson, you are familiar with the laws of Professor Parkinson. Were he with us today he would instantly recognize the situation."

"Holmes!" I protested. "You cannot mean . . ."

"Precisely, my dear Watson; it is perfectly clear. Parkinson's Law of Theoretical Rheology states that theoretical complexity increases in proportion to the power of the tools available to verify the theory raised to the power y , where y is the number of years since the theory was first formulated."

"Second normal stress differences!" I exclaimed. "This is terrible. If you are correct, theoreticians will never reach a solution. Is this why the industrialists have abandoned these meetings? This is the end of science as we know it!"

"Now it is you who are over dramatising," replied my companion. "In fact, quite the reverse is true. If you study the law that I have proposed, you will see that the benefit of any new theory will be made evident within one year of its being promulgated. After that, it grows like a Cayley tree molecule to intractability. What is needed is not less theoretical work; we need more new theories, rather than continued modification of old theories. Remember Watson, the truth, when it is finally revealed, is always simple so that, as your industrial speaker recognized, its essence will be able to be contained within 20 pages of text."

As we reached the crest of the mountain range, our conveyance gradually picked up speed.

"Leaving aside the various expeditions, the second day appears to have been devoted to the field of stretching flows," observed Holmes. "It was this subject that led you to expect to find clues about the missing industrialists, was there any report of the activities of those people?"

"All the speakers were from academic institutions," I replied, "but several noted strong contact with industrialists who, according to one speaker, are obsessed by some notion of 'processability - whatever that is'"

"The actual papers," I continued, "contained a wealth of new experimental results, especially on bi-axial and planar extensional flows. The new generation of instruments have been most painstakingly constructed and are yielding the highest quality of data imaginable. Further, some of the groups are addressing the behaviour of complex material systems such as blends, co-polymers, and grafted side chains. Some highly provocative results were displayed."

"Indeed," Holmes responded, "I am delighted to learn of such scrupulous detective work. Only by attention to the detail of what actually happens will the truth be uncovered. I am particularly interested to note the work on structured systems - a trend that we detected to be of particular interests to the industrial fraternity during our visit to Brussels (2). I imagine that the theoreticians were delighted to be presented with such well researched data."

"Well, not exactly," I confessed. "Someone pointed out that, since theory had not fully resolved the issue of branched homopolymers, it was precipitate of experimentalists to engage on measurements of systems where microphase separation would be likely to occur. Why, in one set of data on polystyrene grafted as side chains onto a polyethylene main chain there was no tension stiffening response at 140°C but strong tension stiffening at 200°C so that the viscosity at the higher temperature could actually be higher than that at the lower temperature. No respectable theoretician would take such data seriously."

"What a pity," mused my friend. "This is exactly the sort of situation where a little qualitative theory might go a very long way in indicating how such effects, which might be industrially exploited, could be optimised in new materials."

"Your reports of experimental technique," continued Holmes, "suggest that they are really only suitable for specialised use. Is there no sign of a tool for simple quality control for use in an industrial laboratory?"

"Oh yes!" I assented. "A very elegant theoretical paper showed how, by using a simple haul off in conjunction with an extruder operated at constant pressure instead of the more commonly preferred constant rate, simple master curves independent of temperature and molecular weight could be obtained. As you pointed out Holmes, the truth, when it is finally displayed is simple."

"That," observed Holmes, "should certainly be welcomed by industrial rheologists. Let us hope that the equipment manufacturers who were present will pass on the good news to their customers. I am also interested to note that it follows a strong trend in the use of stress controlled rheometry, of which I whole-heartedly approve."

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The final day of the conference contained a variety of subjects classified under the title 'Melt Flow Measurement'. Holmes wished to hear of any general trends that I had detected.

"It was gratifying to see the precise measurements now being carried out on well defined, specially synthesized, molecules. Also, the improvements in technique for studying flow patterns into and through a die are of considerable general interest. A new capillary rheometer, operating under modest pressure, is also being used to study oscillatory flow; this appears ideally designed to bridge the gap in our understanding of small amplitude dynamic measurements and steady flow, and may possibly be of particular interest for the study of structured polymer melts. In addition there was some fascinating discussion about the nature of surfaces and their effect on flow defects."

"No other observation?" enquired Holmes. "I fancy that I detected a rather disturbing situation."

Puzzled, I invited him to elucidate.

"Had you not noticed, Watson, that the lecture hall was somewhat empty on the last afternoon. In particular, I was disappointed to note that virtually all the keynote speakers had departed by lunchtime."

"Oh yes Holmes," I replied. "That is unavoidable. Such people have a busy schedule to maintain, and, once they have made their contribution, there is less reason for others, who had come particularly to hear the keynote speakers, to remain."

