

INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY



PRESIDENT'S REPORT
ON
THE STATE OF THE UNION

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IUPAC PRESIDENT'S REPORT

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IUPAC PRESIDENT'S REPORT

Piet Steyn

1. INTRODUCTION

The International Union of Pure and Applied Chemistry (IUPAC) was formed in 1919 by chemists from industry and academia. Over eight decades, the Union has succeeded in fostering worldwide communications in the chemical sciences and in uniting chemistry – academic, industrial, and governmental – in a common language. IUPAC is recognized as the world authority on chemical nomenclature, terminology, standardized measurement methods, atomic weights, and other critically evaluated data. The Union sponsors major international meetings ranging from specialized scientific symposia to meetings with societal impact.

The year 2002 was a period of assessment of the changes initiated and implemented in 2000 and 2001. The changes in the IUPAC system allow the Union to be responsive to the current needs of chemistry. The scientific work of IUPAC is now focused on the ever-changing needs of the global chemical community. The new project approval system continues to be effective, and there is increasing focus on chemistry and its impact on society, as well as on chemistry education. The Divisions now have an active role in project recruitment, assessment, approval, and implementation. The IUPAC website is a source of information for IUPAC activities, and is regularly updated with the most recent news and events.

2. MANAGEMENT ACTIONS TO IMPROVE THE EFFECTIVENESS OF IUPAC

a) Development of a New Vision and Mission Statement, as well as Long-Range Goals for IUPAC

Four years ago, following a series of meetings to obtain input from leaders in chemistry in Europe, Asia, Africa, and the Americas, IUPAC redefined its mission and established goals and strategies to guide its approach to the shaping of the chemical sciences and the service of chemistry in a rapidly changing world. The initial IUPAC Strategic Plan was revised slightly in 2000, and revised more extensively in 2002 by a task group chaired by Dr Ed Przybylowicz. A **Vision Statement** has been added, which is useful in communicating the essence of the Union's "raison d'être". The **Mission Statement** has been expanded to answer the Who, Why, What and How questions surrounding IUPAC and its functions. The **Long-Range Goals** have been streamlined and consolidated to six statements.

Vision Statement

IUPAC advances the worldwide role of chemistry for the benefit of mankind.

Mission Statement

IUPAC is a non-governmental organization of member countries that encompass more than 85% of the world's chemical sciences and industries. IUPAC addresses international issues in the chemical sciences utilizing expert volunteers from its member countries. IUPAC provides leadership, facilitation, and encouragement of chemistry and promotes the norms, values, standards, and ethics of science and the free exchange of scientific information. Scientists have unimpeded access to IUPAC activities and reports. In fulfilling this mission, IUPAC effectively contributes to the worldwide understanding and application of the chemical sciences, to the betterment of the human condition.

Long-Range Goals

To fulfill its mission, IUPAC has established a set of Long-Range Goals. In the pursuit of these goals, IUPAC will assure sound management of its resources to provide maximum value for the funds invested in the Union.

- i) IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.**
- ii) IUPAC will facilitate the advancement of research in the chemical sciences through the tools that it provides for international standardization and scientific discussion.**
- iii) IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.**
- iv) IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.**
- v) IUPAC will utilize its global perspective and network to contribute to the enhancement of chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.**
- vi) IUPAC will broaden its national membership base and will seek the maximum feasible diversity in membership of IUPAC bodies in terms of geography, gender, and age.**

b) Improvement of the Governance Structure of IUPAC

The members of IUPAC are the National Adhering Organizations (NAOs), which may be National Academies of Science, National Chemical Societies, or associations of Chemical Societies. The 44 NAOs pay national subscriptions and may name delegates to the IUPAC Council, the Union's highest governing body. To encourage broad input and involvement, IUPAC incorporates Associate National Adhering Organizations (21), Associated Organizations (32), Company Associates (94), and Affiliate Members (5 100). Former members of IUPAC bodies become IUPAC Fellows, and remain informed of IUPAC activities *via* a free subscription to the *Chemistry International* news magazine. At present, IUPAC has more than 1 000 fellows.

The current governance structure of the Union includes:

- *The Council*: The Council is clearly the ultimate authority and generally meets its responsibilities very well. It elects the Union's Officers, approves the biennial budget, including the national subscriptions and receives reports from the IUPAC Officers, Division Presidents and Standing Committee Chairmen.
- *The Bureau*: The Bureau has long been viewed as somewhat unwieldy. It has the responsibility, according to the Statutes, "to act for the Union during intervals between meetings of the Council ...". The Bureau has had approximately the same structure and size for 40 years. Inclusion of Division Presidents and Chairmen of Operational Committees ensures direct contact with the leaders of most of the Union's programs.
- *The Executive Committee*: The Executive Committee [EC] has, in practice, been given the responsibility, according to the Statutes, "to act for it [the Bureau] in ensuring an orderly discharge of the functions of the Union".

