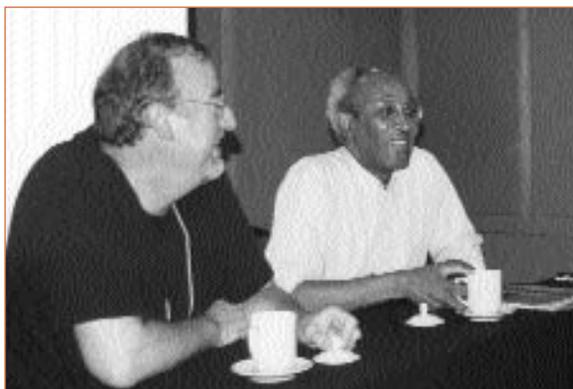


Finally, an international poster contest for 10-16 year old students on the importance of chemistry in daily life is being launched this spring. Selected entries will be displayed at the Congress and published in *Chemistry International*. PUC member Lida Schoen <amschoen@xs4all.nl> is the contest coordinator through the Science Across the World network.

Members of PUC include Dr. Anthony D. Ashmore (UK), Dr. D. Balasubramanian (India), Professor Robert B. Bucat (Australia), Professor Choon H. Do (Korea), Dr. Lida Schoen (Netherlands), Professor Joseph Schwarcz (Canada), and Professor Yoshito Takeuchi (Japan), and myself (Canada) as chairman.

The subcommittee welcomes your suggestions for priorities and would like to be made aware of activities and efforts in your country or region. Please contact me with your comments. 📧

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**Professor Ellis Bell (IUBMB) (left) and Professor Rodolphe Toussaint (IUBS)**

## First Inter-Union Workshop on Science Education

by **Bob Bucat**

The First Inter-Union Workshop on Science Education, entitled "New Directions in the Teaching and Learning of Science," took place during the 17th International Conference on Chemical Education held in Beijing, China, in August 2002. The workshop, which was funded by generous grants from UNESCO and the International Council for Science (ICSU), arose out of an inter-Union collaboration exploration meeting held at the IUPAC Secretariat in February 2002, involving representatives of IUPAC, the International Union of Biochemistry and Molecular Biology (IUBMB), the International Union of Biological Sciences (IUBS), the International Mathematical Union (IMU), and the International Union of Pure and Applied Physics (IUPAP). <[www.iupac.org/projects/2001/2001-054-1-025.html](http://www.iupac.org/projects/2001/2001-054-1-025.html)>

At the workshop, various aspects of science education were discussed. Professor Ellis Bell (University of Richmond, Virginia) represented the IUBMB, and Professor Rodolphe Toussaint (University of Quebec) represented IUBS (co-author with Professor A.

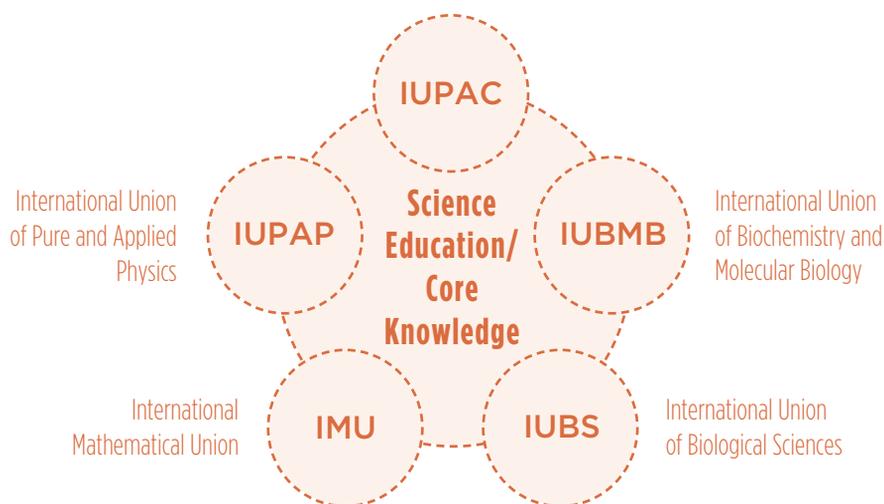
Giordan). Unfortunately, representatives of the other scientific unions were unable to attend.

Professor Peter Atkins (IUPAC) opened the Workshop by describing its motivation: to find a forum at which representatives of different Unions could share their approaches to the problems of science education. According to Atkins, the meeting was intended to allow members of IUPAC to become aware of problems, practices, and solutions in other sciences—perhaps to recognize common ground and perhaps to appreciate new ideas.

Professor Bell addressed the role of education committees in academic societies, pointing out that IUBMB had been increasingly successful at having sessions integrated into its full meetings. As a consequence, the status of the education committee had been raised. In his view, the major problem facing education in biochemistry and molecular biology is how to prepare for a multitude of different interests in the light of the recent explosion of knowledge such as that emanating from the genome project.

According to Bell, the education committee of IUBMB has decided to focus on skills and information. Most of the important skills are not discipline specific. There is of course a core of knowledge, but the focus should be on a toolkit of key principles. As Bell explained, a common problem with too much information has been the tendency to compartmentalize, which is the opposite of multidisciplinary. Examination systems commonly encourage this compartmentalization.

Professor Bell remarked that a "research paradigm of teaching," with programs built around research projects, is IUBMB's current focus. The aim of this mode of education is to encourage thinking like a working scientist.



Concurrent with this focus are a range of emphases:

- use many different styles of teaching
- employ different ways of evaluating student learning
- evaluate a range of outcomes and escape from the crudeness of one-dimensional grades
- use student portfolios
- explore service learning, such as production of outreach information pamphlets
- participate in outreach activities
- research internships
- offer career mentoring

Pedagogical practices being encouraged in the classroom include the following:

- developing Web sites
- providing realistic laboratory experiments
- creating research projects using pre-defined skills
- integrating laboratory components from different courses so that students experience the same concepts in different settings

Professor Toussaint argued that it is possible to develop a scientific culture within the realm of the school curriculum. Courses should inculcate the cultural characteristics of biological sciences and thereby allow the student to interact intelligently with the scientific community. Courses should offer enough data and rationalization for students to become good critics of science and technology and hence to be able to judge the effects of science on society. Moreover, they should be encouraged to become participants rather than spectators in scientific activities and should learn to view the biological sciences as a common human enterprise.

Toussaint went on to argue that the obligations of a biological education included the following:

- Scientific conceptualization should be expressed in and related to particular social contexts.
- The problems studied must integrate ecological, biological, economical, ethical, and legal components. Genetically modified foods are a particular case.
- Problems must be studied in the context of their technological ramifications.
- Material in the public domain of debate should be taught and, conversely, should be part of the public debate.
- History of the technological basis of knowledge and its applications should be included.

Professor Toussaint expressed a belief that courses should build self-confidence in making judgments, a desire to explore and discover, an ability to criticize, an ability to exercise creativity, and an urge to communicate.

The ensuing lively discussion showed that there were numerous common problems and attitudes, and all the participants considered that a similar discussion should be planned in other venues. The point was made that the circumstances seem ripe for the various Unions to cooperate in IUPAC projects that address common challenges. 🏛️

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