"Is that not rather depressing for the speakers scheduled on that final afternoon. It appeared to me," commented Holmes, as he disengaged himself from the contents of a rucksack that had disgorged itself as we shuddered to a halt at Welshpool, "that the contributions to that session were no less important. Indeed, the statistical survey on how accurate rheological measurements really are seemed of the very greatest significance. I anticipate that most of those who presented data would consider their measurements accurate to about $\pm 3\%$, whereas, even for a very well defined measurement like capillary viscometry, the standard deviation appeared to be at least 10%. This seems rather embarrassing - perhaps it was something no one wanted to hear."

"Yes Holmes," I assented, "perhaps it would have been better if that information had been suppressed, although I feel that there is already a general consensus that all is not quite as it might be. One speaker had earlier referred to rheology as a 'logarithmic' science."

"In respect of the wider issue," I continued, "I can see no way of ensuring a satisfactory attendance on the final afternoon; it is always a problem."

At this point, Holmes appeared irritated. "Surely Watson," he opined, "the solution is self evident. Such conferences should be scheduled to finish at lunch time, and the final morning should be given over to the keynote speakers, or at least a just proportion of them. Especially, it would be suitable for those speakers who eschew titles and abstracts and specialise in spontaneity. These leaders in the field could then use their expertise to draw together the diverse threads of the conference so that the assembled delegates had a clear appreciation of the significance of all they had heard and the flow of ideas would be brought to a satisfactory conclusion."

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We were now rapidly approaching the conclusion of our journey. I was interested to know how my companion had spent his time whilst I had attended the scientific sessions.

"Surely it is obvious, my dear Watson," he replied. "You know how important I think it is to study parallel cases. The library at Aberystwyth contains a splendid rheological archive entitled the Scott Blair collection. I have spent my time amongst those papers."

"And did you find any sign of the missing industrialists?" I enquired.

"Oh yes Watson!" he responded. "Surely somebody pointed out that, almost to the day, this is the 20th anniversary of a conference entitled 'Polymer Rheology and Plastics Processing' (3), where a great diversity of opinion was expressed. The proceedings includes such classic industrial contributions as: 'The realities of large blow moulding' and 'Where the money goes in injection moulding'. The preface is also of interest; the organisers of that meeting were also much concerned to establish the link between theory and practice. The preface ends on the very hopeful note that that link will be provided by 'the growing influence of the computer'. Of course, it is unlikely that those who wrote the preface could have imagined the power that, within one generation of researchers, would become available to all who have a desk-top computer, but it is undeniable that they overlooked the inevitability of Parkinson's Law."

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1. "Elongational flows and the case of the missing industrialists" Bulletin of the British Society of Rheology 34, 2, 47-51 (1991)
2. "The case of the missing industrialists, part 2: The Waterloo syndrome" Bulletin of the British Society of Rheology 35, 3, 80-83 (1992)
3. "Polymer Rheology and Plastics Processing" 17th-19th September 1975

CONFERENCE REPORT
IXTH INTERNATIONAL CONGRESS OF BIORHEOLOGY
2ND INTERNATIONAL CONFERENCE ON CLINICAL
HAEMORHEOLOGY

Big Sky, Montana, USA, July 23-28, 1995

The joint meeting of the 9th International Congress of Biorheology and the 2nd International Conference on Clinical Haemorheology took place between 23—28th July 1995 in Big Sky Montana with some 400 attendees. While many aspects of Biorheology were covered, including rheological properties of saliva, mucus and other biopolymers, the vast bulk of the presentations were concerned with haemorheology. This was important from my point of view as I am rapidly approaching the end of my term as a PhD student on a project concerned mainly with the physico-chemistry of the naturally occurring loose aggregation of red blood cells, known as rouleaux formation, which is thought to influence blood flow in vivo.

It is not easy to summarise in a short paper the very broad range of presentations made on haemorheology. Suffice it to say that haemorheological involvement in many clinical conditions was covered, including ischaemia, hypertension, diabetes, cancer, during plasmapheresis, etc. However, particularly prominent areas were those of the white cell : endothelium interaction and rouleaux formation. The former of these is currently very fashionable, and a huge amount of information is now becoming available on a complex area where many different adhesion molecules expressed by the white cells and the endothelium lead to weak rolling adhesion under certain circumstances, which can be transformed into more permanent adhesion and extravasation of the cells into the tissue space during inflammation.

My main interest of course was in the presentations concerned with rouleaux formation. It has been known for years that this phenomenon has very profound effects on blood viscosity in vitro. What is much less clear is its effects, if any, and here controversy still exists. A very interesting public debate took place on the fourth day between Professor Peter Gaetgens of the Freie Universitat of Berlin and Professor Paul Johnson of the University of California, San Diego on precisely this point, putting respectively the con and pro views. I think that the general conclusion was representative of that largely held amongst haemorheologists, that rouleaux formation is important, not in a simplistic way by from its effect on blood viscosity, but rather because of its influence on leukocyte and platelet margination, venular resistance and sedimentation effects.