The latest proposal for reorganization of the Bureau and Executive Committee was put forth in September 2001 on behalf of the Nordic NAOs. It proposed the dissolution of the Bureau and an expansion of the Executive Committee (from three to six Elected Members), which would assume all duties now assigned to the Bureau. The proposal was critiqued by the EC and the Division Presidents and discussed at the Bureau meeting in Paris in September 2002. There was a consensus by the Bureau that organizational changes should indeed be explored seriously and quickly.

i) *The appointment of the Governance Structure Committee*

With the concurrence of the Executive Committee, the IUPAC President appointed the Governance Structure Committee [GSC] with the following membership:

Prof Leiv K Sydnes, Vice President (Chairman) Norway
 Prof Chunli Bai, Elected Member of the Bureau China
 Dr Edwin D Becker, Secretary General USA
 Prof John Ralston, President, Division I Australia
 Prof Gus Somsen, Elected Member of the Bureau Netherlands
 Prof Thomas T Tidwell, President, Division III Canada

The charge to the committee:

- Analyze the strengths and weaknesses of the current structure and operation of the Bureau, including its Executive Committee.
- Develop proposals for alternative structures [including the Nordic proposal] and analyze their potential strengths and weaknesses. Consider any impact on the functioning of other IUPAC bodies, including the Council, and any financial impact. Consult widely within IUPAC to obtain additional suggestions, also on improving communication between the Bureau and the Divisions and Committees of IUPAC.
- Provide a preliminary report to the Executive Committee and to all National Adhering Organizations by April 2003. Request comments and additional suggestions for structural changes that can be considered for inclusion in the final report. Provide options and recommendations to the Bureau and Council in August 2003.

After meeting and communicating extensively by e-mail in April 2003, the GSC made the following proposals to the Executive Committee:

- A new body, the Executive Board, would replace the Bureau and Executive Committee. The members of the Executive Board would be the five officers plus four members elected by the Council. The Executive Board would meet twice a year, one meeting coinciding with the meeting of the Division Presidents. The GSC suggests that the meeting of the Division Presidents be expanded to include the Chairmen of the Operational Standing Committees, allowing the Executive Board to meet jointly with the Division Presidents and Chairmen. The Division Presidents on the GSC felt that a joint meeting was more important than the possession of a voting right on the Executive Board.
- A new body with one representative from each NAO would be formed, tentatively named the Union Policy Committee. This body would meet only at the General Assembly and would be consulted between meetings by the Executive Board on policy matters.

A key feature of this proposal is a direct role in the governance of the Union given to each NAO by the new Union Policy Committee. NAOs were subsequently consulted; their input was requested for consideration and incorporation into a document to serve at the Council Meeting to be held in Ottawa.

I warmly thank the members of the GSC for the proposals they made to improve the governance of IUPAC. Care should be taken that the engine rooms of IUPAC, viz the Divisions and Standing Committees, continue to have close interactions with the Executive Board, as recommended in the GSC report. The proposed Union Policy Committee would provide an opportunity for *all* NAOs to be directly involved on a continuing basis in important decisions on the future of our Union.

c) **Development of Policies by the Finance Committee**

i) ***Investments of IUPAC***

During 2002, IUPAC's operating expenses were approximately USD 1.1 million. The primary sources of income were the national subscriptions paid by the NAOs and IUPAC publications. The work of various IUPAC bodies and operation of the Secretariat comprise the bulk of IUPAC's expenses.

- In reviewing the long-term investments, the performance of the IUPAC portfolio was considered to be excellent in light of the poor market conditions. This is mainly due to the decision taken three years ago to increase IUPAC's fixed income holdings and decrease equity positions. The FC concluded that we should move somewhat further in this direction, with equity holdings being decreased to between 20 and 30% with the rest in fixed income instruments that can yield in excess of 5%.
- The FC noted the continued under spending on the part of the Divisions on projects. This continues to result in our budget being under spent and contributes to our rather good financial position in each of the past couple of years. It is, of course, the purpose of IUPAC to spend these annual allocations on projects of value and the concern is that the organization has not yet gotten the project system working effectively.
- In light of this underspending and the general economic condition throughout the world, the FC concluded that the 2004-2005 budget should be increased by approximately 1% with the following elements: National Subscriptions (NS) will be held to a 1% increase; the Division Committees' budgets will remain the same as in 2002-2003, the Project Reserve will be allocated USD 110 000 and the residual of the project money will end up in the Division Reserve (approximately USD 116 000).

ii) ***Guidelines for Special Funds***

IUPAC encourages individuals and organizations to participate in its mission purposes, such as the munificent contribution of Samsung (USD 125 000) to the Macromolecular Division as an endowment fund. While, in most cases, this takes the form of collaboration and participation in IUPAC projects, it can also be financial aid to various IUPAC activities. Such financial aid can directly support specific IUPAC projects, or it can be set up as a special fund that is used to accomplish certain goals over a period of time or in perpetuity.

For such special funds, the IUPAC FC has the following guidelines:

- The goals for which such a special fund is established must be consistent with and support the IUPAC mission and goals.
- The purposes of the fund should be defined and the body or group within IUPAC that is responsible for administering the funds should be specifically identified (i.e. is it a Division Committee, the President of IUPAC, etc.).
- The fund should be categorized as either an endowment (i.e. only the interest on the money will be used to fund projects) or a consumable fund (i.e. a fund in which both the interest and some principal will be used until the fund is exhausted).
- The money in the fund shall be invested in the long-term IUPAC investment portfolio and shall earn the prevailing interest based on the portfolio of fixed income instruments in the IUPAC portfolio such as bonds and fixed income funds.
- The disbursement from these special funds will be under the control of the responsible group

subject to all the guidelines contained in this policy and the accepted IUPAC practices for reimbursed expenditures such as travel and subsistence.

iii) Development of an Investment Policy

The Investment Policy was redrafted taking cognizance of market volatility and the previous guidelines on the ratio of equity to bond investments. The document identified a set of investment objectives and constraints, asset allocation parameters, performance measurement benchmarks, and guidelines for IUPAC long-term investments. The investment policy statement is intended to assure the Officers, Executive Committee and Bureau of IUPAC that reserve assets are being invested in accordance with the best long-term interests of IUPAC, given the following considerations:

- IUPAC's risk tolerance, or its willingness to withstand substantial losses due to adverse market conditions.
- IUPAC's need to obtain real, or inflation-adjusted, growth in its asset base.
- IUPAC's requirement for current income to support IUPAC programs and activities.
- IUPAC's liquidity requirements, or its need to maintain adequate cash balances to accommodate share withdrawals from the long-term portfolio when needed.

d) Billing of National Subscriptions in National Currencies

The national subscriptions of member countries are based on a formula, which takes the chemical outputs of the countries (usually UNIDO and CEFIC figures) into consideration. This practice has caused much concern to member countries of IUPAC, as well as to countries wishing to join IUPAC, especially in cases where the national governments are not directly involved in the sponsorship of the national subscriptions. A working party led by Dr Chris Buxtorf was appointed to analyze this matter and to make proposals to the Bureau and Council.

