

RHEOLOGY BULLETIN

Publication of The Society of Rheology, Inc.

Volume 42, No. 3



December, 1973

WINTER MEETING

JANUARY 28-30, 1974

Erawan Garden Hotel

Indian Wells, California

Registration

The registration fee for members is \$10; non-members will pay \$15, and students are free. A registration desk will be set up in the hotel Sunday afternoon. Abstracts of the papers will be available at the registration desk.

Reservations

You can reserve a room at the Erawan (see brochure) by mailing the enclosed card. Be sure to mark it "Society of Rheology" to assure yourself of the special rate of \$23.50 (single) and \$27.50 (double) plus 5% tax. Earliest check-in time on Sunday, January 27, is 3 p.m.

Transportation

Limousine service from the airport to the hotel will be provided for participants arriving by air at a cost of \$2.50 per person if you indicate on the registration card that you wish this service. The Palm Springs Airport, 15 minutes from the Erawan, is serviced by Western Airlines, Air West, Air California, and American Airlines. American Airlines also has direct flights from many Midwestern and Eastern locations.

Host Committee

J. J. Aklonis
L. G. Leal
N. W. Tschoegl, Chairman

Recreation

Afternoons are free for golfing, tennis, cable tram rides into the mountains, visits to date farms, and a trip to the Salton Sea. The Erawan Gardens has a pool which probably will be open.

OTHER ASSOCIATIONS

IUTAM Symposium on the "Mechanics of Visco-Elastic Media and Bodies" will be held in Gothenburg, Sweden September 2-6, 1974. Attendance will be limited. Deadline for abstracts is December 31, 1973. Scientist wishing to take active part in the symposium should write the Scientific Committee, J. Hult, Chairman, IUTAM Symposium 1974, Chalmers University of Technology, Fack, S-40220 Gothenburg, Sweden.

1974 ANNUAL MEETING

The next annual meeting will be held at the University of Massachusetts in Amherst, October 21-24, 1974.

Program Committee

S. S. Sternstein, Department of Chemical Engineering, Rensselaer Polytechnic Institute, Troy, New York (chr.)

J. L. Ericksen, Department of Mechanics, The Johns Hopkins University, Baltimore, Maryland.

A. N. Gent, Department of Chemical Engineering, University of Akron, Akron, Ohio

R. S. Stein, Polymer Science Program, University of Massachusetts, Amherst, Massachusetts

K. F. Wissbrun, Celanese Corporation, 806 Morris Turnpike, Apt. 3P7, Short Hills, New Jersey

Local Arrangements Committee

R. S. Porter, Polymer Research Institute, University of Massachusetts, Amherst, Massachusetts (chairman)

R. A. Mendelson, Monsanto Company, 730 Worcester Street, Indian Orchard, Massachusetts

S. Middleman, Department of Chemical Engineering, University of Massachusetts, Amherst, Massachusetts

R. S. Stein, Polymer Science Program, University of Massachusetts, Amherst, Massachusetts

Ideas for symposia may be transmitted to any member of the committee. Deadline for abstract is July 20. Further details will appear in the April 1974 bulletin.

NEW OFFICERS — 1974-76

President:

R. S. Rivlin, Lehigh University

Vice President:

J. R. Knox, Amoco Chemical Corporation

Editor:

R. R. Myers, Kent State University

Secretary:

R. A. Mendelson, Monsanto Company

Treasurer:

E. A. Collins, B. F. Goodrich Chemical Company

Executive Committee at Large:

I. M. Krieger, Case Western Reserve

L. J. Zapas, National Bureau of Standards

F. R. Eirich, Polytechnic Institute of New York

RHEOLOGY BULLETIN

Raymond R. Myers, Editor
Department of Chemistry
Kent State University
Kent, Ohio 44242

WINTER MEETING OF THE SOCIETY OF RHEOLOGY

Erawan Garden Hotel, Indian Wells, California
Monday, January 28, 1974

MORNING SESSION

Chairman: L. G. Legal, Chemical Engineering, California
Institute of Technology, Pasadena, California

- 8:50 Opening remarks
9:00 Invited lecture — *Structural Theories and Rheological Behavior*
R. B. Bird, University of Wisconsin, Madison, Wisconsin
10:00 Coffee
10:30 *Kinetic Theory and Rheology of Solutions of Flexible Macromolecules*
O. Hassager, University of Wisconsin, Madison, Wisconsin
11:00 *The Rheology of Suspensions and its Relation to Phenomenological Theories for Non-Newtonian Fluids*
A. Acrivos, Stanford University, Stanford, Calif.
11:30 *A Rheological Equation of State for Dilute Solutions of Near-Hookean Dumbbells*
R. C. Armstrong, Massachusetts Institute of Technology, Cambridge, Massachusetts
R. B. Bird, University of Wisconsin, Madison, Wisconsin