There has even been controversy over the years as to whether the shear rates *in vivo* are so great as to disrupt all rouleaux except in the most extreme cases. Modern ultrasonic techniques, that were much in view at this meeting, gave reasonably convincing evidence that they are present under many normal *in vivo* conditions.

A final area of controversy in the field has surrounded the physico-chemical basis of the adhesive force in rouleaux formation. Two conflicting hypotheses are extant, one is based on the idea of large plasma proteins, such as fibrinogen, forming cross-links between adjacent cells to hold them together, the other is based on depletion theory, i.e., as cells approach one another there is a region where the glycocalyses overlap, from which large molecules are excluded, leading to osmotic forces that push the cells together. Considerable discussion surrounded this at the meeting with a good 'state of the art' presentation by Professor Don Brooks of the University of British Columbia. There were also some interesting new experimental data, especially by a team from Holland who had used an optical trapping method to manipulate red cells in the investigation of cellular adhesion. One is led to the view that the hypotheses should not be looked at exclusively, but that they both have a role to play.

I made three presentations at the meeting, concerning technology for quantitating red cell aggregation and on the effects of rouleaux formation of enzymic degradation of the glycocalyx. The feedback that I got has been very useful. The meeting has also been very useful in getting my ideas straight for the thesis that I am now in the process of writing. I am, therefore, very grateful to the Society for their financial assistance.

Finally, of course, it was not all work. Big Sky is a skiing resort in the winter and about two and a half thousand metres above sea level. The scenery is very beautiful and it is on the edge of Yellowstone Park. On the one free day that we were given we took advantage to see the delights of the area. The other good aspect of the meeting was that because we were all accommodated in the small area of the resort, rather than dispersed over some large city, there was ample opportunity for communal checking on the rheology of the local beers.

Mark Pearson
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CONFERENCE REPORT

Polymer Melt Rheology, Aberystwyth, 3-6 September 1995

by Rulande Rutgers

Dept. of Chemical Engineering, University of Cambridge

The first impression of this conference that springs to my mind is that of a well balanced and comprehensive programme. I can hardly think of any lecture that was not relevant to me, or that at the very least did not enhance my understanding of Polymer Rheology. I was pleased to meet most of the people who figure on my list of references. This is obviously a Young (European) Member's view, but conversations over various pints with some of the "ones in the know" confirmed to me that most were pleased with the variety of the lectures.

The second memory (still fresh) is that of the high standard and liveliness of the, often "multi-dimensional", presentations: this was also the one positive observation Professor Anthony Pearson made about the current state of this field of research, during his speech at the excellent Conference Dinner. His criticisms particularly concerned the pace of development compared to other scientific areas, with some of the issues remaining as unresolved as twenty-five years ago. He expressed the hope that if more focus was directed towards doing than towards telling others what to do, breakthrough developments would occur before the year 6178.

Meanwhile, the developments and issues that were addressed during this meeting, included molecular modelling and macroscopic modelling, characterisation of extensional behaviour, melt flow instabilities and the flow dynamics of less well defined systems such as blends and liquid crystalline polymers. Several speakers presented data hot off the press. Such presentations are particularly entertaining as the data may yet be unexplained and create a ripple in the audience either of interest, or disbelief.

To help us digest this banquet of scientific knowledge we all took the fresh air (and rain) on Tuesday afternoon, where Ken Thomas offered us two alternative outings to enjoy the charming Welsh countryside. I joined the party who visited the Alternative Technology Centre, where we were shown how all kinds of simple Newtonian fluids can be used for energy, and how we could avoid using polymers as much as possible.

The actual conference was opened with a lecture by Professor Sir Sam Edwards, who discussed the process of modelling physical phenomena, and

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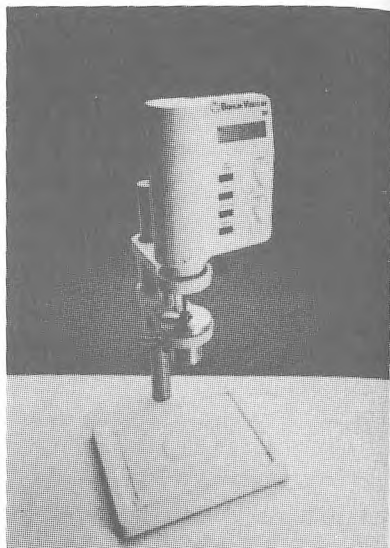
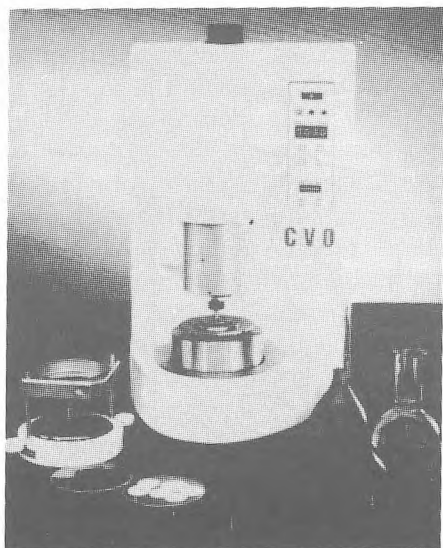
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specifically the risks involved in the consecutive steps of proposing a physical model, translating this into mathematics, simplifying the mathematical model, solving the model and eventually comparing this to the physical reality. He stressed that in this research process it is very important to be aware of the information that one may lose in the various simplification steps, and of the limitations of the applicability of the physical model.

