

# CHEMRAWN XI

**The latest in the series of CHEMRAWN Conferences was held on 15–20 March 1998 in Montevideo Uruguay. A summary of the conference is provided by Prof. Folke Ingman, President of Division V. This is followed by the Statement of the Meeting and of the Future Actions Committee as reported by Prof. Patrick Moyna, organizer of the conference.**

## CHEMRAWN XI, Montevideo, Uruguay, 15–20 March 1998

The eleventh CHEMRAWN Conference was arranged by Prof. Patrick Moyna (member of the CHEMRAWN Committee) and his co-workers at Facultad de Química, Universidad de la República in Montevideo. The topic of the conference was Environmental Chemistry and part of it was devoted to the Latin American Symposium on Environmental Analytical Chemistry. Approximately 250 scientists, mainly from Latin American countries, attended. The conference programme included 26 plenary lectures given by well known scientists and could be divided roughly into three categories:

- Methodological topics ranging from modern sampling techniques and speciation of trace metals in environmental samples using Flow Injection Analysis, to LC-MS-MS, to computational methods in atmospheric chemistry, to different kinds of quantitative spectroscopy involved in Process Analytical Chemistry.
- Quality assurance in Environmental Analytical Chemistry was in many respects the main theme of the conference. Several plenary lectures were devoted to this area including laboratory proficiency testing programmes. A condensed course on laboratory accreditation was also included in the conference.

- Discussions of several programmes aiming at monitoring environmental pollution. A report on the performance and results of a six-year German/Brazilian environmental research project in the industrial area of Cubatao showed how scientific collaboration can increase competence in developing countries and simultaneously yield results useful for political and other authorities. Monitoring programmes were discussed in several contributions. Strategies for the sustainable management of the environment were discussed against the background of results from a university collaboration in the Baltic region.

Several poster sessions were also included in the programme, and altogether some 45 posters covering the same groups of topics as above were discussed.

In connection with the conference, a meeting was also held by the Red para Análisis Químicos Ambientales en América Latina (RAQAL). This is a network aiming at improving competence and confidence among its members, mainly by running rounds of intercalibration. Prof. Joseph Tarradellas (Lausanne, Switzerland) and Prof. Dieter Klockow (Dortmund, Germany) have acted as advisors to the network during its 10 years of existence. The network has completed several rounds to date and now felt ready to undertake the production and certification of a reference material. This will probably consist of black beans, be produced in Santiago de Chile and be analysed by the members.

As a whole, CHEMRAWN XI provided a good overview of the newest developments in Environmental Analytical Chemistry. It also fulfilled the purpose of giving Latin American attendees an opportunity to come

**Prof. P. Moyna welcomes delegates to CHEMRAWN XI**



into contact with colleagues from more developed countries, particularly in the non Spanish-speaking parts of the world.

Folke Ingman, May 1998

**Statement of the CHEMRAWN XI Meeting and Recommendations of the Future Actions Committee (F. Ingman (IUPAC), W. Figueiredo (Sao Paulo), D. Klockow (Dortmund), P. Moyna (CHEMRAWN), A. Pohland (Washington) and L. Ryden (Stockholm)).**

### Introduction

On 15–20 March 1998, the CHEMRAWN XI Meeting at Montevideo, Uruguay, gathered specialists on environmental chemistry and environmental protection from 19 countries world-wide, 12 of them Latin American, to discuss the situation of the environment in Latin America, with particular reference to South America and the Rio de la Plata basin. The Conference was organized cooperatively by various groups in Montevideo, in particular the Universidad de Republica and the Intendencia Municipal de Montevideo, and several international institutions, most prominently the International Union for Pure and Applied Chemistry (IUPAC), the International Association of Environmental Analytical Chemistry (IAEAC), and the International Organization for Chemical Sciences in Development (IOCD).

### The state of the environment in Latin America is deteriorating

The Conference concluded that the environment in Latin American countries is seriously and rapidly deteriorating as the heavy pollution of watercourses, land

degradation, and soil and air contamination continues. Available data, among the many reported to the Conference, pointed to serious emissions of heavy metals, toxic organic compounds and untreated sewage from cities, industries and agriculture. These emissions constitute not only a threat to individuals, public health and the living environment and its biodiversity, but also a considerable economic loss for the countries concerned, due to the misuse of natural resources and investments.

### Urgent action requires reliable information

The situation calls for urgent action. Although many sources of pollution are obvious and should be addressed immediately, a more systematic approach is needed. Therefore, reliable data will be of fundamental importance.

Such data will be necessary for all kinds of environmental actions, be they legal actions, or economic sanctions such as taxation measures. Most importantly, they will be needed to trace the sources of environmental impact, understand its consequences on ecosystems, and constructively address the causes of pollution. Research laboratories are prepared to take responsibility for data collection. The Conference was pleased that the RAQAL network—Red de Análisis Químico Ambiental en America Latina—of analytical chemical laboratories in Latin America is prepared to contribute to the required effort. The RAQAL network, which has existed since 1990, was meeting as part of the Conference. It has secured international support to ensure that the required expertise, instrumentation and methodological developments will be available for carrying out the proper analysis of environmental samples. The analytical chemistry community is willing to work on, for example, sampling strategies and methodologies for the quality control of analytical results. This first basic step will ensure a sound platform for further action.



Participants at the RAQAL meeting held in conjunction with CHEMRAWN XI.

### **Monitoring programmes are urgently called for**

The scientists at the Conference concluded that it is urgent that laboratories in the region address the question of a large scale monitoring programme to survey the environment. This will provide a base both for environmental research and for environmental protection measures. The design and execution of emerging monitoring programmes needs relevant competence both regarding environmental science, and chemical and biological analysis. Just as in other parts of the world, adequate scientific institutions, not the least universities, would be the natural platform for the development of such a programme, and scientists at the participating institutions in Latin American countries are prepared to contribute.

### **Regional co-operation is essential**

Pollutants do not recognize national borders, and a successful environmental programme must adapt to this fact. A monitoring programme should thus be international. The participating scientists are prepared to seek regional co-operation. In the longer term, the governments in the region, in agreement with the results of the UN Conference of Rio de Janeiro, 1992, and the Agenda 21 document, should take responsibility both for environmental surveillance and proper action, in order to preserve their natural heritage and the long-term capacity for sustainable development through environmental protection.

### **Quality and interdisciplinarity are essential**

Environmental data will serve no purpose if they are not related to their effect on the environment and on humans. A successful monitoring programme will have to rely on co-operation between many fields of science, such as chemistry, biology, ecology, medicine, geography and hydrology, amongst others. The arrangements for interdisciplinary co-operation should be addressed appropriately and solved.

### **A strategy is needed for optimal results**

A monitoring programme should, in the first place, develop a proper sampling strategy to ensure that analytical efforts give meaningful and interpretable data. The chemicals to be measured should include not only toxic substances, such as heavy metals and organic pollutants, but also other substances present in amounts that are deleterious to the environment. It is particularly important to include nitrogen and phosphorus, as they cause the ongoing eutrophication of bodies of water from poorly treated or untreated sewage from urban ar-

reas, or as run-off from agricultural land and associated industries. This is particularly urgent in countries where agriculture is a mainstay of the economy.

Environmental impact is due to pollution of air, water, soil and food. All these sources need to be monitored. Samples should be taken not only in open air or water but also from biological samples. Adequate data on pollution of water needs analysis of benthic long-lived organisms and the fish fauna. This makes it possible to identify substances hazardous to humans via food, in particular, seafood and fish. Databases should be set up of the toxic substances found in different matrices such as sediments, organisms and water.

Biological monitoring will give essential information on the ecological effects of pollutants. Environmental transport and the fate of xenobiotic compounds in the specific environment in Latin America should be taken into consideration. A search for specific toxicological endpoints in the flora and fauna, as well as in the human population, including ethnic minorities with specific food habits, need to be addressed.

### **Monitoring water quality**

The status of the water in the region should be monitored most urgently. Clean water for everyone is a prerequisite for the health of the population. Most pollutants are emitted directly into water or finally end up in the water as atmospheric precipitation. The environmental status of the water can be used directly, either to design treatment actions or to redesign water management in urban areas, industry and agriculture.

### **Monitoring air quality**

The measurement of air pollution is already ongoing in several industrial centres such as Cubatao at Sao Paulo in Brazil, because of a successful international co-operation project. Such measurements need to be prolonged and extended to include further areas. Increased car traffic in the big cities is a special concern for air quality, and will in itself have serious effects on public health. Meteorological competence is essential for such a programme.

### **Natural regions for monitoring exist**

Monitoring water needs to take into account the natural borders for waters, the drainage basins and catchments. To improve the situation of a watercourse, all pollution sources within the drainage basin must be addressed. Upstream sources will heavily influence the downstream situation. Therefore, water monitoring should be organized around catchment areas, and mechanisms for the required co-operation in such areas should be found. Meteorological conditions define ar-

eas that influence each other heavily through air-borne pollution.

### Experiences from the world

The Swedish participants at the Conference contributed their experiences from a long-term international co-operation programme for the protection of the Baltic Sea environment. This includes, to the best of our knowledge, the longest running monitoring programme in existence today. The monitoring of pelagic and benthic systems has been running in the Baltic Sea for more than 40 years. This started as, and continues to be, a research programme, although today the governmental authorities are responsible for routine measurements. It has been of utmost importance for the present improvement of the Baltic marine environment. The programme has served as a model when organizing other monitoring programmes of regional sea basins. Such a programme is now being carried out in the Gulf of Thailand. Other relevant experiences exist in several regions, e.g. for the Rhine River on the European continent and the Great Lakes district in North America.

### A change in the position of scientists in the region

The number of problems is apparently overwhelming, but it should be clear that these problems can only be solved if the scientists from the region itself are involved as the main actors. An important part of the decisions and activities have to be taken and generated within the Region, otherwise local groups will always be struggling to keep up with the latest proposals coming from abroad. This is why an important part of the future goals have to concentrate on the training of the scientists at present working in Latin America. More importantly, stress has to be placed on the education of a generation of chemists capable of working independently, of developing and validating the needed analytical techniques, of establishing and running regional networks, and who are capable of raising the needed financial support from local and international groups and institutions.

## IUPAC Fellows Programme

**The IUPAC Fellows Programme was established by Council at Geneva. The purpose, eligibility and appointment conditions of the Programme are described below.**

### 1. Purpose

The Fellows Programme has two purposes: (i) Formally recognizing the service of individuals who have served IUPAC and are no longer active with an IUPAC body, and (ii) Providing a ready means of communicating with former IUPAC volunteers, both to give them news about the Union and to be able to solicit their views and assistance in future IUPAC programmes.

### 2. Eligibility and Appointment

Fellowship is open to everyone who has completed work on one or more IUPAC bodies but is no longer currently active. However, Fellowship, once awarded, will continue even if the individual returns to active service on an IUPAC body.

A letter of thanks for IUPAC service will be sent by the President at the end of each biennium to individuals who are completing IUPAC service and have not then been elected or appointed to any IUPAC position in the

following year. The individual will be invited to become an IUPAC Fellow and asked to confirm his/her acceptance.

Individuals who completed IUPAC service prior to the establishment of this Programme will also be eligible to become Fellows. Eligible individuals are invited to contact the Secretariat.

### 3. Benefits and Costs

The Fellow will be included on a special mailing list (preferably e-mail) to receive news of IUPAC activities from time to time. As needed, we may solicit views or assistance from all or some Fellows on issues or new programmes. Of course, comments and suggestions from Fellows will be welcome at all times.

The cost to the Secretariat for carrying out this portion of the Programme should be small, while the potential benefit to the Union of being able to consult a knowledgeable cadre of former IUPAC experts may be great. The goodwill generated by continuing contacts with these individuals and their ability to continue publicizing the Union's activities may also be of significant value to IUPAC. For these reasons it is not planned at present to charge any fee for Fellowship.

As a token of gratitude and as a means to strengthen the initial relationship with Fellows, a one-year free subscription to *Chemistry International* will be provided to all Fellows during the first year following the cessation of active service. After one year, Fellows will be invited to subscribe to CI directly through the Secretariat at a fee that will be set to cover anticipated costs to the Union.

An individual who is awarded Fellowship and later returns to active service in IUPAC for some period will receive a free subscription to CI during the period of active service but will not receive another free year on cessation of the second period of service. Also, while individuals whose service to IUPAC concluded prior to the establishment of the Programme may become Fellows, they will not receive free subscriptions to CI.