The working party on national subscriptions has proposed that national subscriptions be billed in national currencies. The proposal would be implemented by first calculating the national subscriptions in the usual fashion, in USD. The calculated national subscriptions would then be converted to national currencies using the average exchange rates for the first quarter of the year in which they are calculated. Invoices would be generated for these amounts. Payment would be made in USD at the then applicable exchange rate when payment is made.

In addition the working party on national subscriptions proposed to the Bureau (meeting in Paris, September 2002) that IUPAC should sponsor the participation of one delegate per member country to the IUPAC Council Meetings. The sponsorship for travel and per diem expenditure was limited to USD 2 000 per member country. The Bureau concurred with the additional limitation that the sponsorship should not amount to more than 70% of the National Subscription of the country for the biennium.

3. LONG-RANGE GOALS

The State of the Union will be assessed according to the progress made in each of the agreed upon long-range goals. Although this selection of the activities to be linked to specific goals is necessarily subjective and arbitrary, it remains valuable to assess our activities in the light of IUPAC's long-term strategic goals. The report provides only a limited selection of the many and varied activities of IUPAC.

- i) IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.**

Though several of IUPAC's activities relate to this long-range goal, two projects are highlighted.

a) Advice to the OPCW on the impact of scientific advances on the CWC

Two years ago, President Hayes reported in his State of the Union address that IUPAC had been asked to provide advice to the Organization for Prohibition of Chemical Weapons (OPCW) on the impact of scientific advances on the Chemical Weapons Convention (CWC) – a treaty designed to “Determine for the sake of all mankind to exclude completely the possibility of the use of chemical weapons”. This request to IUPAC resulted in a major project – a planning meeting in July 2001 in The Hague; a workshop in Bergen, Norway in July 2002, with 79 participants from 34 countries; a report to the Director-General of OPCW in November 2002 on findings from the workshop; publication of the workshop proceedings in *PAC* in December 2002; and a briefing to delegates at the First Review Conference on the CWC in May 2003.

Our report and briefing highlighted developments in organic synthesis and changes in chemical plant design that will pose new challenges to the CWC, but they also described recent and probable future developments in analytical chemistry that may assist in implementation of the Convention. We pointed out the need for increased awareness on the part of OPCW inspectors of these advances and the necessity of continuing upgrades of equipment and training for the Technical Secretariat.

IUPAC's efforts were recognized and appreciated by Director-General Rogelio Pfirter and the OPCW Scientific Advisory Board. The IUPAC report was specifically referred to in a plenary session at the Review Conference, and the final report from the conference included a number of references to the points made by IUPAC, for example: “The First Review Conference considered scientific and technological developments in regard to activities not prohibited under the Convention, and recognized that the chemical industry is subject to change over time. The OPCW should, therefore, adapt its verification regime for the chemical industry so as to maintain its effectiveness and relevance, and consistency with the inspection procedures established by the Convention”. “The First Review Conference stressed that the Secretariat staff, in particular the inspectors, need to keep abreast with the developments in science and technology in order to maintain professional excellence and to efficiently discharge their responsibilities. The First Review Conference requested to Director-General to bear these requirements in mind when identifying the future training needs of the Secretariat”.

There are several important outcomes of this project. First, IUPAC is living up to its goal of addressing global issues involving the chemical sciences. Our report has had an impact. Second, it is feasible to obtain outside funding for such major efforts. Over USD 100 000 was raised for this project from foundations, governments and industry. We should be alert to other such funding opportunities. Third, this effort demonstrates the value of our partnerships with other organizations. The project could not have been carried out without the active support of the US National Academies, the National Adhering Organization in the United States, which provided major staff support, paid for the planning meeting and initiated applications for much of the financial support from foundations devoted to disarmament. It is important that we leverage our limited resources through such partnerships. Fourth, by successfully carrying out such high visibility projects, the Union enhances its international profile and obtains valuable publicity that attracts the attention and respect of individual chemists, industry and governments and encourages their participation in future projects.

b) Environmental Activities in conjunction with ICSU

The International SCOPE/IUPAC Symposium on Endocrine Active Substances (EASs), held 17-21 November 2002 in Yokohama, Japan examined “Environmental implications of endocrine active substances: Present state-of-the-art and future research needs (see for further details: <http://www.iupac.org/projects/2000/2000-016-1-600.html>.” (SCOPE is the Scientific Committee on Problems of the Environment of the International Council for Science, ICSU.) More than 70 world-leading scientists presented lectures in four plenary sessions and also participated in six workshops. The areas covered include mode of action, fate and metabolism; effects on rodents, humans and wildlife; use of QSAR for predictions, integrated monitoring, rapid testing, and use of toxicogenomics; and approaches to risk assessment as well as options for risk management. About half of the more than

300 participants were Japanese. The conference was coordinated by the Chemistry and the Environment Division and led by the late Dr Junshi Miyamoto. The proceedings of the SCOPE/IUPAC symposium will soon appear as a massive contribution (ca 800 pages) in *PAC*.

ii) IUPAC will facilitate the advancement of research in the chemical sciences through the tools it provides for international standardization and scientific discussion.