Molecular Modelling

The Leeds based research group of Tom McLeish presented several lectures on the application of the reptation model to branched polymers. The proposed model was that of a central branched section for which the motion is limited by reptation and fluctuation (i.e. relocation of the tube), and coiled extremities of the polymer complying to Rouse-motion. The bulk constitutive behaviour of LDPE was shown to be reasonably well predicted by a regular Caley tree modelled in this fashion. Experimental flow characterisation of well-defined model-polymers is necessary to further validate the model.

An alternative approach to modelling was proposed by David Porter, involving a combination of molecular and continuum mechanics. This Group Interaction Modelling method generates a small set of non-linear viscoelastic parameters from simple stress and energy dissipation balances on spherical domains of fluid in a deformation field. This approach provoked some rather sceptical reactions, in particular from Prof. Edwards who claimed the model doesn't agree with the entropic nature of the polymer deformations.

Constitutive Equations and modelling parameters

In a number of lectures the prediction of complex viscoelastic flows with various constitutive equations was discussed (e.g. Dr. Frank Baayens and Dr. Malcolm Mackley) that make use of relaxation spectra to describe the linear behaviour and damping functions for the non-linear strain dependence. The predictions match shear flow well but show discrepancies with experimental stress fields in the complex flow situation.

The inverse problem of determining a relaxation spectrum (and molecular mass distribution) from rheological measurements was discussed by H.H. Winter and R.S. Anderson. Dr. Winter showed how a discrete relaxation spectrum, when obtained from minimising the error in the sum of the normalised storage and loss modulus, provides a very good fit even to the moduli of a bi-modal polystyrene. He further demonstrated that the

optimum number of relaxation modes is approximately 2 per decade, but that even with many modes the problem does not become ill-posed. On the subject of ill-posedness R. S. Andersen gave us an enthusiastic demonstration of a strategy that stabilises the solution to the inverse problem, by focusing on the required information only, i.e. a particular moment of the molecular mass distribution. This approach was shown to be applicable to any moment of the MMD. Of course although it eliminates the problems due to ill-posedness, it does not solve the problems arising from a limited range of experimental data.

In his lecture regarding the damping function that accounts for non-linear strain dependence, Prof. M.H. Wagner drew a parallel with the Mooney-stress in rubber elasticity. It was shown that both for polymer melts and for rubbers strand orientation is affine and extension is isotropic, leading to a direct comparison of strain measures.

Characterisation of Extensional Behaviour

The whole Tuesday session was devoted to extensional behaviour, including an optional and well-attended video show of some impressively homogeneous planar and bi-axial extensional deformations obtained by Prof. Meissner and his group in the rotary clamp rheometer. His was one of the lectures showing one-week-old data. The importance of control of sample clamping strain rate and temperature was discussed, and the first recovery data for biaxial elongation of LDPE were presented.

Other freshly generated graphs were given by J. Ferguson, surprisingly demonstrating that all the seemingly disagreeing extensional viscosity data from different laboratories lay on a single time-strain-viscosity plane.

Melt Flow Instabilities

Prof. Marcel Crochet presented his recent work on modelling extrusion instabilities using a source of elastic energy storage (either compressibility or viscoelasticity), in combination with a non-linear slip equation. Self sustained oscillations in pressure and flow rate can be generated, such as observed in the spurt-flow regime in LLDPE extrusion. Fluctuations of the free surface were simulated that Crochet suggested may well represent what we observe in the sharkskin phenomenon. Morton Denn expressed his concern that this model, closely related to the Van Der Poll equation for relaxation oscillations, depends on the non-linearity of the slip law, which he and Hatzikiriakos and Dealy could not find experimentally.

Having just completed a literature survey on this topic, I considered it a treat to attend a life-show of both the most active, and probably most opposed, experimental research groups in this field, represented by Prof. Morton Denn and Dr. Nadia El Kissi. Morton Denn links the onset of sharkskin (defined in his lecture as a small scale high frequency disturbance on the extrudate surface) to an abrupt change of slope in the flow curve. His research focuses on the die wall material-polymer interaction that he suggested plays a dominant role in this break in the flow curve and probably involves surface oxidation. A new method of flow Infrared Spectroscopy was described and its application on a tagged C16 system to study interface layer thicknesses and dynamics. Denn concludes from this work that there is strong evidence that the chain interacts with the surface during extrusion and that the relevant science to understanding extrudate instabilities may not be bulk rheology but surface spectroscopy. However the relation between the surface layer dynamics and the dynamics of the extrudate instability (i.e. either adhesive or cohesive failure or disentanglement of the polymer at the surface) remains yet unresolved.