All members of IUPAC bodies, Fellows and representatives of National Adhering Organizations, Observer Organizations and Associated Organizations whose e-mail addresses are known to the the Secretariat, should have received a broadcast e-mail message recently. If you did not receive this message, and would like to receive IUPAC news by e-mail, please send your e-mail address and status (IUPAC body member, AMP member, etc.) to the secretariat: [secretariat@iupac.org](mailto:secretariat@iupac.org)

## World Science Conference

**This Conference is expected to be a major event relating Science to social concerns. Attendance will be by invitation only. The material below was distributed by ICSU and we believe it will be of interest to readers of *Chemistry International*.**

The 29th UNESCO General Conference last year adopted a resolution to organize a **World Science Conference** (WSC) in 1999. The Director General of UNESCO, Prof. F. Mayor, invited ICSU to cosponsor the WSC and the invitation was accepted by the ICSU Executive Board.

The Hungarian Government issued an invitation to host the Conference in Budapest from 26 June to 1 July 1999 and has offered very generous financial support. UNESCO and ICSU have accepted this kind invitation. The Hungarian Preparatory Committee has proposed a two centre arrangement for the Conference: the Budapest Convention Centre and facilities at the Hungarian Academy of Sciences.

The Conference is being co-organized by UNESCO and ICSU in co-operation with the relevant intergovernmental organizations of the United Nations system, and with nongovernmental organizations, such as the International Social Science Council (ISSC), the Third World Academy of Sciences (TWAS) and many other international and national partners.

ICSU will play a very important role in the 1999 World Science Conference. The Conference will address the entire phenomenon of science and its major issues at large, encompassing basic and applied science and

facets relating to the natural and social sciences. The social and human sciences will be closely involved in addressing the social implications of overall scientific and technological progress, its particular breakthroughs, the relationship between science and development, as well as the ethical issues raised by the implementation of scientific research in specific areas. Emphasis will be laid on the increasing need for closer interaction and collaboration between both these realms of science throughout the themes discussed at the Conference.

The Conference aims to improve the public understanding of science and to obtain a renewed commitment of governments to fundamental and long-term research. The participants will be Government representatives, intergovernmental and nongovernmental organizations, policy makers, the scientific community and representatives of the public and other sectors of society.

The main outcome should be a world-wide innovative and pragmatic programme of action which will foster partnerships in science and the use of science for development and the environment. This programme, to be summarized in a 'Science Agenda-Strategy for Action', will be a framework for promoting co-operation and the coordination of efforts of governmental, intergovernmental, and nongovernmental bodies, the industrial sector and the scientific community. The ICSU will be responsible for the drafting of two scientific documents which will be the scientific input to the Agenda and the background documents for Forums I and II. The *Agenda*

*for Science in the XXIst Century* will be drafted by UNESCO for Forum III.

The Conference will be organized around three fora, each dealing with a major umbrella topic. Each Forum will consist of a number of sessions and gatherings devoted to the topics of the programme. Suggestions for topics are listed below:

### **Forum I: Science: its Achievements, Shortcomings and Challenges**

- In-depth analysis of achievements of science (statistical approach: human longevity (The Biological Revolution) communication, transportation, etc.;
- Global Changes—achievements of international co-operation;
- Science and Industry: links between basic science, applied science and industrial development, role of foundations;
- The frontiers of science: prospective approach;
- Closing the gap between North and South;
- Sharing of scientific knowledge;
- Capacity Building and Education;
- Sustainability: Inter-Academy Panel.

### **Forum II: Science and Society**

- Global problems of relations between Science and Society (including Science and Religion);
- Science, Environment and Society;
- Science and Media: how the media speaks of Science;
- Ethics and Responsibility of Scientists;
- Science and Industry: perception of science in industrial products: communication, transportation, food industry;
- Science and Peace;
- Science and Women.

### **Forum III: Toward a New Commitment to Science**

- Commitment of scientists and nongovernmental scientific organizations;
- Commitment of intergovernmental scientific organizations;
- Commitment of civil society;
- Sustained political commitment;
- Commitment of industrial institutions and the private sector.

### **Goals of the World Science Conference**

Through the World Science Conference, UNESCO's specific mandate in science will be exercised in order to draw up a guiding balance sheet of the main achieve-

ments of science, its impact on society and development, the outcome of international scientific co-operation, as well as of the challenges for the next century, particularly those concerning the application of science to development, the rational use of natural resources and environment protection. Also, just as a world-wide political commitment to education for all has been achieved following the World Conference on Education for All (1990, Jomtien, Thailand), a renewed commitment to science by UNESCO's Member States, at both national and international levels, will be sought through an innovative and pragmatic plan of action that would pave the way to UNESCO's Medium-Term Strategy beyond the year 2000.

The proposed World Science Conference will deal with the natural sciences and their impact on society. The social and human sciences will be closely involved in addressing the social implications of overall scientific and technological progress, its particular breakthroughs, the relationship between science and development, as well as the ethical issues raised by the implementation of scientific research in specific areas. Emphasis will be laid on the increasing need for closer interaction and collaboration between both these realms of science throughout the themes discussed at the World Science Conference.

The major objectives of WSC are to:

- undertake an in-depth analysis of the main achievements of science and its shortcomings; current problems and the forthcoming challenges in science with attention given to the role of science in the 21st century;
- contribute towards harmonizing the complex relations between science, society, development and environment, and promoting high ethical standards in scientific research and its applications, taking into consideration the specific cultural contexts of different regions;
- promote a world-wide endeavour geared towards the development of science, with particular attention to the needs of developing countries, and to enhance the interaction between scientists, public and private sectors and society;
- foster the renewal of international co-operation in the sharing of scientific knowledge in the age of information technologies, and give a new impetus to the development of science and its applications in the service of development, environmental protection, and the building of a culture of peace;
- engender the renovation of scientific education, particularly in the framework of 'education for all throughout life', and further improve the public understanding of science as part of culture through formal and informal processes and channels; and
- generate sustained political commitment to science

by UNESCO's Member States and the main stakeholders of international co-operation, through an innovative and pragmatic plan of action beyond the year 2000.

These objectives are to be met through a thoroughly conceived process encompassing the preparation of the Conference, the work of the Conference itself and its follow-up at national and international levels.

## Stakeholders and partners

---

WSC will address and involve Member States' Governmental institutions, public and private sectors, scientists and nongovernmental bodies, as well as intergovernmental and international nongovernmental organizations involved in promoting and supporting science and scientific co-operation at regional and international levels. Particular attention will be given to involving women, youth and the media as partners and stakeholders of WSC.

Following wide consultations, the Director-General is of the view that the preferred status of the WSC would be that of a joint meeting of UNESCO and ICSU, organized in cooperation with the relevant intergovernmental organizations of the United Nations system, the International Social Science Council (ISSC), the Third World Academy of Sciences (TWAS) and other partners.

UNESCO, an intergovernmental body, and ICSU, a nongovernmental organization, have a unique mandate for, and authority in, promoting co-operation in science on the international stage, and they have been co-operating with each other for more than 50 years. Once the General Conference has endorsed WSC, co-operation will be officially sought with other interested bodies, namely, organizations of the United Nations system, intergovernmental organizations, international nongovernmental organizations and centres of excellence, financial institutions, major private foundations and regional and national scientific organizations. Preliminary contacts with the Organization for Economic Cooperation and Development (OECD), the World Bank, the International Association of Universities (IAU), the International Foundation for Science (IFS) and the Third World Academy of Sciences (TWAS) have indicated their wish to be involved in WSC.

## Format and topics

---

The WSC will involve, in all its sessions, the participation and interaction of policy-makers, scientists and representatives of society. Efforts will be made to ensure that each Member State's delegation to the Conference will be composed of these three stakeholders. It is proposed that the sessions of WSC should revolve around

the following three major umbrella topics:

- Science: its achievements, shortcomings and challenges;
- Interfaces of science;
- Towards a new commitment to science.

The first major topic aims to make the participants aware of the role of science and the responsibilities of the scientific community. The second topic seeks to involve focused discussions between scientists, governments, industrialists and representatives of the general public on the interfaces of scientific progress with societal requirements and expectations. The third topic follows logically, and aims to lead to an increased commitment to science by governments, policy-makers and other partners.

Each major topic will be dealt with in a limited number of sessions devoted to such issues or themes as: the history of science and its prospects for the future; science for economically viable, socially equitable and environmentally sound development; science and education, women's participation in science and technology; science and culture; ethical issues; commitment to science by governments and parliaments, scientists and intergovernmental and nongovernmental scientific organizations, etc. The elaboration of the key themes for the WSC working document will be selected by the Conference's scientific organizing committee, taking account of the recommendations made at the 29th session of the General Conference.

## Outcome and follow-up

---

The main outcome of the WSC should be a world-wide innovative and pragmatic programme of action which will foster partnerships in science and the use of science for development and the environment. This programme, to be summarized in the document proposed to be entitled 'Science Agenda—Strategy for Action', will be a framework for promoting co-operation and the co-ordination of efforts of governmental, intergovernmental and nongovernmental bodies, the industrial sector and the scientific community. The draft document will be the subject of thorough consultations during the preparation of the Conference, before being discussed, finalized and endorsed by the Conference itself. A limited number of other documents, declarations and/or messages could be issued by the WSC as a goal-oriented framework for specific actions. By adopting and/or endorsing these documents, WSC will express the participants' determination to unite efforts and share responsibility for the promotion of science and its service to humankind.

WSC will also design an appropriate mechanism for overseeing its follow-up. The UNESCO Secretariat will be the focal body for co-ordinating this follow-up. In ad-

dition, UNESCO's action in science and that of its scientific committees and intergovernmental programmes will be enhanced through the follow-up to WSC, as will UNESCO's cooperation with ICSU, and all other partners and stakeholders. It may be appropriate to announce at the Conference two or three world-wide initiatives for immediate follow-up, e.g. the setting up of international centres of excellence to promote science-related activities such as science teaching and/or scientific research in certain regions.

## Preparatory work

---

WSC will not follow the heavy and costly pattern of similar international conferences involving many regional and/or subregional preparatory meetings. It will, instead, take advantage of already planned regional meetings and small-scale international *ad hoc* meetings, involving natural and social scientists and policy-makers, to help prepare the main working documents of WSC. The National Commissions of UNESCO and field offices will be involved in the preparatory process from the very beginning, as will be all the divisions of the Science Sector and intergovernmental programmes of both the Science Sector (IGCP, IHP, IOC, MAB) and the Sector of Social and Human Sciences (MOST) as well as pertinent units and programmes of other sectors of

UNESCO. Member States will be invited to designate national focal points for WSC in order to ensure their full participation in the preparatory work and the Conference itself. Use will be made of the new electronic communication technologies; a few forums through the Internet are envisaged to broaden consultations on the goals of the Conference and increase awareness of its usefulness.

Some meetings that may be conducive to WSC have already taken place (the International Conference on Donor Support to Development-Oriented Research in Basic Sciences, Sweden, June 1995; the Workshop on Basic Research for National Development Plans under Changing Economic Conditions, Slovenia, June 1997), or are under preparation (the Conference on Science and Technology Development in the Caribbean, Port-of-Spain, September 1998; the meeting of the Genoa Forum on science and culture, and regional forums on science and women).

The third World Science Report and the first World Social Science Report will be circulated at WSC to provide background to the Conference thematic sessions. In addition to intersectoral consultation and partnership within UNESCO's Secretariat, preparatory activities for the World Conference on Higher Education (to be held in 1998) will be coordinated with those of WSC.

# News

---

## News from the Extraordinary Session of the ICSU General Assembly, 25 April 1998, Vienna, Austria

---

The Extraordinary General Assembly of ICSU was held to consider proposed changes to the organization of ICSU as a result of an Assessment Report made by a group of eminent scientists. Given below are excerpts from the Summary of Proposals provided the members before the meeting and excerpts from the revised Statutes adopted by the General Assembly.

### Recommendations for proposed action as a follow-up to the report on the assessment of ICSU

## Introduction and summary of proposals

---

### I. Introduction

The recommendations contained in this document are proposed by the Executive Board of ICSU as a result of

a wide consultation undertaken immediately following the 25th General Assembly. Specifically, the sources for this document are as follows.

- The recommendations in the Assessment Report (which itself was based on exhaustive consultations with ICSU family members).
- Responses from Members to the Assessment sent to Paris in April–May 1997.
- Recommendations of the January meeting of the Executive Board.
- Recommendations of the March meeting of the Standing Finance Committee.
- Recommendations of the March meeting of the Standing Committee on Membership, Structure and Statutes.
- Discussion by the Officers of ICSU in June.

### II. Summary of proposals

- (a) ICSU's **name** to be changed to better reflect the organization's aims and membership.



(b) **Objectives:** somewhat expanded to better reflect today's reality.

(c) **Links with ICSU's Members and non-Members**

- Creation of the category of Multinational Scientific Member.
- Designated role for Ordinary Members of EB.
- Creation of Committee on National Participation.
- Creation of Committee on Union Participation.
- Encouragement of formation of national committees open to a variety of national organizations.

(d) **Governance Structure**

GA to remain essentially as is, however, there would be no need for an Assembly Finance Committee nor an Assembly Nominating Committee.

General Committee to be eliminated, and its function of priority setting and review transferred to a new Committee: Committee on Scientific Planning and Review (CSPR).

