

THEORETICAL RHEOLOGY

Edited by J. F. Hutton, J. R. A. Pearson, and K. Walters

Halsted Press, Wiley, New York, 1975. (\$25.00).

Reviewed by Chris Macosko

University of Minnesota

The last two years have brought a welcome surge of rheology text books. Messieurs Lodge (1974), Astarita and Marrucci, (1974) Huigol (1975) Walters (1975) and Han (1976) have all contributed recent volumes to the field and several other authors are preparing new manuscripts. John Wiley's Halsted Press Division who published the texts by Huigol and by Walters have also added a very nice collection of papers in "Theoretical Rheology." As the title facing page indicates it is "The Proceedings of the British Society of Rheology Autumn conference on Theoretical Rheology held at the University of Cambridge" in fall 1974. It is not a text book nor is it totally theoretical. It is a useful rheology reference book and is highly recommended to libraries and researchers in the field. It is of course not timeless but a number of good review-type papers appear in it. It does have a respectable index. The papers are typeset and printing quality is good including an admirable effort at uniformity of notation. Below is a list of the titles and authors.

Section 1: Converging and Diverging Flow

1. Creeping Flow of a Viscoelastic Liquid Through a Contraction: A Numerical Perturbation Solution. Jesse R. Black, Morton M. Denn and George C. Hsiao.
2. Deceleration of Viscoelastic Liquids. A. L. Halmos and D. V. Boger.
3. Plane Entry Flows of Viscoelastic Fluids. S. Zahorski.
4. Stability and Overstability of the Plane Flow of a Simple Viscoelastic Fluid in a Converging Channel. Karl Strauss.
5. Hydrodynamic Factors Affecting the Growth of Fibrous Crystals of Extended-Chain Polymers. M. R. Mackley.

Section 2: Thermomechanics

6. The Thermomechanics of Materials with Fading Memory. R. S. Rivlin.
7. Rheological Equations of State and Thermodynamic Principles. J. G. Oldroyd.
8. A Non-Isothermal Theory of Viscoelastic Materials. Marcel J. Crochet.
9. Thermomechanics of Compressible Materials with Entropic Elasticity. Gianni Astarita and Giulio Cesare Sarti.

Section 3: Composites and Suspensions

10. Finite Deformations of Strongly Anisotropic Materials. Tryfan G. Rogers.

11. Balance Laws for Mixtures of Granular Materials. S. L. Passman.
12. Mechanical Properties of Semicrystalline Polymers Regarded as Composite Materials. J. L. Kardos, J. C. Halpin and L. Nicolais.
13. The Mechanics of Fluid Suspensions. E. J. Hinch.
14. The Effect of the Non-Newtonian Properties of a Suspension of Rod-like Particles on Flow Fields. J. G. Evans.

Section 4: Rheometry

15. Progress in Experimental Rheology.
16. The Start-up of Steady Elongational Flow of Viscoelastic Materials. M. C. Phillips.
17. Some New Validity Tests on the Bird-Carreau Type Constitutive Equations. H. E. van ES, H. A. M. van Eekelen and M. C. Phillips.
18. The Theory of a Universal Oscillatory Rheometer for the Study of Linear Viscoelastic Materials Using the Principle of Normalised Resonance. M. Sherriff and B. Warburton.
19. Correlations Between Linear and Non-Linear Viscoelastic Data for Polymer Solutions. B. Hlavacek and P. J. Carreau.
20. The Effect of the Non-Newtonian Properties of Polymer Solutions on Flow Fields. Gianni Astarita and Morton M. Denn.
21. Report of the Discussion. J. F. Hutton.

ChE news**JOHN QUINN RECEIVES BENT PROFESSORSHIP**

John A. Quinn, Professor of Chemical and Biochemical Engineering at the University of Pennsylvania, was recently named to be the first recipient of the Robert D. Bent Professorship. The Professorship was established by a \$1,000,000 grant from the Atlantic Richfield Foundation to honor Mr. Bent who retired recently as President of the ARCO Chemical Co. and Senior Vice President of the Atlantic Richfield Co.

Professor Quinn earned his bachelor's degree in chemical engineering from the U. of Illinois in 1954 and his doctoral degree, also in chemical engineering, from Princeton U. in 1959. He joined the faculty of Chemical and Biochemical Engineering at the U. of Pennsylvania in 1971 after having been a member of the chemical engineering faculty at the U. of Illinois for 12 years. His research interests focus on interfacial phenomena, problems related to transport through membranes, and bioengineering. Professor Quinn was recently recognized for his distinguished academic career in chemical and biochemical engineering by being named to membership in the National Academy of Engineering.