Dr. El Kissi provided an extensive series of photographs to underline her statement that sharkskin is a progressive phenomenon with increasing flow rate, from scratches on the surface to the formation of cracks. The scale of the distortion, as opposed to the mechanism, was shown to be dependent on level of entanglement. Recent exit birefringence data show small oscillations in the exit stresses of identical frequency of the crack formation. Fluorinated die wall material at the exit was shown to significantly delay the sharkskin phenomenon. More detailed research in the exit region is required to determine critical stress levels. To Morton Denn the presented data did not support the conclusion that the phenomenon is an exit effect only.

My personal conclusion from this discussion and from most polymer melt rheometry issues discussed at this conference, extending Sir Sam Edwards' warnings on modelling, is that comparison of the modelled behaviour with physical reality is only possible if the actual observation of the physical phenomenon leaves no room for interpretation. This, in the area of polymer melt flow, is not a trivial matter, with high demands on measurement technology and quality and quantity of experimental researchers.

I thank Prof. Ken Thomas for being a warm and helpful host at this lively conference and the British Society of Rheology for their financial support in my attendance.

NEWS FROM THE SOCIETY OF RHEOLOGY, AMERICA

1995 Bingham Medalist, Don Plazek

The Bingham Medal for 1995 will be awarded to Prof. Don Plazek of the University of Pittsburgh. This award has been given in recognition of outstanding scientific contributions to the field of rheology, especially the measurement of polymer viscoelasticity and its relation to molecular structure.

Don Plazek received his Bachelors degree in Chemistry and Ph.D. in Physical Chemistry from the University of Wisconsin. In 1967 he was appointed Associate Professor in the Metallurgical and Materials Engineering Department at the University of Pittsburgh. He attained the rank of Professor in 1975 and remained there until his retirement in 1994. From 1987 to 1994, he also served as an adjunct Professor in the Chemistry Department at Carnegie Mellon University.

Much of Professor Plazek's early experimental work dealt with the measurement of elongational and volume creep. This resulted in improved computer models for converting the measured creep data to other viscoelastic functions, such as dynamic modulus, as well as useful new approximation calculations. In the early 1980's, he turned his attention to the viscoelasticity of polymers and organic glasses and made many important contributions.

Several of Plazek's accomplishments which exemplify his ingenuity and versatility are:

1. Accurate measurements of high reliability of viscoelastic and other physical properties of carefully characterized polymers and assembly of a mass of definitive standard viscoelastic data useful for many applications, especially for critical testing of theories of polymer dynamics.
2. Keen observation of important relationships, which might have gone unnoticed but for the accuracy of his measurements, and discerning analysis of these results to elucidate their physical and molecular origin.
3. Basic scientific analysis of rheological phenomena which have important applications to the processing and performance of polymer materials.
4. Lucid exposition of the basic principles of viscoelasticity and its relation to molecular structure, illustrated by his own measurements, in review articles and short courses.

Professor Plazek received the George Stafford Whitby Award of the American Chemical Society Rubber Division in 1993 and has over one hundred publications to his name.

Nominations for the 1996 Bingham Medal

Nominations should be submitted before January 15th, 1996 to the chair of the Bingham Award Committee:

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 Dept of Chemical Engineering and Materials Science,
 University of California at Davis,
 Davis, CA 95616
 Tel: (916) 752-0400 Fax: (916) 752-1031
 Email: rlpowell@ucdavis.edu

1995 Journal of Rheology Publication Award

The 1995 Journal of Rheology Publication Award has gone to Tom Annable, Richard Buscall, Rammile Ettelaie and Diane Whittlestone of the ICI Corporate Science Group in the UK. The award has been given for their paper entitled, "The Rheology of Solutions of Associating Polymers: Comparison of Experimental Behaviour with Transient Network Theory" and published in the Journal of Rheology, *37*, 695-726 (1993). This paper gives a detailed and complete study of a very significant class of associative thickeners which function by forming transient 3-D networks. The publication presents experimental characterization of the dynamic network properties, the statistical mechanical modelling of the polymer chain configurations and a Monte Carlo simulation of the same. According to one of the reviewers, "Some of the experimental data, including the dynamic moduli of blends, are quite new and exciting. Their interpretation in the light of recent transient network theory is also very interesting and will create a new world in the study of associating polymers".

New Editor of the Journal of Rheology

It has been announced by the Society of Rheology that Mort Denn has agreed to serve as the next Editor of the Journal of Rheology. Mort replaces Art Metzner, who has served as the Editor for the past eleven years.