Executive Board to be enlarged to include six Officers and eight Ordinary Members (present EB has six plus six) and EB given additional responsibilities, with each person having specific duties.

Body of Officers to be given specific responsibilities and each person given a specific duty.

Secretariat to be slightly enlarged.

(e) **Priority setting and review process**

- Vice-President for Scientific Planning and Review.
- Committee on Scientific Planning and Review.

(f) **Grants**

- Elimination of automatic grants.
- Grants used as seed money in support of selected focused activities.

(g) **Interdisciplinary Bodies:** set up by the GA as either Scientific Committees, Programmes or joint initiatives with other bodies.

(h) **Science for Policy, Policy for Science**

- Increased responsibility to EB.
- EB to issue position papers when appropriate.
- Organization of forums for discussions involving national policy-makers.
- Standing Committees to be renamed (and some new ones created) as Policy Committees, addressing issues of policy and common concern for the well-being of science. These Policy Committees would be set up for 3-year periods, with the possibility of renewal by the GA.

Proposed Committees on:

- scientific planning and review (previously GC's duties);
- public understanding of science (new);
- governance (previously SCMSS);
- finance and fund-raising (previously SFC);

- National participation (new, although some aspects previously covered by OC);
- Union participation (new, although some aspects previously covered by GC);
- ethics and freedom in the conduct of science (previously SCFCS and SCRES);
- dissemination of scientific information (renaming of ICSU Press and its INASP, and including electronic publishing);
- developing countries (COSTED);
- the FSU and Central and Eastern Europe (COMSCEE);
- environment (ACE).

(i) **Voice and Outreach**

- Vice-President for External Relations;
- Creation of a Committee on the Public Understanding of Science;
- Dedicated staff person.

### III. Recommendations for proposed action

#### 1. ICSU's name

The name of the ICSU should be changed to reflect more accurately the type of organization it is:

ICS

INTERNATIONAL COUNCIL FOR SCIENCE

*The organisation of International Scientific Unions and National and Multinational scientific bodies: formerly the International Council of Scientific Unions (ICSU).*

CIS

CONSEIL INTERNATIONAL DES SCIENCES

*L'organisation des Unions scientifiques et Institutions nationales et multinationales:*

*auparavant le Conseil International des Unions Scientifiques (CIUS).*

The above recommendations were adopted by the General Assembly, with the exception of the change of the acronym by which the International Council for Science will be known. While the name change was accepted, the acronym will remain ICSU.

The following excerpts highlight the changes in statutes and governance resulting from the decisions taken at the General Assembly.

## Statutes

### I. Denomination and domicile

- 1 The International Council for Science, hereinafter called 'ICSU', is an international nongovernmental and nonprofit making scientific organization.
- 2 The International Council of Scientific Unions (ICSU) was created, following the dissolution of the International Research Council, in Brussels in 1931 where it had its first legal domicile. The name of the

Council was changed to ICSU: The International Council for Science at an Extraordinary General Assembly in 1998, but the acronym ICSU has been maintained. The present legal domicile of the ICSU is in Paris, France, where its Secretariat is located.

## II. Objectives

**3** The principal objectives of ICSU are:

- (a) to encourage and promote international scientific and technological activity for the benefit and well-being of humanity;
- (b) to facilitate coordination of the international scientific activities of its Scientific Union Members (see Statute 7) and of its National Scientific Members (see Statute 8);
- (c) to stimulate, design, coordinate or participate in the implementation of international interdisciplinary scientific programmes;
- (d) to act as a consultative body on scientific issues that have an international dimension;
- (e) to encourage the strengthening of human and physical scientific resources world-wide with particular emphasis on the developing world;
- (f) to promote the public understanding of science;
- (g) to engage in any related activities.

**4** In order to further the attainment of these objectives ICSU may, whenever appropriate:

- (a) enter, through the intermediary of the national adhering organizations, into relations with the governments of their respective countries in order to promote scientific research in these countries;
- (b) cooperate with the United Nations and its agencies, and with other international intergovernmental or nongovernmental organizations;
- (c) provide, through suitable channels, information to interested parties and the public at large about progress in science and technology and its impact on society;
- (d) undertake actions to strengthen the well-being and effectiveness of science and scientists;
- (e) establish and promote programmes either within the ICSU family or in partnership with others.

The term 'National' as used in these Statutes and Rules of Procedure has no connotation other than denoting a Member admitted under the provisions of Statute 8.

**5** In pursuing its objectives in respect of the rights and responsibilities of scientists, ICSU, as an international nongovernmental body, shall observe and actively uphold the principle of the universality of science. This principle entails freedom of association and expression, access to data and information, and freedom of communication and movement in

connection with international scientific activities, without any discrimination on the basis of such factors as citizenship, religion, creed, political stance, ethnic origin, race, colour, language, age or sex. ICSU shall recognize and respect the independence of the internal science policies of its National Scientific Members. ICSU shall not permit any of its activities to be disturbed by statements or actions of a political nature.

## III. Membership

**6** Each Member has the obligation to support the objectives of ICSU, uphold the principle of the universality of science, and meet its financial obligations as appropriate. Members shall normally adhere to ICSU in one of two categories:

(a) *Scientific Union Members, or*

(b) *National Scientific Members.*

**7** A Scientific Union Member shall be an international nongovernmental organization devoted to the promotion of activities in a particular area of science and shall have been in existence for at least 6 years.

**8** A National Scientific Member shall be a scientific academy, research council, scientific institution or association of such institutions. Institutions effectively representing the range of scientific activities in a definite territory may be accepted as National Scientific Members, provided they can be listed under a name that will avoid any misunderstanding about the territory represented, and have been in existence in some form for at least 4 years.

**9** The scientists of more than one nation may form a scientific body (academy, research council, etc.) for application as a National Scientific Member. No organization of scientists may adhere through more than one national membership.

**10** Exceptionally, any other grouping of institutions acceptable to ICSU may be admitted to membership in category a) or b) on a case by case basis.

## IV. Associates

**11** Each Associate has the obligation to support the objectives of ICSU, uphold the principle of the universality of science, and meet its financial obligations as appropriate. Associates shall adhere to ICSU in one of three categories:

- (a) National Scientific Associates
- (b) International Scientific Associates
- (c) Regional Scientific Associates

**12** A National Scientific Associate shall be a scientific academy, research council or other comparable scientific organization that is potentially qualified, but not yet ready, for full national membership. National Scientific Associates shall normally be expected to apply for full membership after 6 years in this category.

In these Statutes and Rules of Procedure, international bodies are taken to mean those bodies to which appropriate organizations in all countries of the world are eligible to adhere.

**13** An International Scientific Associate shall be an international nongovernmental organization in the natural sciences or an organization in a field cognate to those of ICSU, such as the humanistic, medical, social and technical sciences, whose association with ICSU is likely to be of mutual benefit or to advance the cause of science, and whose scientific activities do not fall primarily within the scope of a single Scientific Union Member. An International Scientific Associate shall have been in existence for at least 6 years. Such bodies shall not have voting rights.

**14** A Regional Scientific Associate shall be a nongovernmental Scientific Academy, Science Council, or other scientific institution, to which scientists or scientific bodies from more than one nation adhere, whose association with ICSU is likely to be of mutual benefit and will facilitate the attainment of ICSU's objectives, and whose scientific activities do not fall primarily within the scope of a single Scientific Union Member. Such bodies shall not have voting rights.

## V. Observers

**15** A Member that has failed to fulfil its financial obligations (see Rule of Procedure 10.2) shall only have Observer status. Observers shall be expected to resume full membership in ICSU as soon as possible. Normally no Observer shall be allowed to remain so for more than 6 years.

## VI. Decision-making bodies

**16** The decision-making bodies of ICSU shall be:

- (a) The General Assembly
- (b) The Executive Board
- (c) The Officers

...

## X. Officers

**32** (a) The **Officers** of ICSU are:

- i. The President
- ii. the Vice-President for Scientific Planning and Review
- iii. the Vice-President for External Relations
- iv. the Secretary-General
- v. the Treasurer
- vi. the Past-President or President-Elect

(b) The Officers are responsible for the day-to-day affairs of ICSU between meetings of the Executive Board. They shall meet as often as is deemed necessary, normally twice a year.

(c) The **President** shall hold office until the end of the ordinary session of the General Assembly following his or her election, this Officer shall not be eligible for re-election unless he or she had assumed the office of President as a result of a vacancy arising from the inability of his or her predecessor to complete a full term;

(d) The **Vice-Presidents** shall hold office for one term of 3 years, nonrenewable,

(e) The **Secretary General** and the **Treasurer** shall hold office for terms of 3 years, renewable once;

(f) The **immediate Past-President** shall serve as an Officer for a period of 18 months following the termination of the period of office held as President, to be succeeded until the next General Assembly by the **President-Elect**.

## Circular letter to the ICSU unions from SCRES: the Standing Committee on Responsibility and Ethics in Science. Oslo, 19 April 1998

The International Council of Scientific Unions (ICSU) decided at its General Assembly in Washington DC, 24–27 September 1996, to establish a Standing Committee on Responsibility and Ethics in Science (SCRES). This decision represented a shift of attention from the freedom of scientists and scientific pursuits to the responsibility of science and technology. The Norwegian Research Council (NFR) offered to fund the secretariat, which was placed in Norway, a country with a developed research–ethical tradition. The director of SCRES is a Swedish philosopher of science and logic (Kathinka Evers), the chairman of the committee is a Norwegian philosopher of science (Matthias Kaiser). The other members of the committee are prominent scientists in the fields of physics (Hu Qiheng, China), genetics (Jose Cantu, Mexico), genetics and philosophy (Philip Kitcher, USA), neurobiology (Jean-Didier Vincent,

France) and one legal specialist (Joseph Onek, USA).

The committee of SCRES intends to hold one meeting annually, each time in a different country. The first meeting took place in Oslo, Norway, 19–22 June 1997, by invitation from the Norwegian Academy of Science. The second meeting will be held in Beijing, China, 8–13 June 1998, by invitation from the Chinese Academy of Science and Technology (CAST). The main task of the Oslo meeting was to establish the precise role that SCRES should play in the future: What are its main goals? What does SCRES aim to produce? Who is the intended audience?, etc. The initial discussion focused on how the committee intends to operate, and how it should communicate with other ICSU members. A website has been opened:

<http://www.lmcip.jussieu.fr/icsu/SCRES/>

The issues that SCRES most urgently needs to deal with are here made public in order to invite comments, information, and generally useful ideas from other parties; notably (though by no means exclusively), ICSU member-units. SCRES directs itself to all scientific communities, obviously, but not to them alone: it is vital that SCRES also succeed in addressing the general public and those politicians who represent the general public. SCRES is supposed to function as a focal point of discussions both within and beyond the scientific communities. One of its most important tasks is to improve the public understanding of science, and of problematic issues with respect to responsibility and ethics in science.

There are a wide variety of ethical issues which are important to science today, and they are likely to increase in number and complexity in the future. These issues include problems both of an internal nature and of an external one. Internal problems affect the conduct of science itself and the freedom of scientific inquiry, such as plagiarism and limitations on access to data. External problems concern developments in science and their effects on society, such as research on the human genome, the environment, race and intelligence, gender stereotyping, gene manipulation, embryo research, and weapons research.

SCRES' primary task is to help the scientific communities formulate general codes of conduct for scientific research: to see where such guidelines have already been developed, and, in those areas where none have yet been formulated, to assist in filling these gaps. If these codes, or standards, are not followed in a specific case, there must be special justifying grounds for this omission; grounds that should, upon request, clearly be stated. One issue of interest will concern the reasons for an apparent absence of ethical/legal guidelines: whether it is intentional (and, if so, by what and whose intentions), to what particular problems the gap is due, etc. ICSU has the mechanisms for adopting resolutions,

and member-units may provide an entrée to many of the issues that SCRES needs to discuss.

So far, SCRES has found six topics especially provocative of problems of responsibility and ethics in science: (1) biotechnology and genetic engineering (e.g. cloning), (2) technology transfers with adverse environmental effects, (3) recent developments in the sciences of mind/brain, (4) standards for peer review and authorship in science, (5) the future of medical practice, and (6) quality assurance of scientific information on the Internet. Naturally, SCRES is open to further suggestions, and that is the main reason why we are writing this letter to you. We depend on scientists in all fields to inform us about ethical dilemmas, and perhaps about their possible resolutions. The committee has, for example, recently been faced with a concrete request from the Austrian embassy. They wish to know whether an international 'code of conduct' exists, that regulates the handling of biological material similar to the code of conduct for chemical weapons. SCRES knows of no such internationally valid code. There may be a lack of legislation and guidelines here, and we should be grateful if the appropriate ICSU member organizations and biological unions would contact us and give us their comments and suggestions.

We should also be interested in knowing about those of your meetings at which the presence of SCRES might be relevant and useful.

