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BOOK REVIEW

Rheology: An Historical Perspective. By R. I. TANNER & K. WALTERS. Elsevier, 1998. 268 pp. Hardback: ISBN 0-444-829458. NLG 368 or US$192.50. Paperback: ISBN 0-444-829466. NLG 225 or US$114.

Rheology is the science of deformation and flow of materials. As is usual in the field of rheology however, the attention is on the challenges offered by a description of materials with properties intermediate between those of ideal elastic materials and purely viscous fluids. Rheology became an important field in the 20th century, largely due to the tremendous growth of the chemical and biochemical industry in that period. Thanks to these industries we now have a wide range of fibres, films, foodstuffs, personal care products and other structurally complex materials, the production and correct application of which hinges critically on an understanding of their rheological properties. The two authors of this book have both contributed immensely to the field for which they have in their own words "a great affection and enthusiasm". This book contains their view and their historical perspective on the field.

The book is written with abundant use of tensor notation which will limit the group of potential readers. Thus unlike recent books on the history of mathematics (Singh 1997) it is not likely to find readers outside of the scientific community in general. What limits the potential group of readers even more, however, is the frequent use of mathematical concepts specific to rheology but introduced without definition. Hence the reader should in fact already have studied one of the standard textbooks on rheology to appreciate the equations presented. For example the concept of upper-convected time derivatives is introduced without definition. Also, the so-called Rivlin–Ericksen tensors are introduced without definition but merely with the comment that they are closely related to the covariant convected rate-of-strain tensor introduced by Oldroyd. But since the latter are not defined, this information is of limited help to readers not already familiar with the mathematical description of rheology. Is it then really important that the reader understands the mathematical symbols and equations presented in the book? Or is it sufficient that the reader gets a qualitative feel for what is going on? It was not evident to me that the authors had resolved this question for themselves.

In connection with the statement on the relation between the Rivlin–Ericksen tensors and the Oldroyd rate-of-strain tensors, the authors state that this relation "does not appear to be generally appreciated". This statement I find most surprising inasmuch as the relation is specifically given in the one textbook on polymer rheology with which I am particularly acquainted. Also I was disappointed to see that the authors have not attempted to trace the historical origin of the Finitely Extendable Nonlinear Elastic (FENE) potential in structural theories for polymer solutions. This concept is currently finding increasing application, also outside traditional rheological circles for example in molecular dynamics (Binder 1995). However with more than 700 references the authors have certainly sifted through an enormous amount of material.

Specific to this book is the inclusion at the end of each chapter of several brief biographies of leading scientists who have contributed to the field. The authors must

have known many of these persons and make it a point to put humans into the historical picture. As a curiosity I learned that a large fraction of rheologists have a sense of humour. One has a subtle pawky sense of humour, another has a disarming sense of humour, a third has a keen subtle sense of humour while still another simply has a delightful sense of humour. Others are merely described as charming.

I enjoyed reading the book. I can certainly recommend it to other rheologists. But for the reasons stated I have some difficulties in identifying a group of potential readers outside of the field of rheology.

REFERENCES

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