World Wide Web

Albert Co and Chris Petrie have volunteered to organize a home page on the World Wide Web for the Society of Rheology, which is expected to be up and running in an initial version by the end of the summer. Suggestions are encouraged to Albert Co (albertco@maine.maine.edu) or Chris Petrie (chris.petrie@newcastle.ac.uk) or to Bob Armstrong (rca@mit.edu).

CONFERENCE ANNOUNCEMENTS

12th Annual Meeting of the Polymer Processing Society Sorrento, Italy, May 27 - 31, 1996

This is a meeting which it is believed should be of considerable interest to members of the BSR. A record number of papers are to be presented on a wide range of topics, which will be divided into 13 symposia. Each symposium will feature keynote lectures by world renowned researchers, followed by contributed papers. Poster sessions on each topic will also be organized in order to accommodate the large number of contributions expected. The 13 symposia topics are expected to be:

1. Rheology and Rheometry. 2. Mixing and Compounding.
3. Polymerization and Reactive Processing. 4. Blends and Alloys.
5. Fibres and Films. 6. Extrusion. 7. Injection and Free Surface Moulding.
8. Processing of Liquid Crystal Polymers. 9. Processing of Composites.
10. Reprocessing, Recycling and Environmental Impact.
11. Morphology and Structure Development, Characterization and Analysis. 12. Mathematical Modelling. 13. Welding, Joining.

Call for Papers: Short abstracts of about 200 words on the symposia topics are invited and should be submitted before November 1st, 1995 to:

Prof. José M. Kenny, 12th PPS Meeting,
Dept of Materials and Production Engineering,
University of Naples - P. Tecchio,
80125 Naples, ITALY
Fax: +39-81-768 2404 E-mail: kenny@unipg.it

If accepted, an extended abstract, maximum 2 pages including figures and references, will be required no later than February 15th, 1996.

Further information regarding local arrangements can be obtained from:

Dr Luigi Torre or Dr Salvatore Iannace, 12th PPS Meeting,
Dept of Materials and Production Engineering,
University of Naples - P. Tecchio,
80125 Naples, ITALY
Tel: +39-81-768 2405 Fax: +39-81-768 2404
E-mail: torrel@ds.cised.unina.it
iannace@ds.cised.unina.it

THE ROYAL SOCIETY - UNILEVER INDO-UK FORUM
on
THE DYNAMICS OF COMPLEX FLUIDS

in association with the Programme at the Isaac Newton Institute
for Mathematical Sciences
and with the support of the Tata Trust

24 - 28 June 1996
at the Cavendish Laboratory, Cambridge, UK

The aim of this meeting will be to bring together the various themes of the 6 month Programme on complex fluids to be held at the Newton Institute. The current status and future directions in predicting the behaviour of complex fluids in viscometric and non-viscometric flows will be considered. Session topics will include continuum simulation of viscoelastic and viscoplastic fluid flows, mesoscopic simulation of particulate, polymeric and self-assembled systems and also experimental procedures for characterising microstructural evolution in simple flows and the fields for complex flows. Invited lectures, contributed posters and workshops will be included in the programme, which is intended to provide extensive sessions for discussion. A reduced registration fee and a limited number of bursaries will be available for research students and post-doctoral workers.

For further information, please contact:

Mrs M.E.Staff,
Polymers and Colloids Group,
Cavendish Laboratory,
Madingley Road, Cambridge,
CB3 0HE, England
Tel: 01223-337007 Fax: 01223-337000

**American Institute of Chemical Engineers Annual Meeting
and Polymer Processing Society
Meeting for the Americas
First Joint Topical Conference on**

**PROCESSING, STRUCTURE AND
PROPERTIES OF POLYMERIC MATERIALS**

Chicago, USA 3-6/11/96

The goal of this conference is to provide a discussion forum for the American and world-wide community of scientists and engineers in the field of Polymeric Materials processing. This first AIChE-PPS joint conference provides a unique opportunity for an interdisciplinary exchange of ideas between the polymer processing community and people working in the more traditional fields of chemical engineering. You are invited to take part in this exciting conference by submitting a paper or a poster on selected symposia topics. Authors should indicate their choice of symposia for presentation. Abstracts of approximately 200 words should be submitted before February 1, 1996 to either Prof. I. Manas-Zloczower or Prof. A.N.Hrymak.

The Topical Conference will comprise three full days of sessions with keynote addresses by world renowned researchers, followed by contributed oral and poster presentations in the following symposia:

1. Injection Moulding. 2. Extrusion. 3. Rheology and Rheometry.
4. Mixing in Viscous and non-Newtonian Systems.
5. Polymer Flow and Process Modelling.
6. Numerical Methods for Polymer Flows.
7. Colloidal Phenomena in Polymer Processing.
8. Thermophysical Properties of Complex Systems: Polymer Dynamics.
9. Thermophysical Properties of Complex Systems: Polymer Thermodynamics.
10. Structure and Properties of Polymer Blends.
11. Polymers for Biomedical Applications.
12. Polymerization and Aggregation Kinetics.
13. Mixing, Reactions and Mass Transfer in Polymer Systems.
14. Reactive Processing. 15. Polymer Thin Films and Interfaces.
16. Fibre and Film Processing. 17. Structure Development in Processing.
18. Recycling of Polymers through Blending.