Thus with this letter we cordially invite you to inform us about

- (a) any ethical dilemma that you conceive within your particular field of science, and that you should like to bring to SCRES' attention,
- (b) any other view that you might have about SCRES: its structure, goals or methods, or anything else that you wish to comment on,
- (c) those of your meetings at which the presence of a representative of SCRES might be relevant and useful.

We look forward to hearing from you.

Yours sincerely,

Dr Kathinka Evers, Executive Secretary, SCRES, The Research Park, Gaustadalléen 21, 0371 Oslo, Norway, Tel.: +47 2295 8778/fax: +47 2295 8492.

### **In related news, the following item describes a new European Group on Ethics in Science and New Technologies**

Following a decision of the European Commission, a European Group on Ethics in Science and New Technologies will replace the Group of Advisers on the Ethical Implications of Biotechnology, set up in 1991. Delivering opinions on ethical implications of 'science and new technologies' in the framework of Community

legislation the new Group will have a broader mandate. Above the ethical implications of biotechnology, other fields such as the new information technologies, science and research will be covered. The new member, Prof. Ina Wagner from Austria, will be responsible for the fields 'Sociology-Informatics, Information Society'. Appointed for a period of three years, the 12 members will be completely independent of any political, economic and national interest and of the Commission. Their personal abilities and experience guarantees the multidisciplinary and multicultural composition of the group. The Commission will ask the European Group on Ethics in Science and New Technologies to deliver opinions, but the Group will also have the opportunity to adopt opinions on its own initiative. The Commission will appreciate a close co-operation with other European Union institutions.

## Federation of European Chemical Societies, Annual Report, 1997

The Federation of European Chemical Societies is a voluntary association, the object of which is to promote cooperation in Europe between those nonprofit-making scientific and technical societies in the field of chemistry whose membership consists largely of individual qualified chemists and whose interests include the science and/or practice of chemistry. It was founded in 1970.

**A powerful voice for chemists and chemistry:** The Federation of European Chemical Societies (FECS), with the European Communities Chemistry Council (ECCC), through about 50 member societies together represent some 200 000 individual chemists in academia, industry and government in Europe.

**The Structure of FECS:** The scientific work of FECS is carried out through its Divisions (Analytical Chemistry, Food Chemistry, Chemical Education) and Working Parties. The EUCHEM Committee, operating within FECS, organizes high-level conferences and advises the European Science Foundation on its chemistry conferences. The European Communities Chemistry Council, reconstituted in 1996 in association with FECS, was founded in 1973, its primary object being to act in an advisory or representative capacity in matters relating to the science and practice of chemistry, particularly in relation to the European Commission.

**The FECS Lecture** 'Farbenspiel einer Ionenpumpe' (Colour changes of an ion pump) was given by Prof. Dieter Oesterhelt, Max-Planck-Institut für Biochemie, in September in Vienna during the 100th anniversary meeting of the Gesellschaft Österreichischer Chemiker.

**The Award for Service to FECS** was presented to Prof. Erno Pungor, Hungary, one of the founders and former Chairman of the Working Party on Analytical Chemistry.

**The General Assembly of FECS** met on 11–12 September in Vienna as the guests of the Gesellschaft Österreichischer Chemiker.

## Analytical chemistry

Chairman: Prof. L. Niinisto, Helsinki University of Technology, Kemistintie 1, FIN-02150 Espoo, Finland. Tel.: +3589 4512600, fax: +3589 462373, e-mail: lauri.niinisto@hut.fi

Plans were made to launch the textbook on *Analytical Chemistry* in March 1998. A Who's Who in analytical chemistry in Europe is being prepared to help the ACTIVE and other student exchange programmes. Eurocourses planned include a joint Euro-American-Japanese course in Vienna in July 1998, courses on Quality matters and on Micro total analysis systems.

Much work is being undertaken in quality assurance and accreditation. The history of the Division will be published to mark its 25th anniversary in 1997.

The proceedings of Euroanalysis IX held in Bologna in 1996, with 700 participants, have been published in *Annali di Chimica*, the *Journal of Analytical and Environmental Chemistry*, Vol. 87, 1997. Euroanalysis X will be held in Basle on 6–11 September 1998.

Prof. L. Niinisto, past chairman of the Division, took over the Chairmanship in October, following the untimely death of Prof. Robert Kellner, Chairman of the Division since 1993 and an active participant for over 20 years.

## Food chemistry

Chairman: Dr R. Battaglia, Migros Laboratories, Postfach 266, CH-8031 Zurich, Switzerland. Tel.: +41 1277 3140, Fax: +41 1277 3170, e-mail: Reto.Battaglia@mgb.ch

Conferences organized during 1997 included: 'Alimentacao Mediterranea' in Algarve in March; 'Bioavailability III' in Wageningen in May; 'In Vino Analytica Scientia' in Bordeaux in June; Laboratory Quality Assessment Issues Roundtable at AOAC meeting in US in September, 'EUROFOODCHEM IX' in Interlaken in September. The round table on Laboratory Quality Assessment Issues at the AOAC international meeting in San Diego continued the development of a close relationship between the Division and AOAC International.

Conferences in 1998: 'Structure and Functionality of Food Products', in Mrogowo in May; international symposium on immunology 'Chemical and Clinical Problems of Food Allergy', in Taormina in October. The publication Food Chem Window provides a compendium of student exchange programmes involving 36 research groups in 17 countries.

The second edition of the successful *Who's Who in Food Chemistry—Europe* will be extended to include relevant consulting/analytical/service laboratories.

### Chemical education

Chairman Dr J.M.F. Gagan, Open University, 70 Manchester Road, Chorlton-cum-Hardy, Manchester M21 9UN, UK. Tel.: +44 (0)161 861 9823, fax: +44 (0)161 956 6811, e-mail: jm.gagan@open.ac.uk

The 4th European Conference on Research in Chemical Education (ECRICE) was held in York in September. Plans were made for the 1st European Conference in Chemical Education (ECCE) in Budapest in September 1998 for practitioners of chemical education at degree level. The 1998 FECS Lecture entitled 'Using the results of chemical education research' will be delivered by Prof. Alex H. Johnstone, University of Glasgow, Scotland, on 28 August during ECCE.

In 1998 a special edition of the *International Journal of Science Education* will publish papers illustrating current chemical education research activity in Europe.

### Chemistry and the environment

Chairman: Dr A. Astrup Jensen, dk-TEKNIK Energy and Environment, 15 Gladsaxe Møllevej, DK-2860 Søborg, Copenhagen, Denmark. Tel.: +45 39 555904, fax: +45 39 696002, e-mail: aajensen@dk-teknik.dk

FECS societies have demonstrated increased interest in FECS activity in chemistry and the environment.

Plans were made for the conference 'Atmospheric Chemistry and Air Pollution', in Copenhagen on 26–28 August 1998. There is cooperation with the Italian Chemical Society in the planning of symposia for the conference 'Water in the Mediterranean Area, Conference on Quality and Quantity of Mediterranean Water Resources' in Sardinia on 11–18 October 1998.

An association with the journal *Environmental Science and Pollution Research* assists publicity—URL: <http://www.ecomed.de/naturw/bereiche/titel/espr/welcome.htm>

Plans were made to compile major textbooks in environmental chemistry. Contacts were developed with the European Environment Agency.

### Computational chemistry

Chairman: Dr G. Naray Szabo, Hungarian Chemical Society, H-1027 Budapest, Fő u 68, Hungary. Tel.: +36 1201 6883, fax: +36 1201 8056, e-mail: naray@para.chem.elte.hu

The 2nd European Conference on Computational Chemistry (EUCCO-CC2) was held in Lisbon in September, with about 200 participants. Plans are being made to organize a series of biannual summer schools on

computational chemistry, the first being in Perugia, Italy in 1999.

### Organometallic chemistry

Chairman: Prof. S. Pasykiewicz, Warsaw, Technical University, Faculty of Chemistry, Koszykowa 75, PL-00-662 Warsaw, Poland. Tel.: +48 22 6286599, fax: +48 22 6605462, e-mail: pasyn@ch.pw.edu.pl

The XIth FECCHEM Conference on Organometallic Chemistry was held in September in Prague with 400 participants from 35 countries, including 120 students. The booklet *Organometallic Research Centres in Europe* contains details of over 2000 European organometallic chemists: <http://www.vub.ac.be/ond/aosc/eoc/default.htm>

### History of chemistry

Chairman: Prof. H.A. Deelstra, University of Antwerp (UIA), Universiteitsplein 1, B-2610 Wilrijk, Belgium. Tel.: +32 38202 715, fax: +32 38202 734, e-mail: Labrom@uia.ac.be

The third edition of the highly successful *Guide for Museums with Collections on History of Chemistry and of Pharmacy* has been published. Preliminary plans are being made for publishing a history of European chemical societies.

### Chemistry in the conservation of the cultural heritage

Chairman: Prof. F. Piacenti, Università di Firenze, Dipartimento di Chimica Organica 'Ugo Schiff', Via Gino Capponi 9, I-50121 Firenze, Italy. Tel.: +39 55 2757 647, fax: +39 55 2757 660.

A programme has been launched to compile a 'Data Bank on Conservation Procedures of Stone, Metals Paintings'. Forms for this purpose have been published in *Science and Technology for Cultural Heritage*, 6(1), 1997, edited by the CNR, Rome. A first set of data on the conservation of monumental buildings are compiled in an interactive databank. Conservation organizations in Italy have adopted the forms.

### Electrochemistry

Chairman: Prof. J.W. Schultze, Heinrich-Heine Universität-Düsseldorf, Institut für Physikalische Chemie und Electrochemie, D-40225 Düsseldorf, Germany. Tel.: +49 211 811 4750, fax: +49 211 811 2803.

Plans were made for a meeting on 'Electrified Interfaces' in Porto on 5–10 July 1998, to consider the structure and dynamics of the solid/electrolyte interface. Contacts were developed with the European Commission to discuss relevant aspects of the Framework Pro-

gramme V. The development of a Eurocurriculum on electrochemistry is underway.

### European Communities Chemistry Council

Chairman: Prof. F. Alderweireldt, University of Antwerp, Department of Chemistry, Groenenborgerlaan 171, B-2020 Antwerp, Belgium.

Secretary: Ms E.K. McEwan, Royal Society of Chemistry.

The ECCC comprises national societies, both learned societies and professional associations, representing 150 000 chemists, of whom 50% are under 35 years of age.

### The designation European Chemist—EurChem

The professional designation, European Chemist (EurChem), is open to members of FECS member societies. European Chemist denotes academic qualification plus approved professional experience. There were 656 European Chemists at the end of 1997. The category-A schedule of qualifications lists the approved academic qualification requirements for candidates. Schedules of category-B and -C level qualifications are also maintained.

### PhD training

Collaboration with the CEFIC led to a highly successful joint Seminar on PhD training in chemistry in Europe, with contributions from senior representatives of academia and industry and the European Commission. Participants considered how the providers of PhD training could best respond to the challenges of the future.

### AllChemE

AllChemE mounted a highly successful Workshop on *University/Industry interaction—meeting the needs of the future through chemistry and chemical engineering*. It provided a valuable opportunity for chemists and chemical engineers to share information on good practice and highlighted innovative ways of matching post-graduate training with the research needs of a wide spectrum of industry.

The AllChemE report *Chemistry: Europe and the Future* was translated and published in French, German and Italian. Subtitled 'Science and technology to improve the quality of life in Europe', it aims to influence the future strategies of the European Commission and national bodies. It illustrates research activity in health and agriculture, new materials, energy and protection of the environment, likely to lead to inventions of high significance.

**AllChemE.** Alliance for Chemical Sciences and Technologies in Europe, comprising FECS/ECCC, CEFIC, CERC3 (Chairmen of European Research Councils Chemistry Committees), COST Technical Committee for Chemistry, EFCE (European Federation of Chemical Engineering), coordinates activities of mutual interest and promotes chemistry/chemical engineering in Europe.

### Organization for the Prohibition of Chemical Weapons (OPCW)

#### The regulation of the international transfer of chemicals by the chemical weapons convention

The Chemical Weapons Convention prohibits the transfer, directly or indirectly, of chemical weapons to anyone. It also bans the use of chemical weapons and any involvement in preparations to use chemical weapons. In addition, the Convention regulates the production, processing, consumption, and—to some degree—the international transfer of toxic chemicals which can be converted into or used to produce chemical weapons. The majority of these chemicals are dual-use compounds, i.e. they have legitimate commercial applications. It follows from this that a substantial segment of the global chemical industry could be affected by the Convention's provisions. Compliance with the provisions of the Convention is monitored by a new international organisation, the Organisation for the Prohibition of Chemical Weapons (OPCW), based in The Hague, the Netherlands. Each State Party must also establish or designate a National Authority, which will be entrusted with ensuring compliance within its own territory with the obligations assumed.