EVENING SESSION

Chairman: R. F. Landel, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California

- 8:00 *Restrictions on the Strain Energy Function in Finite Elasticity*
R. S. Rivlin, Lehigh University, Bethlehem, Pa.
8:30 *Viscoelastic Properties of Styrene-*a*-Methyl Styrene Block Copolymers*
D. R. Hansen and M. C. Shen, University of California, Berkeley, California
9:00 *The Effects of Pressure on the Mechanical and Ultimate Properties of a Glass Bead Filled Elastomer*
C. K. Lim, K. Yagii, and N. W. Tschoegl, California Institute of Technology, Pasadena, Calif.
9:30 *On the Stored Energy Function of Compressible Rubberlike Materials*
T. J. Peng and R. F. Landel, Jet Propulsion Laboratory, Pasadena, California

Tuesday, January 29, 1974

MORNING SESSION

Chairman: L. J. Zapas, Polymer Division, National Bureau of Standards, Washington, D. C.

- 9:00 *Rheo-Optics: Electromagnetic Foundations of Flow Induced Anisotropy*

- J. D. Trentacosta and W. R. Schowalter, Princeton University, Princeton, New Jersey
9:30 *Rheological Properties of Dispersions of Iron Oxide in Ethylene Glycol*
C. A. Bruce and T. L. Smith, IBM Research Laboratory, San Jose, California
10:00 Coffee
10:30 *A Note on the Shear and Extensional Flow Behavior of NonDilute Rigid-Rodlet Suspensions*
J. D. Goddard, University of Michigan, Ann Arbor, Michigan
11:00 *The Rheology of Hard-Sphere Dispersions*
T. M. Krieger, Case Western Reserve University, Cleveland, Ohio
11:30 Invited lecture — *Microrheology of Disperse Systems*
S. G. Mason, McGill University, Montreal, Canada

EVENING SESSION

Chairman: W. J. MacKnight, Department of Chemistry University of Massachusetts, Amherst, Massachusetts

- 8:00 *The Mechanism of the Viscoelastic Deformation of Collagenous Tissue*
R. E. Cohen, Massachusetts Institute of Technology, Cambridge, Massachusetts
C. J. Hooley and N. G. McCrum, Oxford University, Oxford, England
8:30 *Flow Visualization and Rheological Aspects of Injection Molding of Molten Plastics*
J. L. White and H. B. Dee, The University of Tennessee, Knoxville, Tennessee
9:00 *The Analysis of Entry and Exit Phenomena in a Newtonian Liquid*
L. Buteau, R. Racano and W. Philippoff, Newark College of Engineering, Newark, New Jersey
9:30 *Rheological Phenomena in Polymerization Reactors: Secondary Flows Around Agitators During the Bulk Polymerization of Styrene*
Y. Ide and J. L. White, The University of Tennessee, Knoxville, Tennessee

Wednesday, January 30, 1974

MORNING SESSION

Chairman: J. J. Aklonis, Chemistry Department, University of Southern California, Los Angeles, California

- 9:00 *Suspensions: Fluids with Fading Memories*
A. Okagawa, G. Ennis, and S. G. Mason, Pulp and Paper Institute, and McGill University, Montreal, Canada
9:30 *The Motion of Slender Rod-like Particles in a Second Order Fluid*
L. G. Leal, California Institute of Technology, Pasadena, California
10:00 Coffee
10:30 *Dispersions or Solutions? A Mechanism for Certain Thickening Agents*
N. W. Taylor and E. B. Bagley, Northern Regional Research Laboratory, U. S. Department of Agriculture, Peoria, Illinois
11:00 *Some Observations and Computations on Weissenberg Climbing*
Lilan Lap-Lun Chan and J. D. Goddard, University of Michigan, Ann Arbor, Michigan
11:30 *The Theory of Slow Plane Convergent Flow of a Newtonian Liquid*
W. Philippoff, Newark College of Engineering, Newark, New Jersey

ANNOUNCEMENT

EMPLOYMENT

We occasionally get word that positions are open. A position in Chicago has been available for several months, so if interested contact your editor.

APPLIED MECHANICS CONGRESS

The Seventh U. S. National Congress of Applied Mechanics will be held at the University of Colorado in Boulder, Colorado during June 3 - June 7, 1974. Send manuscripts before Jan. 1, 1974 to S. K. Datta, Chairman Editorial Committee, Seventh U. S. National Congress of Applied Mechanics, Department of Mechanical Engineering, University of Colorado, Boulder, Colorado 80302.

