

CONSERVATOIRE NATIONAL DES ARTS ET METIERS, PARIS
OCTOBER 18-20, 1999

The 34th annual general meeting of the French Group of Rheology (GFR) has been held in Paris on October 18-20, 1999 (Conservatoire National des Arts et Metiers, 292 rue Saint Martin, Paris). Its main scientific subjects were related to the Rheology in life sciences and technologies (Rhéologie des Matériaux du Vivant). The Scientific Committee chaired by P. G. de Gennes included M. Baquet, L. Dubertret, G. Couarraze, B. Lounay, J.-L. Morançais, C. Oddou, D. Quemada and J.-F. Stoltz.

Bringing together 168 academic and industrial scientists this meeting included 47 communications and four plenary sessions devoted to the following topics: Biorheology (fluids and soft tissues), Rheology of biopolymers, Rheology of biocompatible materials, Rheology of powders and Rheology of controlled release systems.

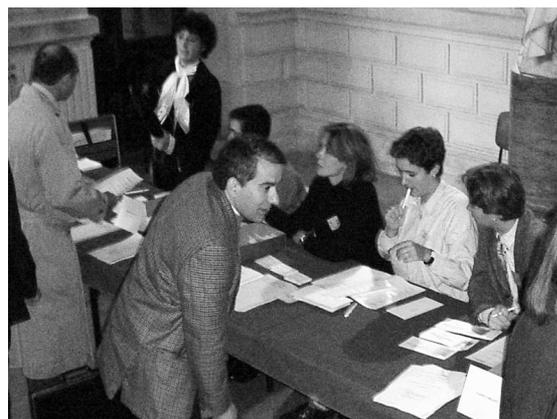
It is really difficult to select some papers among the various quite interesting one which illustrate both the diversity and the quality of the presentations. The first inaugural conference given by Professor P. G. DeGennes (Collège de France, Paris) was devoted to molecular biology and unsolved fundamental problems encountered in genetics. Considering the way a DNA macromolecule enters within the cell through an open pore by the passive process of diffusion and electroporation, he clearly showed that the involved time constants gave sufficient "optimistic" order of magnitude to foresee future applications in the genetic therapy and drug delivery.

Numerous papers were devoted to the study of polymers or biopolymers. The association mechanism of natural associative polymers was

presented by Desbrieres et al., and C. Charnay et al. and the dynamic mechanical property of polymeric network by G. Gallego-Ferrer. Different kind of gels, polymers blends, polymers networks or biopolymers such as hyalouronane or chitosane were also presented (L. Choplin et al., C. Michon et al., V. Normand et al., El Ghzaoui et al., I. Roure et al., M. Khalid et al.) Others food industrial products (alginates, pectins, cross linked starches or amylosed milk products) were studied (M Audebrand et al., I. Dubois et al., A.G. Glevarec or C. Loisel et al.)

The second invited lecture was given by Professor P. Bongrand (INSERM, Marseilles) and concerned another fundamental question in cell physiology related to the process of mecano-transduction. Such phenomena have a crucial role in motility, division and signalling of the cells as well as in all the interactions with the extracellular matrix. The adhesion mechanisms were fully reviewed and clearly analysed from an engineering viewpoint: The associated theoretical concepts and experimental techniques are allowing nowadays the understanding of the kinetics and thermodynamics of this cell adhesion and spreading on its substrate.

In the following session, the rheological behaviour of rheological materials was studied both on a microscopic (cellular) scale and a macroscopic one. The cell adhesivity was studied by using acoustical microrheological techniques (H. Darbeida et al.). V. Laurent et al. presented a paper dealing with the role of the intern stress in the cell skeleton. Blood rheology effects in relation with diabetes was discussed (M. Barraco-Serra et al.) as well as the determination of the



blood yield stress (C. Picard et al.). Some papers considered biological system as a whole, for instance the heart (J. Ohayon et al.) or the wood (P. Perre et al.). Others works gave an insight to the interaction between the cell and the surrounding matrix (E. Fernandez et al.) or the tissues deformation (C. Montserra et al.). The use of some polymers in muscle pathology was discussed by D. Barritauld et al. Some presentations were related to pharmacological (N. Hudson et al., C. Cros et al.) or prosthetic applications in the case of small diameter arteries (M. Zidi et al.). The influence of genetic factors on wheat albumen rheological behaviour was presented by Y. Haddad et al.

In the third invited lecture, D. P. de Rossi (University of Pisa, Italy) gave a talk about the research in biomimetics, and examined some analogues of living matter in term of actuators and sensors. He clearly showed that there is a large amount of evidence that polyelectrolytic gels and conducting polymers are good candidates for properties such as mechanotransduction, pseudo muscular actuators, and even analogue computation.