For an adequate understanding of the Conventions scope, it is important to emphasise that, in accordance with its purposes, the expression 'chemical industry' comprises all chemical, pharmaceutical and agrochemical enterprises and other related sectors, which produce, process and/or consume those chemicals identified in the Convention for the purposes of declarations and routine inspections. This means that not only those firms or plants grouped within the traditional chemical industry sector may be subject to the Convention's provisions. A considerable number of companies from other industrial sectors will probably also be affected by the obligations arising from the Convention, and should therefore prepare themselves adequately if this is the case.

### Chemicals to be monitored

The chemicals which are explicitly specified in the Convention for monitoring purposes cover a wide range and

include chemical warfare agents, as well as key precursors and more distant precursors. These chemical compounds or families of compounds are listed in the three Schedules of the Convention's Annex on Chemicals. Each of these Schedules has a different system of information and inspection requirements which is specified in the Verification Annex itself. These requirements are more stringent in the case of those chemicals which are deemed to pose a greater risk. The Verification Annex also includes restrictions on the international transfer of scheduled chemicals which are summarised below. Basic information on the three Schedules is as follows:

- **Schedule 1** includes toxic chemicals and some precursors, and groups of these, with very limited or no commercial use. It includes known chemical weapons agents such as sulphur mustards, nitrogen mustards, lewisites, and the nerve agents tabun, sarin, soman and VX.
- **Schedule 2** includes toxic chemicals and precursors, as well as groups of chemicals which have limited commercial use. This Schedule includes chemicals with some degree of warfare potential, as well as several precursors, or groups of compounds, which may be part of the final stages of production of chemical weapons. An example of the chemicals included is thiodiglycol, an immediate precursor of sulphur mustards, which is used in several industrial processes such as the production of inks, metal plating, etc.
- **Schedule 3** includes, dual-use chemicals produced in large volumes, for industrial activities, and precursors which may be part of the initial stages of production of chemical agents. This category comprises highly toxic gases such as phosgene and hydrogen cyanide which were used as chemical warfare agents during World War I, but which at present are produced in large quantities for industrial and commercial use.

### Restrictions on the international transfer of scheduled chemicals

The Verification Annex of the Convention establishes the following restrictions on the international transfer of scheduled chemicals:

#### *Schedule 1 chemicals:*

##### *Export:*

- Exports to States not Party to the Convention are prohibited;
- Exports can, be made to other States Parties only for justified non-prohibited (research, medical, pharmaceutical or protective) purposes and within a quantity which allows the purchasing State Party to keep an aggregate amount of such chemicals equal

to or less than one tonne at any given time, and for such purposes.

##### *Import:*

- Imports from States not Party to the Convention are prohibited;
- Imports from other States Parties for justified non-prohibited (research, medical, pharmaceutical, or protective) purposes are allowed, and only within a quantity which allows the importing State Party to keep an aggregate amount of such chemicals equal to or less than one tonne at any given time, and for such purposes.

##### *Other requirements:*

- Any transfer of a Schedule 1 chemical from one State Party to another is required to be notified by both States Parties to the Technical Secretariat (OPCW) at least 30 days before the planned transfer;
- Every year, each State Party has to make a detailed annual declaration on transfers during the previous year. This declaration shall be submitted not later than 90 days after the end of that year and shall include specific information on each Schedule 1 chemical that has been transferred;
- Schedule 1 chemicals that have been transferred shall not be re-transferred to a third State.

#### *Schedule 2 chemicals*

##### *Export:*

- Three years after the entry into force of the Convention, the export of Schedule 2 chemicals to States not Party will be prohibited;
- During the interim three-year period, each State Party shall adopt the measures necessary to ensure that transfers of Schedule 2 chemicals to States not Party shall be used only for purposes not prohibited by the Convention. Such measures shall include requesting a certificate from the recipient State, which has to state, *inter alia*, that the transferred chemicals will be used only for purposes not prohibited by the Convention; that they will not be re-transferred; the types and quantities of the chemicals; their end-use(s); and the name(s) and address(es) of the end-user(s).

##### *Import:*

- Three years after the entry into, force of-the Convention, the import of Schedule 2 chemicals from States not Party will be prohibited.

##### *Other requirements:*

- States Parties are required to make initial and annual declarations on aggregate national data for the previous calendar year on: (a) the quantities of each Schedule 2 chemical produced, processed, consumed, imported and exported; and (b) a quantitative specification of import and export for each country involved.



### *Schedule 3 chemicals*

#### *Export:*

- Each State Party shall adopt the measures necessary to ensure that transfers of Schedule 3 chemicals to States not Party shall be used only for purposes not prohibited by the Convention. Such measures shall include requesting from the recipient State a certificate which has to state, inter alia, that the transferred chemicals will be used only for purposes not prohibited by the Convention; that they will not be re-transferred; the types and quantities of the chemicals; their end-use(s); and the name(s) and address(es) of the end-user(s);
- Five years after the entry into force of the Convention, the need to establish other measures regarding transfers of Schedule 3 chemicals to States not Party will be considered.

#### *Other requirements:*

- States Parties are required to make initial and annual declarations of aggregate national data for the previous calendar year on: (a) the quantities of each Schedule 3 chemical produced, imported and exported; and (b) a quantitative specification of import and export for each country involved.

### **Further requirements**

The Convention also establishes further requirements in relation to activities to be carried out with scheduled chemicals, as well as with other chemicals which are widely used in industry. These requirements—in particular, those related to the production, processing, and consumption of the above-mentioned chemicals—should be taken into account as complementary information when the international transfer of such chemicals is being considered. These requirements are included in the Verification Annex of the Convention. Some comments on them follow:

*Schedule 1 chemicals:* Large-scale production of these chemicals is prohibited, and any existing stocks exceeding one tonne must be destroyed. However, each State Party may, at any given moment, retain a total of up to one tonne of these chemicals for the development of means of protection and for medical, pharmaceutical or research activities. The production of these chemicals is authorised only for research, medical, pharmaceutical or protective purposes, and shall be carried out only in a single small-scale facility approved by the State Party, and in other facilities as set forth in Part VI of the Verification Annex, in the context of restrictions which are clearly established in the Convention. These facilities are subject to systematic inspections by the Technical Secretariat of the OPCW

*Schedule 2 chemicals:* Those companies which produce, process or consume chemicals listed in Schedule 2 in annual amounts surpassing the thresholds established in the Convention must declare to their National Authority both the production facilities and the production volumes. Declared plant sites that comprise one or more plants which, during any of the previous three calendar years, have produced, processed or consumed Schedule 2 chemicals above inspection thresholds, or which are anticipated to produce, process or consume Schedule 2 chemicals above inspection thresholds in the next calendar year, are liable to inspections from the Technical Secretariat of the OPCW

*Schedule 3 chemicals:* The Convention also includes in this category production thresholds which, when surpassed, render declarable the facilities which produce them. In addition, declared facilities which produce Schedule 3 chemicals in excess of inspection thresholds are subject to random inspections.

The Convention also includes provisions for another group of chemicals which is of considerable importance to the chemical industry: the group of (unscheduled) 'discrete organic chemicals' (DOCs). These are understood to mean any chemical belonging to the class of chemical compounds consisting of all compounds of carbon which are identifiable by means of their chemical name, structural formula, if known, and by their Chemical Abstracts Service registry number if assigned.

In the case of such DOCs, production facilities must be declared whenever annual production surpasses 200 tonnes of all DOCs produced together. The exceptions are those facilities dedicated exclusively to the production of hydrocarbons or explosives, and the definition of DOCs itself makes an exception for all oxides, sulphides and metal carbonates. The First Session of the Conference of States Parties to the Convention, which met in The Hague in May 1997, also agreed with the recommendations of the Preparatory Commission for the OPM, that polymers and oligomers of all compounds of carbon, are excluded from these declarations. Should these compounds contain phosphorus, sulphur or fluorine, the declaration threshold for each chemical will be 30 tonnes per year. The verification of these facilities will commence at the beginning of the fourth year after the entry into force of the Convention (entry into force was 29 April 1997), unless the Conference of the States Parties decides otherwise at its regular session in the third year after entry into force.

More information is available at OPCW's Web Site, URL: <http://www.opcw.nl/ptshome.htm>

## IOCD Annual Report

### International Organization for Chemical Sciences in Development

#### Programme Activities, 1998

For up-to-date Information about IOCD activities, please see the Web Site: [www.iocd.unam.mx](http://www.iocd.unam.mx)

#### (1) IOCD's vision and mission.

After reviewing 17 years of IOCD activities, from its creation in 1981 to the present, the IOCD's principal officers prepared the following vision and mission statements:

*The IOCD Vision:* We envision IOCD as a global network of scientists committed to building capacity in the chemical sciences in developing countries and to employing this capacity in practical undertakings that contribute to the well-being of the people in these countries.

*IOCD's mission* is to provide a vehicle for the ethical concerns of distinguished scientists wishing to assist their fellow chemical and biological scientists in developing nations, to utilize their resources and capacities in practical ways that will serve the needs of their communities, and to influence these scientists' career decisions based upon appropriate originality, entrepreneurialism and practicality.

#### (2) Activities of the IOCD Working Groups.

IOCD pursues its mission through four working groups, each focused on a specific field: *Plant Chemistry*, *Tropical Diseases*, *Environmental Analytical Chemistry*, and *Fertility Regulation*.

These working groups:

- organize symposia in developing countries that serve as catalysts for change by bringing together commercial, academic and basic scientific researchers to focus on practical solutions to developing world needs;
- provide opportunities for developing world scientists to work within world renowned laboratories, for short periods, in order to gain experience with modern methods and techniques;
- carry on workshops within developing world laboratories, in order to enhance proficiency in relevant techniques by providing hands-on research experience.

##### (a) Joint IOCD/IUPAC Working Group on Environmental Analytical Chemistry.

This working group convened the Workshop on Environmental Analytical Chemistry in Montevideo, Uru-

guay, from 19 to 22 March 1998 for between 20 and 30 analytical chemists in Latin American countries. The workshop took place in association with CHEMRAWN XI (Regional Conference on Environmental Chemistry for Latin America) that also convened in Montevideo from 15 to 21 March 1998. A description of the workshop (lecturers and topics) and CHEMRAWN may be requested from IOCD (see also p. 99 of this issue).

Funding of this workshop was made possible through grants from IUPAC and the Chemical Manufacturers Association (CMA), enabling the IOCD to cover the costs of air travel, hotel and meals of many of the participants. IOCD will also meet the cost of air travel and hotel and meals for several of the lecturers, although many have received support from their institutions or governments. IOCD also received a grant from UNESCO for reprinting of the 700-page Spanish language version of the EPA/FDA Central American Pesticide Laboratory Training Manual for distribution to analytical chemists in Latin America.

##### (b) IOCD Working Group on Plant Chemistry.

As a cosponsor with CYTED, a Latin American nongovernmental organization, IOCD organized the International Symposium on the Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas on 23–26 February 1997 in Panama City, Panama. Over 200 participants from 29 countries gathered to hear updated information concerning different aspects of research on phytochemistry and pharmacology of plants in North and South America. Prior to the symposium, a workshop on chemical screening methods for plants was held in Lima, Peru for natural products chemists from Latin American countries. IOCD will publish the proceedings of the symposium as a book through Harwood Publishing Company within one year. (The proceedings of the previous international symposium organized by this working group in Zimbabwe in 1996 are available as a book: *Chemistry, Biological and Pharmacological Properties of African Medicinal Plants*. University of Zimbabwe Press, Harare, Zimbabwe. Price: US\$50.00.)

Reviewing this book in the *Journal of Natural Products* (Vol. 60, no. 20, 1997), Dr Maurice Iwu of Walter Reed Army Institute of Research states that this book 'will remain a reference for a long time.'

Throughout 1998, the IOCD Working Group on Plant Chemistry will collaborate with other organizations in supporting symposia and workshops for natural products chemists in developing countries. With CYTED, IOCD is co-sponsoring the Workshop on Methodologies in the Search for New Lead Compounds from Plants (28 September—2 October 1998) in Santiago, Chile. IOCD expects to provide travel grants to three or four young chemists from Latin American countries as participants in the workshop.

At the 7th International Chemistry Conference in Africa (ICCA), 6–10 July 1998, in Durban, South Africa, IOCD is organizing a satellite symposium with two noted African research scientists, the President of IOCD, Dr Jean-Marie Lehn of Strasbourg and Paris, France, and the Chairman of the IOCD Plant Chemistry Working Group, Dr Kurt Hostettmann, Lausanne, Switzerland, who will review 10 years of research into African medicinal plants.

