RHEOLOGY BULLETIN

Publication of The Society of Rheology, Inc.

Volume 37, No. 4



November, 1968

39th ANNUAL MEETING THE SOCIETY OF RHEOLOGY, INC.

WILLIAMSBURG LODGE COLONIAL WILLIAMSBURG, VIRGINIA

JANUARY 13-15, 1969

Program Committee

J. G. Brodnyan (Chairman), Research Laboratories, Rohm and Haas Company, Spring House, Pennsylvania 19477.

M. L. Dannis, Goodrich Research Laboratories, Brecksville, Ohio 44141.

C. L. Sieglaff, Diamond Alkali Research Center, P. O. Box 348, Painesville, Ohio 44077.

J. R. Knox (Local Arrangements Chairman), Avisun Corporation, Post Road, Marcus Hook, Pennsylvania 19061.

This is the 1968 Annual Meeting of the Society of Rheology, Inc., despite the fact that the date has been delayed until 1969 because of the International Congress in Japan.

Accommodations

Preregistration is urged, and directions for reaching Williamsburg Lodge will be sent by the Local Arrangements Chairman to those who send him the preregistration form which is inserted in this Bulletin. Those who do not preregister can get these directions by written request to the Local Arrangements Chairman. The registration desk at Williamsburg Lodge will be open on Sunday from 2:00 to 6:00 P.M.; on Monday from 8:00 A.M. to noon, and on Tuesday from 10:00 A.M. to noon.

Accommodations will be available at Williamsburg Lodge and also at the Williamsburg Inn, across the street from the Lodge.

A form for hotel reservations is included with this Bulletin.

Travel to Williamsburg

BY AIR:

Dulles airport, Washington, D.C., is 150 miles north of Williamsburg, which is about two and one-half hours by car. Newport News, Virginia is served by the following air lines: Allegheny, National, Piedmont, and United. Newport News is only 15 miles from Williamsburg by airport limousine.

BY SURFACE:

The main line of the Chesapeake and Ohio R.R. goes westward from Williamsburg. Those desiring north or south connections will change at Richmond, Virginia. There is Greyhound bus service from Washington, D.C. to Williamsburg.

Facilities

Speakers will be provided with a blackboard and 2 inch by 2 inch and 3-1/4 inch inch by 4-1/4 inch slide projectors. If other facilities are required for the presentation, the Local Arrangements Chairman should be contacted as soon as possible.

THE BINGHAM MEDAL, 1968

Dr. Jerald L. Ericksen, Professor, Department of Mechanics, The Johns Hopkins University, has been selected as the recipient of the Bingham Medal for 1968. Professor Ericksen is a mathematician whose work and personality are both widely known and appreciated by rheologists. Though known and recognized for his theoretical work, he has a grasp of the significant experimental developments in rheology which is matched by few experimentalists. His theoretical work in continuum mechanics is remarkable for its originality and has opened up large areas of the subject which have subsequently been extensively cultivated. Of particular note is the idea of specifying all deformations possible for materials of a certain class of constitutive equations. This idea is basic to the rational measurement of material properties. In a further development he showed that rectilinear flow through non-circular tubes was possible only for

RHEOLOGY BULLETIN

Raymond R. Myers, Editor Department of Chemistry Kent State University Kent, Ohio, 44240

very special fluids, and thus that nonrectilinear flow can usually be expected for non-Newtonian fluids. Professor Ericksen is also responsible for opening up the study of propagation of waves in nonlinear materials by studying surfaces of discontinuity of mechanical parameters. More recently he has been developing a rational approach to the mechanical theory of liquid crystals through his concept of anisotropic fluids.

The award will be presented at the Rheology Meeting on January 13-15, 1969, at Williamsburg, Virginia.

Other Activities

There will be a cocktail party on Tuesday evening, January 14, from 6:15 P.M. to 7:15 P.M., and a banquet at 7:30 P.M. the same evening. The Bingham Medal will be awarded at the banquet.

A Note from the Editor's Secretary

Occidentals become inscrutable after visiting the mysterious Orient!—but, perhaps before the next issue of this Bulletin the mystery and opulence will have gone and the enchanted Congressmen will have given us some *scientific* idea of what went on in Kyoto. Until then, sayonara.

PROGRAM

39th ANNUAL MEETING THE SOCIETY OF RHEOLOGY, INC.

January 13-15, 1969

(Asterisks indicate invited paper) MONDAY, JANUARY 13

SESSION A-Monday Morning

Chairman: J. G. Brodnyan, Rohm and Hass Co., Spring House, Pa.

A-1

9:00 a.m.* I. M. Krieger, Case Western Reserve University, Cleveland, Ohio, "Monodisperse Colloidal Suspensions of Spherical Particles."

10:00 a.m. Coffee break

A-2

10:15 a.m. B. D. Coleman, Mellon Institute, Carnegie-Mellon University, Pittsburgh, Pa., "Shear Waves as a Possible Cause of Melt Fracture"

A-3

10:45 a.m. R. A. Mendelson, W. A. Bowles, F. L. Finger, Monsanto Company, Texas City, Texas, "The Effect of Molecular Structure on Polyethylene Melt Rheological Behavior"

A-4

11:15 a.m. R. A. Stratton, Mobil Chemical Company, Edison, New Jersey, "Non-Newtonian Flow in Polymer Systems with No Entanglement Coupling"

SESSION B-Monday Afternoon

Chairman: M. L. Dannis, B. F. Goodrich Company, Brecksville, Ohio

B-1

2:00 p.m. W. N. Findley and K. Onaran, Brown University, Providence, Rhode Island, "Product Form of Kernel Functions for Nonlinear Viscoelasticity of PVC Under Constant Rate Stressing"