The majority of IUPAC projects fall into this long-range goal. In the report, special attention is directed to the progress made with the project-driven system, since it was formally introduced only at the start of the current biennium.

a) The naming of elements: name and symbol of element 110

One of IUPAC's best-known contributions to science is the naming of the elements. At the Guildford Council Meeting the names of elements 104-109 were announced.

We are delighted that a joint IUPAC-IUPAP Working Party has confirmed the discovery of element number 110 [*Pure Appl. Chem.* Vol. 73, No. 6, pp. 959-967 (2001)]. In accord with IUPAC procedures, the discoverers at the Gesellschaft für Schwerionenforschung mbH (GSI) in Darmstadt, Germany have proposed a name and symbol for the element. The name darmstadtium and the symbol Ds found general acceptance. The announcement of the naming of darmstadtium will be made during the forthcoming Council meeting in Ottawa, following the expected approval by the Council.

b) The Management of IUPAC Projects

Until the end of 2001, volunteers serving in its seven Divisions and the associated 37 commissions did the bulk of IUPAC's scientific work. The transition to a project driven-system was based on the proposals of the Strategy Development and Implementation Committee of IUPAC, headed by Prof Joshua Jortner, and on in-depth organizational planning. Since the beginning of 2002 IUPAC has operated entirely under a project system, through which proposals are actively solicited from within IUPAC as well as from chemists not directly involved with IUPAC. The creation of a Division VIII, entitled "Chemical Nomenclature and Structure Representation Division" and approved at the Council Meeting in Brisbane (2001), established the leadership role of IUPAC in this important area of the chemical sciences.

The number of reports emanating from our scientific undertakings is one measure of the effectiveness of IUPAC. See Table 1.

Table 1

MOST RECENT REPORTS FROM IUPAC DIVISIONS		
Division	1/1/2000 – 5/1/2003	1997 – 1999
Physical and Biophysical Chemistry Division (I)	11	14
Inorganic Chemistry Division (II)	11	12
Organic and Bio molecular Chemistry Division (III)	7	15
Macromolecular Division (IV)	10	15
Analytical Chemistry Division (V)	19	32
Chemistry and the Environment Division (VI)	8	13
Chemistry and Human Health Division (VII)	15	13

All the reports contribute substantially to the contents of *Pure and Applied Chemistry*.

75 projects were approved in 2002, an indication of the awareness and effectiveness of the project system. The projects cover a wide range, including chemical education, nomenclature and terminology, human health, and environmental chemistry, including two CHEMRAWN projects. IUPAC also participated in inter-union activities and projects, including the First Inter-Union Workshop on Science Education, "New Directions in the Teaching and Learning of Science" in Beijing, the IUPAC/IUPAP Joint Recommendation and Report on the Recognition of the Discovery of Element 110, and the IUPAC-IUBMB Joint Commission on Biochemical Nomenclature.

The effective approval and management of projects is at the core of the new IUPAC. Two standing committees, the Evaluation Committee, chaired by Professor Gerhard Schneider, and the Project Committee, chaired by Professor Jack Lorimer, rendered invaluable service in this regard.

iii) IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.

I am very grateful to Dr Alan Hayes for his dedication to the enhancement of relations between the chemical companies and IUPAC. These efforts involved a number of meetings with senior management of major international chemical corporations, and were aimed at determining their expectations of IUPAC.

Most of IUPAC's activities have a bearing on chemistry-related industries, whether direct or indirect. IUPAC's Committee on Chemistry and Industry (COCI), chaired by Dr Nelson Wright, is specifically tasked with serving the chemical industries. Among COCI projects and activities have been:

- A Training Program for Safety and Environmental Protection, involving a number of participants from developing countries.
- Workshops on Safety in Chemical Production followed on their successes with a meeting held in Beijing in November 2002 and co-sponsored by COCI, UNESCO, and SINOPEC. It attracted more than 150 participants from SINOPEC plants throughout China.
- The DIDAC Project, jointly sponsored by COCI, CCE and UNESCO, for the teaching of chemistry in developing countries, has been particularly successful. This Belgian-developed teaching tool has now been translated into a considerable number of languages, including Arabic, Japanese, Korean, and Russian. It is currently distributed to over 47 countries, with an UNESCO goal of more than 100 by the end of 2003. Color posters have been developed from transparencies for use in countries with minimal electricity, and the system will soon be available in free CD-ROMs and "books".

COCI obviously remains crucial to IUPAC's interaction with industry, and its future includes a key role in improving the public perception and understanding of chemistry. Dr David Evans, until recently an executive in a leading international chemical company, will chair COCI from 2004.

Prof Piet Steyn, IUPAC President, presented a key lecture at the World Summit on Sustainable Development, held in South Africa in August 2002. This lecture, The Role of Chemistry in Sustainable Development, was complemented by a contribution on Green Chemistry by Prof Pietro Tundo, Chairman of the Subcommittee on Green Chemistry.

iv) IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.

Effective communication is vital to an international scientific organization. At IUPAC, we take this task very seriously in our efforts to contribute to the worldwide promotion of the chemical sciences, and to the role of chemistry in the technological development of mankind. Chemists often get acquainted with IUPAC by participating in IUPAC-sponsored conferences, congresses or symposia, or more recently by access to the IUPAC web pages or the IUPAC e-newsletter. As electronic communication

has become predominant, IUPAC has made its two main publications, *PAC* and *CI*, available online, and e-mail has become the preferred vehicle for communication.