In a third collaboration in 1998, IOCD is co-sponsoring with ARRT International, Inc., publisher of the *Screening Forum*, the international conference CYPRUS 1998, on 'New Technologies and Frontiers in Drug Research,' 4–8 May 1998, in Limasol, Cyprus. The conference addresses emerging technologies in drug discovery with special attention to their impact on the chemical and biochemical sciences. ARRT International Inc. is meeting the full costs (registration fee and hotels and meals) for five scientists from developing countries (to be selected by IOCD) to participate in the conference. The complete programme of CYPRUS '98 is available from IOCD.

(c) IOCD Working Group on Tropical Diseases.

The Chairman of this working group, Dr Fred Opperdoes, Research Unit for Tropical Diseases, Brussels, Belgium, is also leader of COST-B9 'Action on Chemotherapy of Protozoal Infections.' COST is the acronym for the European Cooperation in Scientific and Technical Research, a programme of cooperative research among European universities that is funded by the European Union. At the request of Dr Opperdoes, the group of five European laboratories co-operating as COST-B9 have extended observer status to the IOCD Working Group on Tropical Diseases with the expectation that IOCD will facilitate participation of chemists from developing countries in COST programmes.

As the first collaborative activity between COST and IOCD, IOCD will convene a workshop on medicinal chemistry from 4 to 6 June 1998. This will follow the first COST-B9 Congress on Antiprotozoal Chemotherapy that meets 31 May to 3 June 1998, in Sierra Nevada, Granada (Spain). The medicinal chemistry workshop will help chemists from developing countries who are specialists in synthetic organic chemistry to acquire knowledge of the principles of contemporary medicinal chemistry and therefore become capable of moving from mere synthesis of an analogue of a lead compound that someone else has identified, to actual identification of that lead compound itself. A grant from the National Academy of Sciences and the American Chemical Society ensures that travel costs are covered so that chemists from developing countries may participate in this workshop. Instruction will be provided by both IOCD and COST scientists, including Dr Lester A. Mitscher, University of Kansas, a member of the Senior Advisory

Council of IOCD and a Titular Member of the Commission on Training and Development, Chemistry and Human Health Division, IUPAC.

**(3) IOCD support of biodiversity exploration and conservation.**

In June 1994, IOCD responded to a request from the National Academy of Sciences to assist Dr Thomas Eisner of Cornell University in establishing a global organization for promoting exploration and conservation of biodiversity resources in developing countries. Dr Eisner is convinced that only a focused global effort can hope to stop the rapid disappearance of these critical resources under the continuing pressures of development. Under a grant from the MacArthur Foundation, IOCD obtained the services of Dr Charles Weiss, the former Science and Technology Adviser of the World Bank, to form the Biotic Exploration Fund as an instrument through which IOCD can collaborate with developing countries in building local scientific and entrepreneurial capacities needed for chemical and biological exploration of biodiversity, including eventually establishing production capacities for commercialization of findings from explorations.

*South Africa.* In early 1996, South Africa was the first country to request IOCD assistance through the Biotic Exploration Fund. IOCD used funds from the MacArthur Foundation grant and additional grants from UNESCO and the National Academy of Sciences to send Dr Weiss and another IOCD scientist to South Africa to work for six weeks with the South African Council for Scientific and Industrial Research (CSIR). This joint project preparation mission prepared a business plan for the CSIR that called for establishment of major commercial enterprises based on outcomes of exploration with biodiversity resources in South Africa.

*Nepal.* In 1997, the Royal Nepal Academy of Science and Technology requested IOCD to assist them in building local capacity for bioprospecting in Nepal. A grant from the Novartis Foundation for Sustainable Development enabled IOCD to respond to this request. In September 1997, IOCD scientist, Dr Maurice Iwu, traveled to Nepal to join members of the Nepal Traditional Medicine Promotion Group (TWPG) in a joint mission of several weeks.

While in Nepal, Dr Iwu and his colleagues:

- 1 conducted an initial workshop with the Traditional Medicine Promotion Group to explain the process of drug discovery and outline the operations and policies for bioprospecting;
- 2 visited relevant research laboratories and local private pharmaceutical, cosmetic and other manufacturing facilities based on biodiversity resources in Nepal;

- 3 interviewed government officials concerned with access to biodiversity resources, scientific research, and promotion of biotechnology business;
- 4 obtained information about traditional healers in order to learn about their resources and determine their capabilities;
- 5 discussed a specific local action that TWPG will implement. (IOCD has given a small grant to the TWPG for implementation of this local action and urged TMPG to recognize it must be a basic component of the long-term programme for developing the capacity and infrastructure in Nepal for bioprospecting).

Kenya. Also in 1997, the International Centre for Insect Physiology and Ecology (ICIPE) in Nairobi, Kenya, has requested IOCD assistance in preparing a bioprospecting programme focused on insect diversity. IOCD has allocated funds in a 1997 grant from the Na-

tional Academy of Sciences and the American Chemical Society to the costs of a joint project preparation mission in Kenya for three weeks in June 1998.

In all its work through the Biotic Exploration Fund, IOCD is committed to dealing equitably and respectfully with indigenous peoples and to being guided by the following policy:

IOCD intends to honour the letter and spirit of the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and other international, regional and national laws and policies concerning biodiversity.

Prepared by: Robert Maybury, Executive Director, IOCD, IOCD (USA Office), PO Box 8156, Falls Church, VA 22041 USA, Tel. & fax: (703) 845 9078, e-mail: iocd@igc.apc.org

## Reports from IUPAC sponsored symposia

The Plenary and Invited Lectures from the IUPAC International Symposium on Advances in Polymer Science and Technology, appear in *Pure and Applied Chemistry* 1998, Vol. 70, 1229–1299

**The Conference was organized by the Central Leather Research Institute, Madras from 5 to 9 January 1998.**

One of the challenges confronting polymer chemists and technologists is to translate the recent insights of the structure and properties of macromolecules gained through research into the practicalities of the chemical industry. Macromolecules Science and Technology is

unique in this aspect, in that innumerable developments in the field have found applications in industry as varied as consumer products, construction, packaging, electronics, coatings, space and aerospace, leather composites, etc.

The prestigious IUPAC International Symposium on Advances in Polymer Science and Technology, organized by the Central Leather Research Institute from 5 to 9 January 1998 at Chennai focused attention on the recent advances in the Indian and International scene of the last two decades. The Symposium covered 287 papers contributed by 590 scientists from India and abroad. The Symposium consisted of plenary, invited lectures and poster presentations, 127 papers were

presented orally and 160 papers presented in the form of posters. The topics covered in the sessions were Polymerization by Single Site Catalysis, Novel Polymers and Polymerization Techniques, Liquid Crystalline Polymers, Conducting Polymers, Functional Polymers, Polymeric Membranes, Biomaterials and Biomedical Polymers, Polymeric Fibres, Blends and Composites, Polymer Structure–Property Relationships, Polymer Characterization and Newer Applications of Polymers.





This Symposium was cosponsored by the Indian National Science Academy, the Council of Scientific and Industrial Research, Departments of Science and Technology, Biotechnology and Defence Research Development Organization of the Government of India, Tamil Nadu State Council for Science and Technology, Indian Petrochemicals Corporation Ltd, Vadodara (India) and The Society for Polymer Science, India. The Conference organizers take this opportunity to thank the large number of International and Indian scientists who participated in this Symposium.

**Dr K.S.V. Srinivasan,  
Convener**

### The Plenary and Invited Lectures of The Eighth International Conference on Bioinorganic Chemistry (ICBIC 8) appear in *Pure and Applied Chemistry* 1998, 70, 855–991

The Eighth International Conference on Bioinorganic Chemistry was held in Yokohama, Japan, during the week of 27 July–1 August 1997, with Prof. Masanobu Hidai, University of Tokyo, as Chairman. Following the tradition of the previous conferences held in Florence, Italy (1983), Algarve, Portugal (1985), Leiden, The Netherlands (1987), Cambridge, MA, USA (1989), Oxford, UK (1991), La Jolla, CA, USA (1993), and Lübeck, Germany (1995), the scientific programme of the Conference consisted of oral and poster sessions: there were five plenary lectures, 66 invited lectures, and 370 poster presentations, which were attended by 730 participants from 28 countries.

The plenary lectures were given by Profs R. Huber, K. D. Karlin, P.J. Sadler, J.K. Barton, and T. Kitagawa, and the 66 invited lectures were given in the following 18 sessions:

- A** Molybdenum
- B** Metal Uptake, Transport, and Storage
- C** Copper
- D** Heme Iron and Metalloporphyrins
- E** Metals in Medicine

- F** Nickel
- G** Manganese
- H** Zinc
- I** Bioinspired Homogeneous Catalysis
- J** Iron-Sulfur and Other Metal-Sulfur Clusters
- K** Activation of Small Molecules
- L** Metal Complexes of Small Biomolecules
- M** Non-Heme Iron
- N** Metals, Nucleic Acids, and Gene Regulation
- O** Environmental Bioinorganic Chemistry
- P** Vanadium
- Q** Electron and Energy Transfer
- R** Specific Application of Spectroscopy

All the lectures presented the state of the art of the current research activities in various fields of bioinorganic chemistry. The ICBIC 8 issue of *Pure and Applied Chemistry* contains the plenary lectures and invited lectures on selected topics. The first four lectures were presented by the plenary lecturers. They were followed by the lectures on molybdenum enzymes (A), galactose oxidase (C), heme enzymes (D), Mössbauer spectroscopy of iron porphyrins (D), water-oxidizing manganese enzyme models (G), metal–sulfur clusters (J), diiron complex-dioxygen interactions (M), orientation of imidazole rings in metal complexes (L), stacking and hydrolysis of nucleotide 5'-triphosphates (L), nucleobase arrangements by metal ion coordination (N), and electron transfer in metalloproteins (Q).

This issue will be a valuable guide and source of information for the current trends and achievements in bioinorganic chemistry. Owing to the page limitation, however, only a limited number of topics were selected, so that it was not possible to incorporate the other important and interesting lectures. Readers are recommended to refer to the abstracts of ICBIC 8 published in *The Journal of Inorganic Biochemistry* (Volume 67, Numbers 1–4, 1997) for further information.

The Conference was organized by the Science Council of Japan and the Chemical Society of Japan, and was sponsored by the International Union of Pure and Applied Chemistry, the Society of Biological Inorganic Chemistry, and the Division of Biofunctional Chemistry of the Chemical Society of Japan. Generous financial support by these and other sponsoring organizations and many companies is gratefully acknowledged. I also wish to thank all the members who took part in organizing the Conference for their heartfelt dedication.

Finally, I would like to express my sincere thanks to the lecturers for their kind cooperation and excellent contributions to this issue.

**Osamu Yamauchi,  
Conference Editor,  
Chairman, Programme Committee**

## Reports from IUPAC bodies

### Commission of High Temperature Materials and Solid State Chemistry (II.3)

#### Summary of the minutes of the meeting in Geneva, 24–26 August 1997

The commission is working primarily on focused international projects concerned with inorganic materials. Current projects reflect the principal function of the Union, i.e. standardization and nomenclature. Other projects are concerned with advancement of teaching solid state chemistry, teaching materials chemistry, and chemistry related to problems of ceramic materials.

The activity of the commission in the area of standardization resulted in the report 'Characterization of SiC powders and influence of powder properties on sintering' by G. Schwier, J. Tensel and M.H. Lewis, published in *Pure and Applied Chemistry*. An important part of the report is the detailed description of the merits and shortcomings of methods for characterizing powder properties, such as particle size, morphology, bulk and surface chemistry.

The objectives of the project 'Characterization of carbonaceous materials and new carbons (CCMC)' are to collect and review the national standards and to point out differences in important parameters (e.g. sample size, particle size, temperature, etc.). The work is performed within the subcommittee project on CCMC. Dr Boehm reported that the various national standards for the characterization of carbon materials, ASTM, ISO, British Standards, DIN (Germany), AFNOR (France), NNI (Netherlands), JIS (Japan) are now compiled. Prof. Heintz (SUNY at Buffalo, NY) is in the process of listing these standards in a format suitable for easy comparison. The format will be similar to that used in an earlier publication in *Pure & Appl. Chem.* (1979). Prof. Heintz hopes to finish this work before the end of the year.

Several projects are devoted to terminology. The project 'Terminology for diffusion in solid state' is in its final stages. A draft manuscript has been prepared and sent to a number of external experts for comment. After revision in light of their comments, and approval by the commission, the revised manuscript will be sent to 15 referees.

The objective of the project 'Terminology of Vapour Deposition Techniques' is to provide definitions for terms used in vapour deposition science and technology. The coordinator proposed a list of terms and is soliciting comments from experts. This input will result in an extended and amended listing which will then be presented to the commission before sending to reviewers.

Provisional recommendations for silicon nitride terminology were accepted for publication in the *Journal of the European Ceramic Society* and announced in the *Bulletin of the American Ceramic Society*. Readers were invited to comment. The coordinator will prepare a revised report for IUPAC review after considering readers comments.

