Reflections *from the Frontiers*

Explorations for the Future
Gordon Research Conferences, 1931–2006

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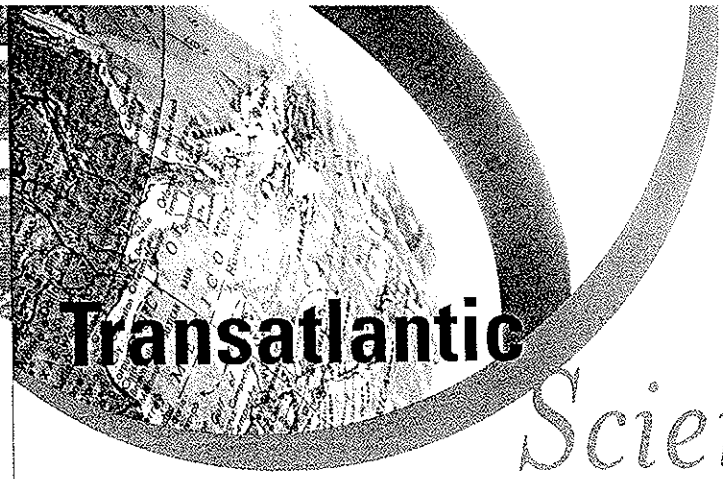
Gordon Research Conferences
Chemical Heritage Foundation



Transatlantic Science

Carl Storm retired, I had many interactions with the firm that facilitated the search. The firm's director repeatedly expressed surprise and delight at the ability of the GRC board to focus on issues and to work together for the benefit of the organization (apparently in contrast to many of the searches the firm carried out for other scientific organizations and academic institutions). While I was associated with the organization, its achievements—an aggressive commitment to internationalize GRC by establishing meeting sites in Europe and Asia, funding and construction of GRC's first independent headquarters, the key recruitment of Nancy Gray, financial strengthening, increase of the chairs' fund, and the managed growth of the conference portfolio—certainly did not occur without spirited discussion. But discussion always showed that everyone's concern was focused on the good of the organization.

As a board member and an attendee of conferences at many sites, I was surprised to observe that the ratings of the venues by attendees did not differ greatly from site to site. Some sites were clearly better than others, and the personal comments from the few individuals who bothered to make them reflected this. The overall scores, however, were surprisingly similar, which is a reminder in dealing with a large number of people that individual expectations and requirements differ greatly. For some the proverbial pea-under-the-mattress is a distressing discomfort, while for others not even a boulder in the same location would cause an impression. For some only caviar would bring praise for the GRC meals, but for others even army rations would be happily accepted. Fortunately, enough information filters through the survey process for GRC to carry out a continual pruning of weak sites and replacement with better ones.

The collegial nature of Gordon Conferences brings out the fact that the attendees are human beings and that most are passionate about their work. I can recall the glow of triumph in a young man who had for the first time wowed the audience and tears in the eyes of someone who had just lost out in a scientific race, and even an occasion when a member of the National Academy of the Sciences heaved a can of beer in disgust at a Nobel laureate. Science and the passion that feeds it are the core of the GRC experience.

W. Gerhard Pohl

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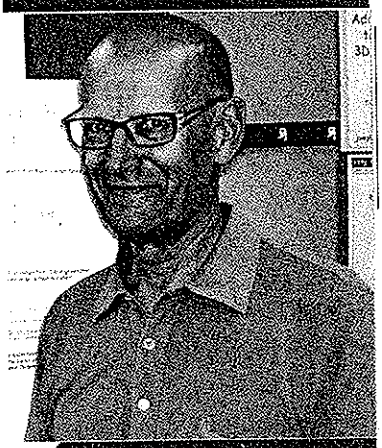
Austrian Chemical Society



In January 1992 I read about the first Science Education Gordon Research Conference, scheduled for 30 March through 3 April 1992 in Ventura, California. The main reason I applied to participate was because Linus Pauling was the first speaker. I quickly received a letter informing me that approximately ninety people were on the waiting list in front of me. There was no chance I would be admitted.

However, I had included in my application a list of all my activities in the field of science education. As a result I was asked to submit a proposal to offer a similar Gordon Conference in Europe. My proposal for a conference titled New Visualization Technologies for Science Education was accepted in March 1993. To get acquainted with the Gordon Conferences I was invited to participate in the Innovations in the Teaching of College Chemistry Gordon Conference held in Oxnard, California, in January 1994. There I learned a lot about the organization.

John Fackler of Texas A&M University acted as my cochair for the Science Education Conference in Irsee, Germany, and I appreciated his help. In a session called "Visualization of Molecules and Atoms" two Nobel laureates gave lectures: Gerd Binning showed us how solid surfaces can be visualized atom by atom using atomic force microscopy, and Robert Huber discussed the indirect visualization of large molecules by X-ray scattering. Other speakers at the conference talked about electron microscopy and computer graphics as methods to reveal molecular structures and establish structure-function relationships. Ways to use interactive media at science museums were presented by speakers from Cité des Sciences et de l'Industrie in the Parc de la Villette (Paris) and the Deutsches Museum (Munich). Wolfgang M. Heckl, now general director of the Deutsches Museum, showed an impressive film taken with a scanning tunneling microscope of the removal of an atom from a surface layer. Peter Atkins, a chemistry book author, and Ernst Peter Fischer, now a well-known German book author, talked about writing in science.