IUPAC is reaching out to individual chemists by offering scientists, who served on IUPAC bodies, membership in our Fellows Program. Chemists are also invited to join the long-standing Affiliate Program. The termination of IUPAC Commissions at the end of 2001 caused a dramatic increase in the number of Fellows, from 468 to more than 1 000. The number of Affiliates has increased from 2001 to 2002, but this was mainly due to an increase in the number of ACS Affiliates. The enrollment of a number of young chemists in the AMP is very heartening. The overall cost of the Affiliate Membership Program plus *Chemistry International* still showed a net income to the Union, when the cost of providing free issues of *CI* to various groups was considered.

a) IUPAC Conferences

IUPAC sponsorship of scientific meetings continues to be regarded as a guarantee of quality – of organization, of the scientific programs, of access to bona fide scientists. The plenary lectures presented at IUPAC-sponsored symposia are frequently published in *PAC*, IUPAC's premier publication.

The Biennial IUPAC Congress is a major scientific event and the main attraction on the calendar of IUPAC-sponsored chemistry meetings.

i) *The Brisbane IUPAC Congress (2001)*

The Brisbane IUPAC Congress, held concurrently with the General Assembly in July 2001 was a great success. Several Nobel Laureates in Chemistry participated in the Congress, with the theme of *Frontiers in Chemistry*. Excellent lectures were also presented on:

- Materials Chemistry for the Future
- Chemistry by Computer
- Challenges for Drug Discovery and Development in the 21st Century
- Environmental Chemistry and the Greening of Industry
- Modern Synthetic Chemistry

ii) *The Ottawa IUPAC Congress (2003)*

The current 39th IUPAC Congress and 86th Conference of the Canadian Society for Chemistry is organized under the stewardship of Prof Alex McAuley as chairman. Its theme is *Chemistry at the Interfaces*, congruent with the new role of chemistry as the enabling science. The Congress has attracted about 2 500 participants; the following symposia are offered:

- Analytical/Environment
- Chemical Education
- Macromolecular Science and Engineering
- Inorganic Chemistry
- Macromolecular Science and Engineering
- Organic Chemistry

- Physical and Theoretical Chemistry
- Special Symposium on Synchrotron Radiation

Nobel Laureates, Profs Polanyi, Fréchet, and Smalley, will give plenary lectures, as will the winners of the Canadian Institute of Chemistry and Montreal Medals, Profs Kapral and Alper.

The highlight of the Opening Ceremony will be the awarding of the IUPAC Prizes to nine outstanding young chemists. Welcoming speeches will be given by the Governor-General, President of IUPAC, the Head of the NRC (the Canadian NAO), and President of the Canadian Society for Chemistry.

iii) The Beijing Congress (2005)

The IUPAC General Assembly and 40th Congress is scheduled for August 2005 at the Beijing International Convention Centre, and *Innovation in Chemistry* is to be its theme. The Chairman of the Congress and its Organizing Committee is Prof Chunli Bai, member of the IUPAC Bureau.

iv) Concluding Remarks on IUPAC Congresses

IUPAC is the international nongovernmental body representing the interests of chemistry and chemists worldwide. It is, therefore, vitally important that the membership of the International Advisory Committee and the invited plenary lecturers of IUPAC Congresses reflect the global diversity of the chemical sciences. It is heartening that the chemical fraternities of IUPAC member countries remain dedicated to the organization of these important high profile congresses.

The IUPAC Congress held in Brisbane as well as planning for this year's Congress to be held in Ottawa benefited greatly from the guidelines for the holding of IUPAC Congresses developed by Prof Jortner and Prof Modena. Since 2001 the Congresses have been held concurrently with the General Assemblies as an experiment. It is proposed that IUPAC evaluate the effectiveness of this practice and provide guidelines, preferably before the organizers of the 2007 GA and Congress begin their work.

b) The IUPAC Sponsorship of Conferences and Symposia

During 2002, 32 IUPAC-sponsored meetings were held in 25 countries throughout the world. A sampling of themes from these meetings illustrates the current excitement in chemistry: Bio-informatics, Advanced Materials, π -Electron Systems, Solid State Chemistry, Electronically Active Polymers, Chemical Thermodynamics, Structure and Mechanism in Organic Chemistry, High Temperature Materials, Bio-Organic Chemistry, Bio-inorganic Chemistry, Biophysical Complexity, Biopolymers, Bio-molecular Chemistry, Plasma Chemistry, Spectroscopy and Macromolecular Systems.

IUPAC's commitment to promoting chemistry in the developing world continues with the support of Chemistry Conferences in developing countries; the Committee tasked with this matter reviewed five applications for support of conferences to be held in 2004. IUPAC will support three of these meetings: the *International Conference on Biodiversity and Natural Products: Chemistry and Medical Applications* (Combining ICOB-4 and ISCNP-24), Delhi, India, the *4th International Conference of the Chemical Societies of the South-Eastern European Countries*, Belgrade, Serbia and Montenegro, and the *4th International Symposium on Chemistry and Biological Chemistry of Vanadium*, Szeged, Hungary.