A special session will be organized for the presentation of all the posters. Awards will be presented to the best posters. All the papers presented at the conference will be included in a special Conference Proceedings volume.

Meeting Location:

The meeting will be held at the Palmer House Hotel in downtown Chicago.

Contact:

Prof. I. Manas-Zloczower, Case Western Reserve
University, Dept of Macromolecular Science,
Kent Hale Smith Building, Cleveland, OH 44106. USA.
Tel: (216) 368-3596 Fax: (216) 368-4202 E-Mail: ixm@po.cwru.edu

Prof. A.N.Hrymak, McMaster University,
Department of Chemical Engineering,
Hamilton, Ontario, Canada, L8S 4L7
Tel: (905) 525-9140 Fax: (905) 521-1350
E-Mail: hrymak@mcmail.cis.mcmaster.ca

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CONFERENCE DIARY

DATE	PLACE	DETAILS
12-17/11/95	San Francisco, CA, USA	Symposia on ' Developments in Non-Newtonian Flows III ' & ' Electrorheological Flow III '. ASME Int.Mech.Cong. and Exposition, Contact: Prof. Dennis A. Siginer, Dept.Mech.Eng., Auburn Univ., 201 Ross Hall, Auburn, AL 36849-5341, USA Tel: 1 205 8443331 Fax: 1 205 8443307 E-mail: dsiginer@eng.auburn.edu
27-31/5/96	Sorrento, Italy	The Polymer Processing Society, 12th Annual Meeting Contact: Prof. José M. Kenny, Dept of Materials & Production Chemistry, University of Naples - P. Tecchio, 80125 Naples, Italy Tax: +39-81-768 2404 E-Mail: kenny@unipg.it
3-5/6/96	Glasgow, Scotland	'Production Methods and Workability of Concrete & 4th Concrete - Scotland Exhibition' . Contact: Carol MacDonald, Technology & Business Centre, University of Paisley, Paisley, PA1 2BE, Scotland Tel: 0141 848 3734 Fax: 0141 848 3739
8/1-22/6/96	Cambridge, UK	6 month Workshop on ' Dynamics in Complex Fluids '. For further details, see page 35, Vol. 38, No.1
24-28/6/96	Cambridge, UK	The Royal Society - Unilever Indo-UK Forum on 'The Dynamics of Complex Fluids' Contact: Mrs M.E.Staff, Polymer & Colloids Group, Cavendish Laboratory, Madingley Laboratory, Cambridge, CB3 0HE, England. Tel: 01223 337007 Fax: 01223 337000
18-23/8/96	Quebec City, Canada	'XIIth International Congress on Rheology' , Canadian Rheology Group / Groupe Canadien de Rhéologie, Chairman: Prof. D.DeKee, Dept of Chemical Engineering, University of Sherbrooke, Sherbrooke, Québec, J1K 2R1. Canada Congress Secretary: Dr M. Dumoulin, National Research Council - Canada Industrial Materials Institute, 75, de Mortagne, Boucherville (Québec), Canada, J4B 6Y4 Fax: 1-514-641-5103

Travel grants are available to help students attend any of these meetings.
Applications to the BSR Secretary supported by a letter from supervisor.

DATE	PLACE	DETAILS
9-11/9/96	Aberystwyth, Wales	'4th International Conference on Flow Processes in Composite Materials (FPCM '96)' Contact: Dr R.S.Jones, Dept of Mathematics, University of Wales, Penglais, Aberystwyth, Dyfed, SY23 3BZ, UK Tel: +44(0)1970-622762 Fax: +44(0)1970-622777
3-6/11/96	Chicago, USA	'American Institute of Chemical Engineers Annual Meeting and Polymer Processing Society Meeting for the Americas First Joint Topical Conference on 'Processing, Structure and Properties of Polymeric Materials' Contact: Prof. I. Manas-Zloczower, Case Western Reserve University, Dept of Macromolecular Science, Kent Hale Smith Building, Cleveland, OH 44106. USA. Tel: (216) 368-3596 Fax: (216) 368-4202 E-Mail: ixm@po.cwru.edu
16-20/2/1997	Galveston, TX, USA	'68th Annual Meeting of the Society of Rheology.'

Travel grants are available to help students attend any of these meetings.
Applications to the BSR Secretary supported by a letter from supervisor.