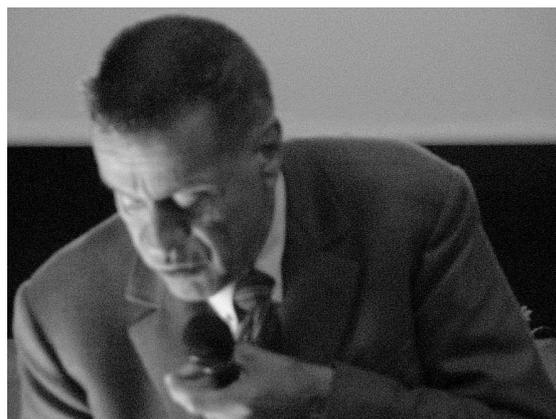
In the field of biomimeticism, a particular attention has to be paid to the conference presented by G. Jeronimidis (University of Reading, U.K.) as the fourth invited lecture which focused on plant physiology, recent and potentially interesting field for biorheologists. It was shown why and how the plant adapts its structure and composition in response to biomechanical and physical external constraints. The way by which the plant biology presents original answers to the change in its environmental stresses has to be

considered as of prime importance in engineering.

The following sessions were devoted to the field of rheology of powders and dispersed systems and of rheology of controlled release systems. The rheological studies of powders were illustrated by the work of P. Coussot, P. Marechal et al., A. Boudoukha et al., or in the alimentary field by M. Tixier et al., K. Bottin et al.. Others multiphasic materials were presented in this field (J. Scher et al., C. Renault et al., B. Launay, N. Bornes et al., C. Derail et al., N. Bornes et al.). Some pharmacological applications were illustrated by P. Carmona et al., A. Djedour et al., A. Hadj-Sadok et al., or C. Postel et al.). Original studies on dispersed systems (emulsions, suspensions, etc.) were presented by N. Fourati et al., V. Muguët et al., D. Lerche et al., A. Desrumaux et al. and D. Quemada. The properties of other complex systems such as foam (N. Antonova et al.) or gels (P. Greismar et al.) were also presented. The role of the rheology in controlled release systems was illustrated by different works (B. Petitalot et al., A. Ponton et al., V. Ratsimbazafy et al., A. Bochet et al.).

In the field of biofluid rheology, the fifth invited conference given by P. Snabre was very exciting from an experimental viewpoint; the emphasis has been put on rheo optical and rheo acoustical techniques. The theoretical expertise of the author in this field has allowed to have a synthetic and well documented overview that put emphasis on the physical processes entering at the microscopical level.

During the three days of this conference, the participants had also the opportunity to get



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information of the latest developments of the instrumentation by the majors rheometer companies who had booths just in front of the conference rooms. Some time was also left for special social events like the visit of the Senat Palace or the CNAM museum which houses very interesting pieces which belong to the history of French sciences and techniques.

After the annual general meeting of the GFR, Patrice Flaud who was coordinating the organization committee has been elected as the new president of the GFR and all participants had a chance to do some practical work on fluid transportation since the traditional Banquet was held on a boat cruising on the river Seine. The next GFR annual conference is already planned. It will be held in Grenoble at 23-15 October 2000.

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GFR - 2000 ACTIVITIES TO COME

In year 2000 our 35th Annual General Meeting will be held in Grenoble from 23 to 25 October in concert with the greek and italian societies of rheology. Nadia El Kissi (Laboratoire de Rhéologie) is coordinating the organization. The topic is "Rhéologie et innovation". The deadline for submitting abstracts is March 31, 2000. More information can be found on the conference website at the following address <http://rheologie.ujf-grenoble.fr> additional inquiries can be obtained through gfr2000@ujf-grenoble.fr

The third edition of the "Meeting of Young Rheologists" will take place in La Colle sur Loup, close to the mediterranean sea, from May 22nd to 24th, 2000. It will be organized by Bruno Vergnes (CEMEF, Ecole des Mines de Paris). All young rheologists familiar with french are welcome to attend this meeting. For more information contact: vergues@cemef.cma.fr. The deadline for inscription is February 15, 2000.

The GFR and the Canadian Rheology Group are organizing Symposia on Rheology within the 50th Canadian Chemical Engineering Conference to be held in Montreal, October 15-18, 2000. Sessions on

Fundamental and Applied Rheology, Polymer Solutions, Polymer Blends and Composites, Emulsions, Suspensions, Instrumentation, Numerical Simulations, etc. will be organised. Abstracts, in English or French, should have a minimum of 200 and a maximum of 500 words and should include the title, the names of the authors and the authors affiliation(s). The abstracts can be submitted by e-mail to bouton@rheo.fr before February 15, 2000. Acceptance of papers will be based on the submitted abstracts. Notifications of acceptance will be mailed to authors by May, 2000. More information on the CSChE-48 meeting can be found on the conference website at the following address <http://csche2000.ca>

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