IUPAC is dedicated to promoting new directions in chemistry, and the IUPAC Bureau approved a program to support conferences in these novel and fascinating areas. Only Divisions and Standing Committees are permitted to request such funds from the Project Committee. The Project Committee in the New Directions Program approved two requests:

- Conference on "Biophysical complexity", 23-25 April 2003, Southampton, UK. Proposed by Division I.
- "CHEMRAWN Consultation Forum – Innovation in the Chemical Industry: the way from Pure to Applied Chemistry", 9 August 2003, Ottawa, Canada.

c) Publications of IUPAC

i) *Pure and Applied Chemistry*

Since 1960, IUPAC has made available to chemists a large amount of important chemical information published monthly in *Pure and Applied Chemistry (PAC)*. *PAC* contains IUPAC recommendations and technical reports, and lectures from IUPAC-sponsored symposia.

Papers from 14 Conferences were published in 2001, and papers from 8 Conferences were published in 2002. There were 26 Recommendations and Technical Reports published in 2001 and 23 Recommendations and Technical Reports published in 2002. In addition, there were 5 Special Topic articles, including four by the winners of the 2002 IUPAC Prize, and two Special Topic Issues published in 2002. Included in the 23 Recommendations and Reports published in 2002 were the "*Critical Evaluation of Proven Chemical Weapon Destruction Technologies*", and "*Lectures Presented at the IUPAC Workshop: Impact of Scientific Developments on the Chemical Weapons Convention*." In both cases a significant number of extra copies of the journal were printed and distributed to interested parties at no charge.

PAC continues to hold its own in the Impact Factor rating of journals. In a field of 118 similar publications, *PAC* had an impact factor of 1.257 in 2000 and 1.535 in 2001 and was ranked number 31 in both years. These results are a distinct improvement from the rank of 35 and Impact Factor of 1.144 for 1999. And an article published in *PAC* (Seddon et al *PAC* **72**(12) pp. 2275-2287, 2000) was ranked number 8 in the CAS Science Spotlight Most Requested article during the second quarter of 2001. According to CAS, "the Most Requested Documents in Chemistry and Related Science" category reports the most frequently requested journal articles and patents based on full text document requests of scientists via the ChemPort Connection feature. Requests are based on aggregated statistics from the ChemPort service.

Prof James Bull has accepted the position of Scientific Editor of *PAC*. In this capacity, he will be working to improve the quality of *PAC* by collaborating with the Conference Editors to increase the rigor of the current refereeing process. He will also work with the Divisions and Standing Committees to increase the number of major conferences sponsored by IUPAC and published in *PAC*. Four Special Topic issues were published in 2002 and through June of 2003, Natural Products, Nanostructured Advanced Materials, The Science of Sweeteners, and Medicinal Chemistry in the New Millennium. In addition, Special Topic articles from the winners of the 2002 IUPAC prize were published in the November 2002 issue of *PAC*.

The number of institutional subscribers to *PAC* has declined from a high of 883 in 1990 to below six hundred in 2003. This trend is common to all scientific journals and is expected to continue as libraries remain under pressure to keep journal acquisitions down in the face of higher subscription costs. This leads to regular elimination of journals that are not central to the research interests of the faculty. This trend is particular hard on general chemistry journals such as *PAC* that are often not viewed as central to current research.

An online version of *PAC* is available at < www.iupac.org/publications/pac > . Tables of contents for all volumes from 1997 are available. These give free access to every abstract and full text Adobe Acrobat pdf's of all IUPAC Reports and Recommendations. In addition, IUPAC has arranged with a number of portals and distributors to provide pay per view and/or subscription access to the entire contents of the journal.

ii) Chemistry International (CI)

The news magazine of IUPAC, *CI*, is published bimonthly and is sent to approximately 9 000 subscribers, including several hundred copies sent at no cost to chemists in developing and economically disadvantaged countries. In addition, *CI* is distributed to IUPAC-sponsored conferences and various events.

As stated by the *CI* Strategy Development Committee, the mission of the newsmagazine is to provide IUPAC and chemists worldwide with a readable and attractive printed medium for the discussion of issues of concern to the international chemistry community and for the dissemination of information about the programs and activities of the Union.

In January 2002, Dr Meyers took over the responsibility as managing editor. A new copy editor, Chris Browner, and a designer were hired as consultant. Improvement in content and style is readily apparent. The content complements the IUPAC website, the journal *Pure and Applied Chemistry*, and the regular e-news (see below). The new design introduced with the January-February 2003 issue includes one additional color throughout the text, and that color will vary with each issue. The design is coordinated with the IUPAC website and allows for an easier integration and reference to the web content. When available in good quality, color illustrations can be accommodated in the template. The web edition was also simultaneously redesigned; it now includes additional indexes and alternative navigation options from page to page. It is freely accessible.

Because of its size and timeliness, the news magazine is an important component of the Union's public face. *CI* shall continue to ascertain an important role, and as my successor will focus his Presidency on how to improve IUPAC's communications, it is likely that *CI* will continue to receive the attention that it deserves.

iii) Books published by IUPAC and book sales

Two books were published in 2002:

- *Pharmaceutical Salts: Properties, Selection, and Use – A Handbook*, Wermuth, CG and Stahl, PH, Verlag Helvetica Chimica Acta, 2002 [ISBN: 3-906390-26-8].
- *Interactions between Soil Particles and Microorganisms*, Series on Analytical and Physical Chemistry of Environmental Systems Vol. 8, Huang, PM, Bollag, J-M, Senesi, N, John Wiley & Sons, 2002 [ISBN: 0-471-60790-8].

Two books have been published through June 2003.

- *Chemicals in the Atmosphere: Solubility, Sources and Reactivity*, Fogg, P and Sangster, J (Eds.), John Wiley & Sons, 2003 [ISBN: 0-471-98651-8].
- *The Experimental Determination of Solubilities*, Hefter, G and Tomkins, RPT (Eds.), John Wiley & Sons [ISBN: 0-471-49708-8].