COURSE DIARY

DATE	PLACE	DETAILS
13-17/11/95	Univ of Strathclyde, Scotland	One Week Course: 'Engineering Rheology.' Contact: Prof J. Ferguson, Dept of Pure & Applied Chemistry, University of Strathclyde, 295 Cathedral St., Glasgow, G1 1XL. Tel: +44 (0) 141 552 4400 X 2161 Fax: +44 (0) 141 552 5664
6-7/12/95	AEA, Harwell, Oxfordshire	'Practical Viscometry Course' Contact: Mrs Margaret McCulloch, AEA Technology, 404 Harwell, Didcot, Oxfordshire, OX11 0RA, UK Tel: 01235 434626 Fax: 01235 432313
15-19/4/96	Bristol, UK	'Spring School in Surface Chemistry & Colloids' Contact: Dr Susan Pringle, Dept for Continuing Education, University of Bristol, 8/10 Berkeley Square, Clifton, Bristol, BS8 1HR, UK Tel: 0117 928 7122 Fax: 0117 925 4975

MEMBERSHIP NEWS

The following applications for membership were approved at the Council meeting on September 4th, 1995

Mr G.M. Corfield,
Dept of Chemical Engineering,
Imperial College of Science,
London, SW7 2BY
(fetsa ABHILO)

Mr T. Dobbie,
Rosand Precision,
Balds Lane, Lye
Stourbridge,
West Midlands, DY9 8SH
(fetsa BCDIL)

Dr X.K. Li,
Dept of Mathematics,
University of Wales,
Aberystwyth, SY23 3BZ
(fetsa AFGJLMN)

Mr H. Matallah,
Computer Science Division,
University College of Swansea,
Swansea, SA2 8PP
(petsa DEGLN)

Mr S.P.F. Mayers,
Coates-Lorilleux International,
Cray Ave., St Mary Cray,
Orpington,
Kent, BR5 3PP
(fea DFGH)

Dr J. Meney,
Royal Ordnance Plc,
Station Road,
Bishopton,
Strathclyde, PA7 5NJ
(fea CO)

Dr J. Mulligan,
Technical Dept.,
Smith & McLaurin,
Kilbarchan,
Renfrewshire, PA10 2AF
(pesa DGO)

Mr J.G. Murray,
Dept of Pharmaceutical Sciences,
University of Strathclyde,
Royal College Building,
University of Strathclyde
Glasgow, G1 1XW
(pesa FO)

Mr V.P.J.-M. Navez
Dept of Mathematics,
University of Wales,
Aberystwyth, SY23 3BZ
(fetsa BDN)

Mr P. Patel,
SmithKline Beecham Pharmaceuticals,
Analytical Dept., P.Q.A.,
Clarendon Rd., Worthing,
West Sussex, BN14 8QH
(pea GH)

Dr D.A. Tod,
Defence Research Agency,
Fort Halstead,
Sevenoaks,
Kent, TN14 7BP

Honorary membership has been conferred on the following members:
Dr John A. Palfrey, Mr Bryn Roberts and Prof. Ray Wetton.

The following resignations have been received:
Dr S.J. Bryan, Mr A.J. Farnley, Mr S.T.E. Aldhouse

The following cease to be members under rule 4(d):

Dr J.A. Barnes, Dr N. Botu, Dr R. Bragg, Miss S.M. Chandler,
Mr M.A. Conway, Dr D. Doraiswamy, Dr W.A. Gerrard,
Dr L.B. Gilman, Dr R.W. Hall, Dr D. Hayes, Mr K. Juvas, Mr J. Konupek,
Mr K.-H. Krause, Dr W. Mader-Hipp, Mr C. Meier, Dr H. Michel,
Dr I. Walker, Mr P.J. Weaver, Mr R.W. Winter, Mr G.G. Zahler.

Classification of abbreviations for Members' Rheological Interests

- f Member's main interest is rheology (ie. full-time)
- p rheology is secondary interest (ie. part-time)
- e approach is experimental
- t approach is theoretical
- s area of work is pure science
- a area of work is technology

- | | |
|--------------------------------|-------------------------------|
| A metals | I glasses, ceramics |
| B composites | J oils, greases |
| C solid polymers | K building and road materials |
| D molten or dissolved polymers | L foodstuffs |
| E natural fibres | M biological materials |
| F liquid-liquid systems | N theoretical models |
| G liquid-solid systems | O other systems |
| H particulate systems | |

Subscriptions. A Short Note from the Membership Secretary.

Subscriptions for the year 1995/6 are now due. Many of you have paid in advance, and I would request that those who have opted to pay by standing order check that this has been done. The remaining members have a choice of paying by cheque (£15) or credit card (£10), and a mandate form for the latter is enclosed. If paying by cheque, please ensure that any charges are paid beforehand. For example, transfer by Fundsflow attracts a charge of £2, so this should be added to the amount paid. It is obviously an advantage to pay for a number of years in advance, paying a one off charge, and ensuring a hedge against a rise in subscriptions.

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