An important commission activity is to promote education in the fields of Solid State Chemistry and High Temperature Materials Chemistry. The purpose of the current project 'Teaching Experiments in Solid State Chemistry' is to widen the collection of instructive, easy-to-perform, tested laboratory experiments illustrating important aspects of solid state chemistry. A list of experiments with comments collected to date by the commission members will be made available to interested readers in the CTC newsletter, with plans to make them available on the World Wide Web.

Two current projects are devoted to ceramic materials 'Chemical research needed to improve High Temperature Processing of Advanced Ceramics' and 'Surface analysis of ceramics'. The purpose of the first project is to interest solid state chemists in devoting their knowledge and techniques to the solution of significant problems of modern technical ceramics, whereas the second project focuses on surface-sensitive experimental techniques directed toward ceramics. It is believed that both projects will be particularly useful to industrial users and processors of advanced ceramic materials. The basic approach in both projects is to engage a number of experts for recommendations and critical evaluation of the field.

The commission continued its highly successful series of conferences on High Temperature Materials Chemistry. HTMC IX was hosted by Prof. Spear at Pennsylvania State University in May 1997 and was attended by more than 130 participants. The plenary lectures were published in *Pure and Applied Chemistry* 1998, **70**, 439–515, and the conference proceedings, issued shortly after the conference, contain papers covering a broad spectrum of material phenomena at high temperatures. These conferences are greatly enhanced by the international composition and unique mix of expertise of the commission. HTMC X will be held at Jülich, Germany, in 2000, organized by Prof. Hilpert.

The commission discussed and verified several new potential projects, related in particular to contemporary inorganic materials. New members with expertise in the proposed projects were identified and proposed for membership in the commission.

## Summary of the Minutes of the meeting of the Commission on Molecular Structure and Spectroscopy (I.5) at the IUPAC General Assembly, Geneva, Switzerland 24–27 August 1997

Fifteen members of the Commission on Molecular Structure and Spectroscopy (I.5), including national representatives and observers, met for three days of hard work during the 39th General Assembly in Geneva, Switzerland, with little time for admiring the beautiful setting on the Lac Lemman and the famous Geneva fountain. Three new Titular Members, Robin S. McDowell, Noboru Hirota and James E. Boggs, and three Associate Members, Soji Tsuchiya, Qing-Shi Zhu and Paul von Rague Schleyer were elected to the Commission. Four new national Representatives were appointed, Profs P.T. Manoharan (India), J.P. Hawranek (Poland), B.J. Van der Veken (Belgium), and R. Janoschek (Austria).

Several projects were completed and the results published in *Pure & Appl. Chem.*: C.L. Wilkins, Guidelines on Nuclear Magnetic Resonance Computerized Databases *Pure & Appl. Chem.* 1995, **67**, 593; A.M. Bradshaw and N.V. Richardson, Symmetry, Selection Rules and Nomenclature in Surface Spectroscopy, *Pure & Appl. Chem.* 1996, **68**, 457; G. Guelachvili and 23 collaborators, High Resolution Wavenumber Standards for the Infrared, *Pure & Appl. Chem.* 1996, **68**, 193, and this paper was also reprinted in *J. Molec. Spectrosc.* 1996, **177**, 164 and *Spectrochim. Acta* 1996, **52**, 717; C.J.H. Schutte, J.E. Bertie, P.R. Bunker, J.T. Hougen, I.M. Mills, J.K.G. Watson and B.P. Winnewisser, Notations and Conventions in Molecular Spectroscopy part 1. General Spectroscopic Notation, *Pure & Appl. Chem.* 1997, **69**, 1633; C.J.H. Schutte, J.E. Bertie, P.R. Bunker, J.T. Hougen, I.M. Mills, J.K.G. Watson and B.P. Winnewisser, Notations and Conventions in Molecular Spectroscopy part 2. Symmetry Notation, *Pure & Appl. Chem.* 1997, **69**, 1641; P.R. Bunker, C.J.H. Schutte, J.T. Hougen, I.M. Mills, J.K.G. Watson and B.P. Winnewisser, Notations and Conventions in Molecular Spectroscopy part 3. Permutation and Permutation-Inversion Symmetry Notation, *Pure & Appl. Chem.* 1997, **69**, 1651.

The following book has been published: J.E. Bertie, C.D. Keefe and R.N. Jones, Tables of Intensities for the Calibration of Infrared Spectroscopic Measurements in the Liquid Phase, 263 pp., Blackwell Science Ltd, 1995. A joint article from Commissions I.5 and V.4 describing the work in the two commissions has been published in *Applied Spectroscopy* 1996, **50**, 12A; J.E. Bertie and T. Vo-Dinh, Spectroscopy Commissions of the International Union of Pure and Applied Chemistry.

Other articles which were in press or the projects were very close to completion were: R.K. Harris, J.

Kowalewski and S. Cabral de Menezes, Parameters and Symbols for Use in Nuclear Magnetic Resonance, *Pure & Appl. Chem.* 1997, **69**, 2489–2505; E.D. Becker, W. Bremser, S. Cabral de Menezes, R. Goodfellow, P. Granger and R.K. Harris, Recommendations for NMR Nomenclature A. Nuclear Spin Properties and Conventions for Chemical Shifts; and J.E. Bertie, Specification of Components, Methods and Parameters in Fourier Transform Spectroscopy by Michelson and Related Interferometers. The latter paper has been divided into one part for modest resolution spectroscopy ( $0.1\text{ cm}^{-1}$  or less) and one for high resolution spectroscopy ( $10^{-3}\text{ cm}^{-1}$  or better). In addition, a part pertaining to FT-Raman spectroscopy is included. The following manuscript of a book was approved in Geneva: E. Hirota, R.W. Field, J.P. Maier and S. Tsuchiya, Editors, Non-linear Spectroscopy for Molecular Structure Determination. It constitutes a monograph of 268 pages and 10 chapters, probably suitable both for teaching and as a reference book to nonlinear spectroscopy. The book will be published by Blackwell early in 1998.

Projects from the Sub-Committee on Theoretical Chemistry are in progress: Guidelines for Presentation of Methodological Choices in the Publication of Computational Results, A. *Ab Initio* Electronic Structure Calculations (Project leader J.E. Boggs) *Pure & Appl. Chem.* 1998, **70**, 1015–1018. The paper was approved by the Commission for immediate publication. A draft for semi-empirical calculations is in progress (part B) and should be completed in two years. A third paper (part C) is planned to deal with computation of large molecules by molecular mechanics. An extensive report comprising 194 compounds was presented to the Commission for discussion and suggestion: R. Janoschek, The Quantum Chemical Computation of Structures and Properties of Small Experimentally Known Molecules I. Diatomic Molecules for H-Ar. It was agreed that the project would be completed following consultations with an international group of specialists.

Various new projects were initiated: Notations and Conventions in Molecular Spectroscopy. Part 4. Vibrational-Rotational Spectroscopy (Project leaders R.S. McDowell and J.K.G. Watson); Notations and Conventions in Molecular Spectroscopy. Part 5. Electronic-Vibrational-Rotational Spectroscopy (Project leaders J.K.G. Watson and R.S. McDowell). The Commission approved both these projects. Another proposed project was also approved: Quantities, Terminology and Symbols in Photothermal and Related Spectroscopies (Project leaders N. Hirota and M. Terazima); these methods are very sensitive and of increasing importance in applied science. R.K. Harris successfully sought approval-in-principle for a project to recommend Nomenclature for tensor quantities used in NMR, NQR and ESR Spectroscopies (Project leader R.K. Harris);

formal IUPAC approval for this project will be sought when the working party members have been recruited and the goals have been more precisely formulated.

Joint meetings were held between Commission I.5 and three other commissions: Commission V.4 (Commission on Spectrochemical and Other Optical Procedures for Analysis) of the Analytical Division; Commission I.3 (Commission on Electrochemistry) and Commission I.1 (Physicochemical Symbols, Terminology and Units). With each of these commissions various projects of common interests were discussed. These joint meetings are very important to avoid overlap between projects of different commissions and to provide stimulation for joint projects of greater breadth than is usually achieved by a single commission. In particular, the meetings in Geneva gave good ideas to both parties about new proposals and cooperation on existing projects. With Commission I.1 it was agreed on additions and alterations which should be included in the next edition of *The Green Book* (Quantities, Units and Symbols in Physical Chemistry).

Theoretical chemistry plays an ever increasing role in chemistry and the Subcommittee on Theoretical Chemistry, which was established at the General Assembly in Guildford, continues with its chairman Prof. James E. Boggs. The subcommittee is strengthened with five new members. The Subcommittee on Notations and Conventions for Molecular Spectroscopy has a new chairman Dr J.K.G. Watson, and Dr Robin S. McDowell and Prof. Jean-Marie Flaud will join the subcommittee.

The commission discussed the use of the World Wide Web and it was suggested that a Home Page be established. However, no decision was made concerning the content and who should be responsible for the Web Site.

The chairman, John E. Bertie, expressed his thanks to the outgoing members for their contributions to the work of Commission I.5 and looked forward seeing the members at the next IUPAC General Assembly to be held in Berlin in August 1999.

Peter Klæboe  
(Secretary of Commission I.5)

## Book Review

**This review was first published in *Terminology* 1997, 4(1), 161–189, and is reprinted in part by permission of the publisher, John Benjamins Publishing Co.**

J.C. Rigg, S.S. Brown, R. Dybkaer and H. Olesen. *Compendium of Terminology and Nomenclature of properties in Clinical Laboratory Sciences (Recommendations 1995)*. Blackwell Science Ltd, 1995.

This volume, the *Silver Book*, prepared on behalf of the International Union of Pure and Applied Chemistry (IUPAC) and the International Federation of Clinical Chemistry (IFCC), is the first systematic and comprehensive guide to approved terminology and nomenclature for clinical chemistry and allied fields. The chief intent of the work is to harmonize and promulgate rules and conventions on quantities, dimensions and units.

Official recommendations published by IUPAC, IFCC, and other bodies, some of them not readily accessible to the scientific community, are here brought together and set forth in a unified format. The authors have exercised considerable editorial discretion in selecting material for inclusion and in coordinating recommendations from diverse sources. A voluminous bibliography supplies historical and authoritative underpinning.

This work is not just a bald catalogue of metrologic standards, but is a thorough treatment of the subject, including background information and definitions of terms pertaining to laboratory medicine, as well as valuable details on the history and philosophy of clinical laboratory metrology.

The marriage between laboratory science and practical medicine has never been altogether harmonious. Although workers in the two disciplines share essentially the same goals, they differ markedly in method and point of view. Medical interpretations and decisions tend to be far more qualitative, empirical and even subjective than those in pure science.

In view of the diversity of potential users, the *Silver Book* supplies definitions of terms and concepts in both pure science and clinical laboratory work. For the laboratory scientist, the authors provide an orientation to the clinical setting, with useful information about the processes whereby specimens are obtained, identified, and submitted for testing. The medical professional will discover that the goal of the work is not regimentation but international consistency and internal coherence in measurement.

Metrologic standards are prescribed for certain specialized fields (optical spectroscopy and spectrometry,



centrifugation, electrophoresis, and enzymology) having particular relevance to laboratory medicine. The *Silver Book* does not, however, pretend to be all-inclusive, much less definitive. Some branches of metrology have been passed over because a consensus on terminology and units has yet to be reached, others because they were not deemed sufficiently relevant to clinical laboratory work.

As the formal title of the book suggests, its recommendations are by no means limited to metrologic standards. Some narrow restrictions have also been placed on terminology. Terms such as activity, density, power and strength are rejected as ambiguous. Abbreviations are no longer acceptable for the names of chemical components, because some of these have more than one meaning, are not understood internationally or even across disciplines, or have been formed from obsolete terms. For example, TSH, universal shorthand for thyroid-stimulating hormone, is condemned because the latter term has supposedly been replaced by thyrotropin.

Although the *Silver Book* sets forth recommended standards, it does not undertake to persuade either laboratory workers or physicians and allied health practitioners to abandon deeply entrenched metrologic traditions, some of them rooted in the 19th century.

What kind of new units, standards and conventions are workers in laboratory medicine as well as physicians now asked to put into practice? A concrete example may help to clarify the type and extent of such changes.

Almost from the origins of modern clinical chemistry, concentrations have been recorded in units of weight (grams or submultiples of the gram) per standard volume (generally either one litre or one decalitre)—for instance, glucose: 124 mg/dL. By exception, ionic analytes such as sodium ( $\text{Na}^+$ ) and bicarbonate ( $\text{HCO}_3^-$ ) have in recent decades been reported in milliequivalents (mEq, based on molecular weight) to facilitate calculations of serum electrolyte balance.

Meeting the standards laid down in the *Silver Book* will require the following changes from current practice:

- 1 Concentrations (now called volume fractions) of most analytes must be reported in units based on molecular weight (now called relative molar mass) per unit volume. The only exceptions will be complex molecules or mixtures, for which a molar mass cannot be established; these will continue to be measured by weight. Applying the appropriate conversion factor to the glucose concentration given above, we get 0.688 mEq/dL.
- 2 The equivalent, or val, has been renamed the mole (mol). The glucose concentration thus becomes 0.688 mmol (millimoles)/dL.