The series, *Macromolecular Symposia*, continue to present contributions in the field of macromolecular chemistry and physics from selected international meetings, including those sponsored by IUPAC.

IUPAC purchased a stock of books from Blackwell Scientific, IUPAC's former official publisher, and the Solubility Data Series from Oxford University Press and Elsevier. At present more than 90% of the initial costs of these acquisitions have been recovered by the sale of books from this stock. However, IUPAC did not purchase the stock with the intent of making a profit, the intent was to ensure that IUPAC books remained readily available. A number of IUPAC books are now

available through Amazon.com and this is currently the largest single outlet for our stock, other than sales directly from the Secretariat.

e) **IUPAC's Electronic Communication**

i) IUPAC Website

Websites have come to be regarded as vitally important to communication, the transfer of knowledge and the promotion of institutions. IUPAC is very fortunate in having an outstanding website.

The IUPAC website continues to attract more than 300 000 hits per month. Anecdotal evidence indicates that many of these visitors are not connected in any way with IUPAC. A redesign of the website has improved navigation for the public, but with the increased visibility of the site it may be beneficial to undertake a further design effort. Together the IUPAC website and IUPAC e-news make a significant contribution to the public understanding of chemistry.

An **activity index** has been defined that represents the monthly activity relative to the average activity encountered on the site during the first three months of 1998. The corresponding absolute hits are: 3 616 for the first three months of 1998, and max 340 209 in July 2001, corresponding to an activity index of 94. The index nearly reached its highest value again in January and July 2002, with an index of 93.

ii) IUPAC E-News

The e-mail news alert, first started in June 2000, has developed into a regular service that supplements the website, directing subscribers to recent news and updates. IUPAC e-news is open to anyone who wishes to join. As of June 2003, there are 5 572 subscribers to the list, which includes IUPAC members, Fellows, and some affiliates. Since the initial list was compiled, individuals have been simply invited to subscribe, and not automatically added; in other words, the list became self-managed by its subscribers.

A typical e-mail includes Shortcut to News & Notices from IUPAC, references to recent publications, provisional recommendations, a list of new pages on iupac.org, new projects, IUPAC-sponsored events, and miscellaneous news from other organizations.

iii) E-Newsletter of the Committee on Chemistry Education

The online newsletter of the Committee on Chemistry Education presents reports, facts and figures, as well as opinions and essays, compiled through the voluntary efforts of the creative and committed members of CCE.

v) IUPAC will utilize its global perspective and network to contribute to the enhancement of chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.

a) **Committee on Chemistry Education**

The deliberations of the Education Strategy Development Committee culminated in the establishment of the Committee on Chemistry Education with Prof. Peter Atkins as its founding chairman. Members of the CCE were prominent participants in the 17th International Conference on Chemical Education, *New Strategies for Chemical Education in the New Century*, held in Beijing, 6-10 August 2002. In the CCE two issues are given high priority: Chemistry Education for Development and Public Understanding of Chemistry. These areas are led by Profs John Bradley and Peter Mahaffy, respectively. The awarding of the Pierre Crabbé Award of the IOCD for chemistry education to John Bradley recognized his sterling contributions to Chemistry Education, also within the context of

IUPAC. The co-operation of UNESCO in promoting chemistry education in developing countries is warmly appreciated.

IUPAC undertakes several activities to promote chemistry, three programs specifically directed at young chemists – the Young Scientists Program, The IUPAC Observers Program and the IUPAC Prize.

b) Young Scientists Program

This program was established to enable young chemists to participate in the biennial IUPAC Congress, and has been functional for a number of years. The program for 2003 is funded by grants from IUPAC (USD 25 000), the US Army Research Office (USD 32 000), and additional grants (USD 27 000). Over 300 applications were received, and 64 awards were made to recipients from 44 countries. In addition, there were 21 Canadian awards given, using the funds from the CNC/IUPAC and NSERC.

c) IUPAC Young Observers Program

We have launched an experimental program to invite a number of those being supported by the Young Scientists Program, as described above to attend the Congress, to also attend the GA as Observers.

d) The Award of the IUPAC Prize for Young Chemists

The IUPAC Prize for Young Chemists has been established to encourage outstanding young research scientists at the beginning of their careers. The prize is awarded for the most outstanding PhD thesis in the general area of the chemical sciences, as described in a 1 000-word essay. The first IUPAC Prizes were awarded at the opening ceremony of the Brisbane Congress. The number of applicants for 2003 has decreased slightly from last year (34 vs. 40); the number of countries represented (based on the country of the institution from which the PhD was received) decreased from 20 to 13. The Executive Committee agreed to recommend to Council that the IUPAC Prize be continued. The four winners of the IUPAC Prize for 2002 contributed four excellent review papers on their PhD studies; these were published in the November 2002 issue of PAC. The highlight of the Opening Ceremony of the Ottawa Congress will be the awarding of the nine IUPAC Prizes to the winners of 2002 and 2003.

We at IUPAC are committed to recognizing and awarding outstanding talent in the chemical sciences. We would, however, prefer to see more applicants representing all the member countries of IUPAC. The IUPAC Prize program was established for four years. The Council will be asked to continue the program. I strongly support its continuation.

vi) IUPAC will broaden its national membership base and will seek the maximum feasible diversity in IUPAC bodies with regard to geography, gender, and age.

IUPAC has 44 National Adhering Organizations, 21 Associate Adhering Organizations, 32 Associated organizations, 94 Company Associates, more than 5 000 Affiliate Members and over 1 000 Fellows. IUPAC membership is unfortunately still very much dominated by the northern hemisphere, particularly Western Europe, the UK and North America. Africa is represented by Egypt and South Africa alone, despite efforts to attract countries from other parts of the continent.