AMERICAN INSTITUTE OF PHYSICS INCORPORATED FOR SOCIETY OF RHEOLOGY

Statement of Receipts and Disbursements — Six Months Ended June 30, 1973

Balance in Account - January 1, 1973			\$22,578.57
RECEIPTS (January 1 - June 30, 1973)			
Dues Collections:			
1973 Dues	\$3,340.13		
1974 Dues	10.00	3,350.13	
Miscellaneous Income			
Income from Winter Meeting	\$ 283.15		
Interest Income	30.00	313.15	
Total Receipts			\$26,241.85
DISBURSEMENTS (January 1 - June 30, 1973)			
Charge for Dues Billing and Collection	\$ 248.17		
Charge for Preparation and Maintenance of Member Record File	568.24		
Financial Handling Charge - Six Months-1973	182.06		
Member Society Dues - Six Months-1973	400.00		
Editorial Expenses:			
Salaries, Telephone and Postage	300.00		
Transactions of the Society of Rheology (Schedule A)	4,825.67		
S of R Transactions:			
Mailing Expense	\$ 326.52		
Subscription Expense	1,879.02	2,205.54	
Winter Meeting:		484.01	
Spring Bulletin:		331.82	
Mailing Ballot:		94.84	
Questionnaire:		84.75	
Advance to Chairman for Montreal Conference 10/28/73		700.00	
Retirement Gifts for E. Wolf		400.00	
Other:			
Offsetting 500 Letterheads	5.95		
Offsetting 100 Welcoming Letters	.89		
Transfiles	7.70		
Postage	8.01		
Telephone	3.05		
Xerox Charges	4.95	30.55	10,855.65
Balance in Account - June 30, 1973			<u>\$15,386.20</u>

NOTE: A transfer of funds in the amount of \$12,000.00 was made to Society of Rheology on August 13, 1973.

TRANSACTIONS OF THE SOCIETY OF RHEOLOGY — SCHEDULE A

Statement of Income and Expense — Six Months Ended June 30, 1973

INCOME			
Publication Charges			\$1,950.00
Reprint Sales			1,304.48
Total Income			<u>\$3,254.48</u>
EXPENSES			
Publishing Expense	\$6,490.11		
Printing Reprints (Wiley)	1,304.48		
Printing Mailing Labels	8.16		
Reprint Order Handling Charge	277.40		
Total Expense			8,080.15
Net Income or (Expense)			<u>(\$4,825.67)</u>

Respectfully Submitted,
E. A. Collins, Treasurer

SUMMARY OF TWO SYMPOSIA AT THE MONTREAL MEETING

Submitted by Nobu Nakajima

A need was pointed out for improving communication between theoretician and practitioner at the Annual Meeting of the Society of Rheology, at Knoxville, Tennessee, 1971. At the following Annual Meeting in Cincinnati, Ohio, 1973 various ways were suggested on how to improve the communication. Some of the key suggestions were as follows:

1. To have industrial rheologists present examples of unsolved and incompletely understood practical problems.
2. To have presentations on the state of arts of polymer processing.
3. To have presentation of examples showing the contribution of rheology to business benefit.

Programs at the Montreal Meeting and Accomplishments

The Monday morning symposium was on the unsolved problems (suggestion 1). The evening symposium was on the blow molding (suggestions 2 and 3). Specific accomplishments were:

1. Dispelled a common excuse that all practical problems are confidential in nature.
2. Drew attention to the importance of examining bulk polymers rather than polymer solutions.
3. Pointed out sample materials of the industrial importance. They are often very similar materials and indeed, sometimes they cannot be distinguished from

one another by laboratory tests yet show differences in processability. This is in contrast to the "model polymers" which are often studied at universities. The model polymers are usually very different from each other, and also very different from commercial samples.

4. Showed the need for studying rheology of powders and solid particles.
5. Showed the need for studying rheology of high speed paper coating.
6. Recognized that a complete hydrodynamical analysis was essential for understanding polymer processing such as blow molding, etc.
7. Showed that practical problems can be approached in a fundamental manner at universities having both academic and industrial value in addition to providing fruitful student training.

Recommendation for Future Actions

1. Make the symposium on unsolved problems an annual event to be included on each program.
2. Make the symposium on the state of the arts an annual event to be included on each program.
3. Continue to keep an active committee soliciting and preparing the publication of unsolved problems.
4. Form a new committee composed of respected leaders at universities and industry to implement the program and come up with future action.

Application for Membership in the SOCIETY OF RHEOLOGY

I hereby desire to apply for membership in the SOCIETY OF RHEOLOGY dating from
January 19.....

Name
(Include Title, e.g., Mr., Dr., Prof., Miss, etc.) Please print.

Mail Address

Mail Address

Professional Connection

Position

Chief Interest

Highest Academic Degree

Date

Enclose Remittance of \$10 for Regular Annual Dues or \$100 for Sustaining Annual Dues
and Mail to:

SOCIETY OF RHEOLOGY
American Institute of Physics
335 East 45 Street
New York, New York 10017