B-2

2:30 p.m. J. S. Y. Lai and W. N. Findley, Brown University, Providence, Rhode Island, "Prediction of Uniaxial Stress Relaxation From Creep of Non-Linear Viscoelastic Material"

B-3

3:00 p.m. R. A. Dickie and T. L. Smith, Stanford Research Institute, Menlo Park, California, "Stress-Strain Characteristics of an SBR Vulcanizate in Simple Tension, Constrained Biaxial Tension and Equal Biaxial Tension"

3:30 p.m. Coffee break

B-4

3:45 p.m. K. L. Cheng, Lord Corp., Erie, Pa., "A Strain Energy Function for Rubber-like Materials"

B-5

4:15 p.m. K. C. Valanis, Iowa State University, Ames, Iowa, "Elastic Materials with Particle Interactions of Finite Range"

B-6

4:45 p.m. H. K. Mueller, California Institute of Technology, Pasadena, California, "Some Mechanical Properties and the Surface Energies of a Swollen and Unswollen Polyurethane Elastomer" PREREGISTRATION FOR 39th ANNUAL MEETING

OF THE SOCIETY OF RHEOLOGY, INC.

NAME	

ADDRESS:

Member	\$ 6.00
Non-member	\$10.00
Registration plus membership	\$16.00

Mail to:

J. R. Knox Avisun Corporation Post Road Marcus Hook, Pennsylvania 19061

SPECIAL TOPIC DISCUSSION-Monday Evening

8:00 p.m. Topic: "*The Rheology of Dispersions*" Discussion Leader: S. G. Mason, McGill University, Montreal, Canada

TUESDAY, JANUARY 14

SESSION C-Tuesday Morning

Chairman: C. L. Sieglaff, Diamond Alkali Company, Painesville, Ohio

C-1

9:00 a.m. E. Menefee, Western Regional Research Laboratory, Albany, California "Improvements in Viscoelastic Theory for Polydisperse Entangled Macromolecules"

C-2

9:30 a.m. J. Rotne and S. Prager, University of Minnesota, Minneapolis, Minnesota, "Variational Treatment of Hydrodynamic Interaction in Polymers"

10:00 a.m. Coffee break

C-3

10:15 a.m. F. Bueche and G. Tokcan, University of Dayton, Dayton, Ohio, "Range of Validity of the DTO Model"

C-4

10:45 a.m. P. J. Carreau, The University of Wisconsin, Madison, Wisconsin, "Rheological Equations From Molecular Network Theories"

C-5

11:15 a.m. N. Sarkar, The Dow Chemical Company, Midland, Michigan, "Viscosity of Polymer Solutions as a Function of Shear Rate"

C-6

11:45 a.m. J. L. Sutterby, The Dow Chemical Company, "Zero Shear Rate Viscosity by Falling Sphere Viscometry. I. Wall, Inertial, and End Corrections to Stokes Law for Newtonian Fluids"

SPECIAL TOPICS DISCUSSION-Tuesday Afternoon

- 2:00 p.m. Topic: "The Influence of Entanglement on Flow" Discussion Leader: E. A. Collins, B. F. Goodrich Company, Avon Lake, Ohio.
- 4:00 p.m. Coffee break
- 4:30 p.m. Society of Rheology Business Meeting

WEDNESDAY, JANUARY 15

SESSION D—Wednesday Morning

Chairman: J. R. Knox, Avisun Corporation, Marcus Hook, Pa.

D-1

9:00 a.m.* R. F. Scott, California Institute of Technology, Pasadena, California, "The Application of Rheology to Soil Mechanics"

10:00 a.m. Coffee break

D-2

10:15 a.m. R. L. Schiffman, University of Illinois, Chicago, Illinois, "Secondary Consolidation of Clays— A Viscoelastic Analysis"

D-3

10:45 a.m. J. L. Ericksen, The Johns Hopkins University, Baltimore, Maryland, "Some Ordinary Differential Equations Pertaining to Liquid Crystals"

D-4

11:15 a.m. B. Bernstein and R. L. Fosdick, Illinois Institute of Technology, Chicago, Illinois, "Some Rheological Relations for Small Oscillations Superposed on Large Steady Shear of Non-Newtonian Fluids"

D-5

11:45 a.m. H. Leeming and W. G. Knauss, Lockheed Propulsion Company, Redlands, California, "Constitutive Behavior of Polymers Under Transient Thermal Conditions"

SESSION E—Wednesday Afternoon

Chairman: R. A. Stratton, Mobil Chemical Co., Edison, New Jersey

E-1

2:00 p.m. A. Siflinger and A. Silberberg, Weizmann Institute of Science, Rehovot, Israel, "The Mechanical Stability of Viscoelastic Jets"

E-2

2:30 p.m. R. I. Tanner, Brown University, Providence, Rhode Island, "The Use of Iterative Numerical Methods for the Solution of Integral Equations Arising in Rheology"

E-3

3:00 p.m. A. C. Pipkin and R. I. Tanner, Brown University, Providence, Rhode Island, "Intrinsic Errors in Pressure-Hole Measurements"

E-4

3:30 p.m. R. C. Penwell and R. S. Porter, University of Massachusetts, Amherst, Massachusetts, "Rheology of Polystyrene Near the Glass Transition"

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8.00 p.m. Explicit The Shoolegge of Discretions" Discussion Landars & G. Shoon, Metalli University, Storitest, Canada

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