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Karlheinz Schwarz

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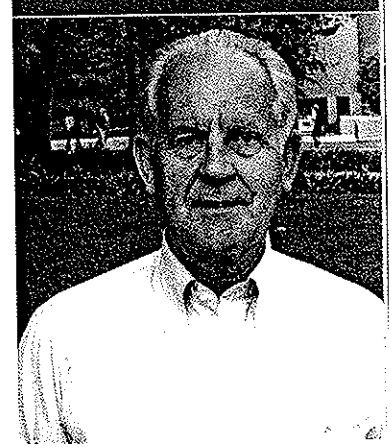
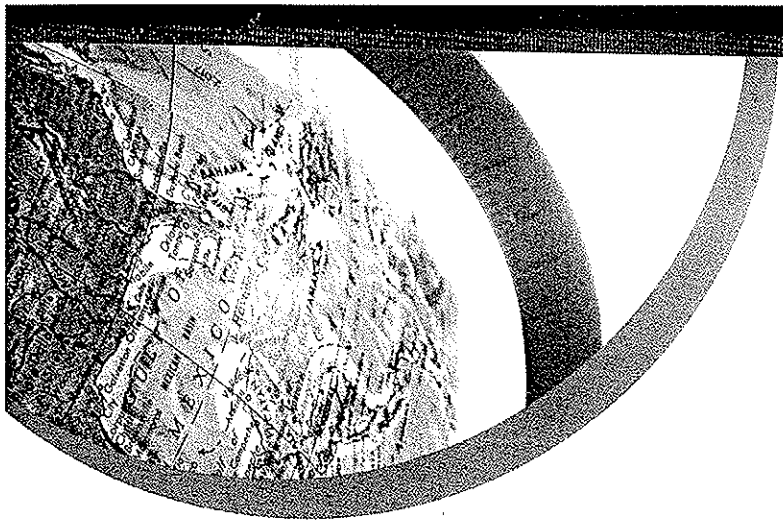
Technical University of Vienna





Transatlantic *Science*

The significance of the visualization of molecules has grown since 1994. Various macromolecules are visualized based on X-ray data using computer graphics; a good example is the visualization of a potassium channel of mammalian cell membranes published in *Science* by Roderick MacKinnon's group. Visualization has become a major theme of science education. The Visualization in Science and Education Gordon Conference held at Queen's College in Oxford, England, in 2005 was well attended. Visualization is not only an enormous help for researchers in establishing structure-function relations, but it also allows science educators to explain complex chemical and biological phenomena at a secondary level. Physical molecular models are useful for teaching introductory chemistry, whereas computational graphics are indispensable when dealing with large assemblies of molecules and macromolecules. Progress in the field of visualization techniques continually shows at the Gordon Conference.

Karlheinz Schwarz

In 1994 I chaired a Gordon Research Conference called Phase Transitions in Non-Metallic Solids, which was held at the medieval village of Volterra in the Tuscany region of Italy. It was begun to bring together experts from physics, chemistry, mineralogy, crystallography, mathematics, and materials sciences. In retrospect, the unusual setting has created a very positive atmosphere for fruitful discussions that started many collaborations in this field. For example, one of the speakers, J. Manu Perez-Mato, from Bilbao, Spain, spent a year on sabbatical with my group in Vienna; we have several joint publications that were the result of his expertise in group theory and our competence in first principles calculations.

The second GRC I organized in Europe was called Electron Distribution and Chemical Bonding, held at Queen's College in Oxford in 1998. This conference has occurred triennially for the past thirty years. I have attended most of the meetings, and I must say that these conferences have had a significant impact in the field; it is the interdisciplinary nature of GRC that makes them so important. We brought together experimentalists and theorists—from researchers who focus on instrumentation like synchrotron radiation or area detectors to computational scientists who simulate the properties the experimentalists measure. The combination of the various approaches has led to new insight and brought progress to science.

Several factors make the Gordon Conferences unique. Limiting the number of participants allows time for intensive discussion on unpublished research. The mix of experts from various disciplines—both senior and young scientists—creates an atmosphere in which problems can be openly discussed and constructive criticism can occur. The conference locations are usually far from large cities but are attractive and allow a focus on research without too much distraction. The mandatory requirement that afternoons be kept free from lectures is conducive to informal and fruitful conversation. Afternoon excursions in the surrounding area have led to long-lasting friendships and collaborations. Both Gerhard Pohl and I have seen many joint publications initiated by friendships created at GRC. Finally, alternating conference sites between the United States and Europe has helped strengthen understanding and transatlantic relations among scientists.