

Preface

This special issue contains papers presented at the ZiF-Workshop and Poster Sessions on “Dynamics of Polyelectrolytes, Colloids and Interfaces: Electro-optical Methods in (Bio-)Technology and Medicine” (Electro-opto '94), September 4–9, 1994 at the Center of Interdisciplinary Research (ZiF) of the University of Bielefeld, Germany.

The ZiF-Workshop was the 7th Symposium of the “International Molecular Electro-optics Group” and was organized as a satellite symposium of the 8th Gordon Conference on Bioelectrochemistry: Molecular and Cellular Biophysics of Membrane Transport (chairman: E. Neumann, Bielefeld; vice-chairman: J.C. Weaver, Boston), September 18–23, 1994 at Kloster Irsee, Kaufbeuren, Germany. Senior colleagues who had fundamentally laid the path of electro-optical research were selected as Honorary Chairmen of the Scientific Organizing Committee of the ZiF-Workshop: K. Yoshioka (Tokyo), M. Mandel (Leiden) and Th. Dorfmueller (Bielefeld). The Guest of honour was C.T. O’Konski (Berkeley).

The contributions to this special issue of *Biophysical Chemistry* impressively demonstrate the great extent to which progress in polyelectrolyte and colloid science is conditioned and catalyzed by advancements in experimental methodologies. The topics covered by the ZiF-Workshop and in part also by the Gordon Conference were: (1) linear and globular polyelectrolytes, (2) colloids and interfaces, (3) electro-optical techniques and applications, (4) theory of electrical polarizations and (5) membrane electroporation in cell biology and medicine.

Among the various electro-optical methods the electrical birefringence is a particularly sensitive tool based on the so-called “Kerr electro-optical effect”, first documented in John Kerr’s publication in 1875

under the title “A new relation between electricity and light” (see B.R. Jennings’ preface in “Colloid and Molecular Electro-optics 1991”, Institute of Physics Publishing, Bristol, 1992). In 1991 a John Kerr Medal was established and the first medal was awarded to C.T. O’Konski, Berkeley. It is a pleasure to report the award of the John Kerr Medal in 1994 to B.R. Jennings, ECC Intern. Ltd., Reading University, UK (see Fig. 1).

Clearly, the emphasis of the ZiF-Workshop and in part of the Gordon Conference was on the physicochemical basis of electrical and optical phenomena of charged molecular organizations and of electromagnetic field effects in the biosciences. Theory and molecular electromechanistic concepts were included to guide experimental approaches and satisfactory data analysis. In a more general context, however, fruitful research activities in material sciences and biosciences usually give rise to high expectations of technological and medical advances both in politics and among the broader public. In the application of electrical and electro-optical techniques to biopolyelectrolytes and biocolloids, the hope for new benefits extends from the diagnosis and therapy of diseases to the production of medical drugs and nutrients, including aspects of energy conservation and environmental protection.

In view of the continuing high expectation for the usefulness of basic research in human society, the growth of knowledge also increases the responsibility of the scientists to be aware of risks and to consider social and ethical problems resulting from the application of scientific knowledge.

Finally, I am delighted to gratefully acknowledge financial support, enabling the participation of some 90 young scientists and students in both conferences,



Fig. 1. Professor B.R. Jennings, PhD (left), St. Austell, Cornwall, UK after the award of the John Kerr Medal 1994 for his outstanding contributions to the development of molecular electro-optics, at the Electroopto '94, ZiF-Workshop in Bielefeld, organized by Professor E. Neumann (right), vice-chairman of the International Molecular Electro-optics Group and President of the Society of Bioelectrochemistry. Foto: Pierel, Bielefeld.

from the Center of Interdisciplinary Research (ZiF, Bielefeld), Volkswagenstiftung (Hannover), Stifterverband der Deutschen Wissenschaft (Marga und Kurt Möllgaard-Stiftung, Essen), International Society of Bioelectrochemistry (BES), Deutsche Gesellschaft für Biophysik, Westfälisch-Lippische Universitätsgesellschaft (Bielefeld), Biorad Laboratories (München), ASTA-Pharma/Degussa (Bielefeld) and from the USA: Gordon Conference Office (Kingston, RI), Department of Energy (Washington, DC), Office of Naval Research (Arlington, VA), and

Electric Power Research Institute (Palo Alto, CA).

The main editorial burden of this special issue was in the hands of the co-editor, Gerhard Schwarz, Basel. My personal thanks go to him and to the many contributors and referees who made the rapid appearance of the ZiF-Workshop Proceedings possible.

Eberhard Neumann
Guest Editor