IUPAC's Vision Statement is meant to inspire us to advance the worldwide role of chemistry to the benefit of mankind. IUPAC's leadership and members take this task seriously; we try to align our activities to the Vision Statement as closely as possible. All chemists, members or not, benefit from IUPAC's core functions as the world authority on chemical nomenclature, terminology, standardized measurement methods, atomic weights, and other critically evaluated data. IUPAC aims to ensure open access to its information and output by offering a free web service and a free e-news letter. Our web service records 300 000 hits per month and is introducing chemists and non-chemists alike to IUPAC. IUPAC's divisions have contributed significantly by offering training and teaching programs in developing countries. The Young Scientists Program and the Young Observers Program will introduce

a new generation of talented chemists to the activities of IUPAC and encourage them to get involved in the various projects of the Union.

Chemists worldwide benefit from participation in IUPAC-sponsored scientific meetings, which have become an important Union function. In addition, IUPAC sponsors conferences in developing countries to encourage a more diverse participation in these events. Chemical Research Applied to World Needs and the CHEMRAWN Conferences have long provided a primary mechanism for IUPAC to address issues that transcend pure science, and have important socio-political relevance. We aim to ensure that the advisory boards and programs of our scientific conferences reflect the worldwide diversity of chemistry.

IUPAC is committed to success on this important challenge. Bureau members Prof Hitoshi Ohtaki and Prof Bob Gilbert have visited the chemical fraternities of several countries to negotiate IUPAC membership; their efforts were complemented by actions of the IUPAC President and Vice-President. During the forthcoming Mendeleev Conference to be held in Kazan, Russia, in depth discussions will be held with the chemistry leadership of the previous republics of the Soviet Union to encourage them to join IUPAC. I am pleased to note that Bangladesh and Malaysia are planning to apply for NAO status at the Ottawa General Assembly. In addition, Uruguay has become an ANAO during the current biennium.

It is evident that chemical societies in several countries cannot afford the national subscriptions of IUPAC, especially without governmental support. Therefore, IUPAC has developed a system to enable the billing of subscriptions in national currencies. In addition, IUPAC is flexible in determining the National Subscriptions of countries joining IUPAC, as well as for countries experiencing exceptional financial hardship.

The World Chemistry Leadership Meeting, held in Brisbane in July 2001, focused on the needs of the developing world, particularly on chemistry education. Their next meeting in August 2003 in Ottawa will once again concentrate on the developing world, with a focus on:

- Progress on selected findings from the Brisbane meeting
- Public Image of Chemistry
- Relationship of IUPAC, National Adhering Organizations, and National Chemical Societies

It is anticipated that several representatives from developing countries will participate in the Ottawa WCLM and be inspired to convince their countries to join IUPAC.

4. CONCLUSION

Chemistry is often characterized as the enabling science. In its enabling role, chemistry is the core science in a number of exciting new multi-disciplines, such as chemical biology/postgenomic chemistry/biotechnology, material science/nanotechnology and information technology. In fact the borders of the chemical sciences are being expanded at an exponential rate, and we scientists have come to assume momentous developments from the ingenious integration of science and technology. IUPAC's role continues to be vital to these new interactions: Truly, Chemistry at the Interfaces, the Theme of the 39th IUPAC Congress.

a) Highlights of the current biennium

- The development of a new vision statement, mission statement, and statement of long-range goals.
- Naming of element 110, darmstadtium, Ds.
- Award of the IUPAC Prize to exceptionally talented young chemists.

- Advice to the Organization for the Prohibition of Chemical Warfare (OPCW) on the impact of scientific advances on the Chemical Weapons Convention (CWC).
- Organization of the International SCOPE/IUPAC Symposium on Endocrine Active Substances.
- Development of proposals for the restructuring of the governance of IUPAC.
- Development of policies for the investment of IUPAC funds and the management of special funds.
- Promotion of communication in IUPAC through the IUPAC website, the development of IUPAC e-news, and the organization of conferences and symposia.
- Billing of national subscriptions of member countries in their national currencies.

b) Challenges

- Ensure the effective functioning of the new project system in IUPAC (long-range goal ii).
- Effectively involve the chemical industry in IUPAC (long-range goal iii).
- Improve the public understanding and perception of chemistry (long-range goal v).
- Broaden the geographic base of the Union (long-range goal vi).

c) Acknowledgements

The leadership of IUPAC takes enormous pride in the achievements of its members and their service to the discipline of chemistry. Obviously these achievements were reached through the contributions of a host of individuals, working either in teams or individually. I am especially indebted to all my colleagues in the Union, and in particular the officers, members of the Bureau and the Executive Director, Dr John Jost and his team at RTP. Your assistance, advice and guidance to me and to the Union have been invaluable. I stand in awe of the commitment of so many top quality scientists, the 'IUPAC Family,' to projects on behalf of IUPAC, the industrial community and world chemical research. Your unselfish contributions enhance the image of IUPAC at the international level in scope and impact.

Kindly allow me to single out Dr Ted Becker. Dr Becker has served as Secretary General of IUPAC since 1996, and his term of office ends at the close of 2003. Ted is the key source of organizational memory in IUPAC and has made innumerable contributions to the Union, among them pivotal roles in the creation of the new IUPAC and the Strategy Development and Implementation Plan. Ted also identified the need for IUPAC's leadership in nomenclature, and was instrumental in creating Chemical Nomenclature and Structure Representation as a new Division. Ted, we shall retire your IUPAC lab coat to a suitable place of honor.

June 2003