- 3 Since the standard denominator, or volume unit, in a concentration is now one litre, our value for glucose must be restated as 6.88 mmol/L.

- 4 In line with Continental practice, the comma has replaced the decimal point: 6,88 mmol/L. (Using the comma to break up large figures into groups of three numerals—1,234,567,890—is no longer approved.)

- 5 A further change, though not yet required, appears extensively throughout the book and will no doubt become *de rigueur* in due course. This is the expression of an implied division, not with a slash mark, but by showing the denominator as a factor with a negative exponent: 6,88 mmol L<sup>-1</sup>.

The first three of these changes have been put into effect by the publishers of a number of medical reference works and of some clinically oriented journals. But the 21st century will probably be well advanced before all these changes gain universal acceptance among clinical laboratory workers and physicians.

Even scientifically oriented workers may resist some of the innovations spelled out in the *Silver Book*. Everyone has trouble abandoning long-familiar language, units and symbols for new ones, but some of the standards proposed actually represent new ways of looking at physical reality. The language and perspective of systems-analysis theory is all-pervasive. The term constant is now restricted to 'universal constants of nature'. Hence, although molar number constant is approved as a new name for Avogadro's number, equilibrium constants are now expected to be termed equilibrium coefficients.

Among 'kinds-of-quantity of dimension one' (those in which exponents of dimensional terms are all zero), percentage and its symbol (%) are acceptable, but parts per million (p.p.m.) is not. Many old friends appear in unfamiliar guises. Density has become areic number, and specific gravity is now relative volumic mass. Specific heat has emerged from the furnace as massic kelvic enthalpy.

The language of this book is lean and rigorously precise. Even those who object to some of the recommendations as arbitrary or irrational must concede that the presentation of the material is clear and admirably coordinated. British-Continental spelling appears throughout: colour, litre, metre, titre; but: gram, kilogram.

Neither the *Silver Book* nor the recommendations of IUPAC, IFCC, and other bodies that it contains have any legislative force, unless they should be made mandatory by institutional or governmental authority. How fully the new standards will be voluntarily adopted, and by how large a segment of the scientific and medical world, remains to be seen.

**John H. Dirckx,  
University of Dayton**

# New books and publications

## New IUPAC books

*IUPAC Series on Analytical & Physical Chemistry of Environmental Systems*. Series Editors: J. Buffle, University of Geneva, Geneva, Switzerland & H. van Leeuwen, Agricultural University, Wageningen, The Netherlands

The main purpose of this series is to make chemists and other scientists aware of the most important biophysico-chemical processes which influence the behaviour of environmental systems, in terms of sound quantitative theoretical concepts. The volumes of this series emphasize processes which are specifically related to environmental systems, systems with which chemists with a main background in homogeneous reactions in solutions are often unfamiliar.

The main aim of this series is to discuss in detail:

- (i) the important bio-physico-chemical processes and structures
- (ii) the analytical tools which exist or should be developed to study these processes and structures

The interdisciplinary nature of the IUPAC Series ensures that these volumes are invaluable for chemists, biochemists, biologists, ecologists and environmental engineers.

Previously published volumes:

*Environmental Particles*, Vol.1, edited by J. Buffle & H.P. van Leeuwen. Lewis Publishers (1992), ISBN 0 87371 589 6.

*Environmental Particles*, Vol.2, edited by J. Buffle & H.P. van Leeuwen. Lewis Publishers (1993), ISBN 0 87371 895 X.

*Metal Speciation and Bioavailability in Aquatic Systems*, Vol. 3, edited by A. Tessier & D.R. Turner. John Wiley & Sons (1996), ISBN 0 471 95830 1.

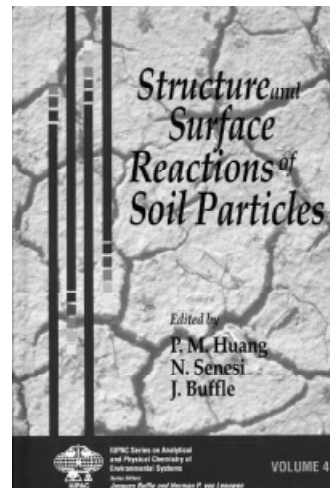
*Structure and Surface Reactions of Soil Particles*, Vol. 4, edited by P.M. Huang, N. Senesi & J. Buffle. John Wiley & Sons (1998), ISBN 0 471 95936 7.

A fundamental understanding of soil structures and processes at the molecular and microscopic level is essential to understanding and regulating the behaviour of environmental systems. *Structure & Surface Reactions of Soil Particles*, the definitive guide to the analysis of soil, addresses the basics of structure and surface reactions of soil particles and colloids.

Here, leading scientists review and evaluate the best sampling and analysis methods currently available, and summarize possible future research. Ideal for graduate

students, chemists and biologists working in environmental analysis and soil chemists studying the effects of landfill, pesticides and climate change, this book specially covers:

- Minerals-organics-microbes interactions in the soil environment.
- Fractal approach in the evaluation of soil particle dimensions.
- Aggregation and surface chemistry.
- Modern advanced instrumentation in analysis of soil particles.

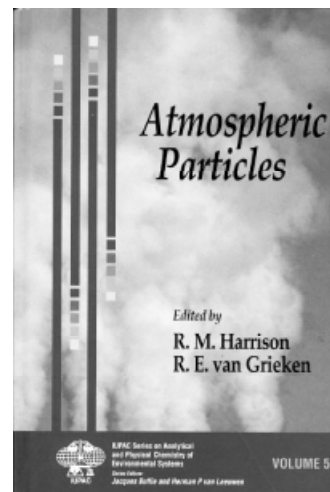


*Atmospheric Particles*, Vol. 5, edited by R.M. Harrison & R. van Grieken. John Wiley & Sons (1998), ISBN 0 471 95935 9.

Devoted specifically to the chemistry of atmospheric particles which can impose environmental health impacts, for instance, by acting as catalysts in the air, speeding up processes such as global warming and ozone depletion.

After considering the sources and distribution of airborne particles, the authors then discuss sampling methods and methods of chemical analysis of individual aerosol types.

- First book to deal solely with airborne particles and their impact on climate, health and the atmosphere.
- Leading scientists review and evaluate the best methods available for analysis of atmospheric chemistry.
- Excellent overview of current research and forthcoming developments in this rapidly expanding area.



# Conferences

---

## IOCD Working Group on Plant Chemistry. Second International Symposium on Chemistry, Biological and Pharmacological Properties of African Medicinal Plants. Addis Ababa, Ethiopia, 28 February–3 March 1999

---

The aim of the symposium is to bring together scientists from African and other countries who are involved in the phytochemical investigation of African plants of medicinal, agricultural, nutritional or toxicological interest. An update on different aspects of research concerning the phytochemistry and pharmacology of African plants will be presented. Participants from both academia and industry are invited to participate. The symposium will feature 12 plenary lectures, six from African speakers and 6 from non-African speakers. In addition, there will be contributed papers in the form of oral presentations and poster sessions.

Prior to the symposium, there will be a workshop on Analysis of Natural Products by Chemical and Biological Methods, University of Addis Ababa, 25–27 February 1999.

For further information, please contact: Prof. K. Hostettmann, Chairman, IOCD Working Group on Plant Chemistry., Institute of Pharmacognosy and Phytochemistry, University of Lausanne, B.E.P., CH-1015 Lausanne-Dongny, Switzerland, Tel. +41 21 692 45 61; Fax: +41 21 692 45 65; e-mail: kurt.hostettmann@ipp.uni.ch or Prof. E. Dagne, Chemistry Department, University of Addis Ababa, PO Box 30270, Addis Ababa, Ethiopia., Tel.: +251 1 11 45 54 or 1 12 62 76; fax: +251 1 55 12 44; e-mail: eda@telecom.net.et

## International Dairy Federation Seminar On New Applications Of Membrane Technology. Rennes, France, 7–10 June 1999

---

### Objectives

The Seminar will attempt to assemble the most recent information on new applications of the membrane processes that would benefit the dairy processing industry world-wide. The seminar is intended for dairy professionals interested in all aspects of membrane processes: researchers, industry practitioners, regulatory personnel, students, engineers and scientists interested in industrial membrane processes and new products development.

The overall objective of the seminar is to highlight new developments, new knowledge and new actual or proposed practical applications of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis for industrial processing of milk, traditional dairy products, novel dairy ingredients and dairy processing wastes.

The specific objectives of the five half-day sessions will be focused on

- the fluid milk industry, including milk and milkfat cream processing
- cheesemaking and whey processing
- fractionation of milk components and their derivatives
- engineering advances of membrane applications in the dairy industry

The Seminar is being organized within the context of the work objectives of IDF's Group B47 'Membrane Processing'.

### Call for contributions

Programme contributions from participants are invited on any subject related to the above seminar objectives. Presentations will be either in oral form or eventually as posters. The Scientific Programme Committee reserves the right to accept or reject any paper and make the final decision on the form of presentation. The deadline for submission of titles accompanied by an abstract of about 200 words is 15 October 1998. Titles of a general nature, indications of the desire to submit a contribution, or titles submitted without the abstract, will not be considered. Information about acceptability of the proposals and detailed instructions for the authors regarding the presentation will be supplied at a later date to all authors of the proposed contributions.

### Structure of the seminar

*Monday, 7 June 1999 (afternoon):*

Registration  
Welcome and opening address  
Cocktail reception

*Tuesday, 8 June*

Membrane applications in the fluid milk industry and for treatment of dairy wastes

*Wednesday, 9 June*

Membrane applications for cheesemaking and whey processing

Laboratory and dairy industry excursion  
Seminar Dinner

Thursday, 10 June

Engineering advances and membrane applications in fractionation and recovery of milk and whey components and their fragments

Close 16.00

For further information on any aspects of this seminar, to mail your preliminary registrations and/or contribution proposals please contact: Prof. J.L. Maubois, Dairy Research Laboratory INRA, 65 Rue de Saint Briec, FR-35042 Rennes Cedex, France.

International Scientific Programme Committee: J.L. Maubois, Chairman, (France), G. Daufin (France), A. Garem (France), B. Horton (USA), P. Kelly (Ireland), P. Jelen (Canada), A. Marshall (New Zealand), K. Qvist (Denmark), G. Trädgård (Sweden), C. van der Horst (the Netherlands).

Local Organizing Committee: (INRA, Rennes, France): Mme D. Salvat-Brunaud (Chair), G. Ollivier, C. Hulin, A.M. Renouard, J. Fauquant, A. Garem, H.

Goudédranche, G. Daufin, J.L. Maubois.

## The XXVIth General Assembly of the International Union of Radio Science (URSI), University of Toronto, Toronto, Canada, 13–21 August 1999

---

The scientific programme will cover:

- Electromagnetic Metrology;
- Fields and Waves;
- Signals and Systems;
- Electronics and Photonics;
- Electromagnetic Noise and Interference;
- Wave Propagation and Remote Sensing;
- Ionospheric Radio and Propagation;
- Waves in Plasmas;
- Radio Astronomy;
- Electromagnetics in Biology and Medicine.

For further information, please contact: URSI GA '99 Secretariat, National Research Council Canada, Ottawa, Ontario, Canada K1A 0R6, Tel.: +1 613 993 7271; fax: +1 613 993 7250; e-mail: [ursi99@nrc.ca](mailto:ursi99@nrc.ca), URL: <http://www.nrc.ca/confserv/ursi99/welcome.html>

# Provisional Recommendations

---

## IUPAC seeks your comments

---

In this section we publish synopses of IUPAC's latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry* and synopses of these are published in *Chemistry International* as recent reports.

If you would like to comment on the provisional recommendations please write to your nearest national/regional centre requesting a copy of the full report. Copies are not available from the IUPAC Secretariat. The most recent list of the national/regional centres appeared in *Chemistry International* 1997, **17**, 141. This information is also available on the IUPAC Web Site: <http://www.iupac.org>

## Inorganic Chemistry Division. Commission on Nomenclature of Inorganic Chemistry— Nomenclature of Organometallic Compounds of the Transition Elements

---

Organometallic compounds are defined as containing at least one bond between an organic molecule and a metal. Organometallic nomenclature therefore usually combines the nomenclature of organic chemistry and that of coordination chemistry. Provisional rules outlin-

ing nomenclature for such compounds are found both in Nomenclature of Organic Chemistry, 1979 and in Nomenclature of Inorganic Chemistry, 1990.

As part of a joint effort by commissions II.2 and III.1 to publish a separate rule book on organometallic nomenclature, a document on transition metal compounds is presented.

This document describes the nomenclature of compounds with metal-carbon single bonds, metal-carbon multiple bonds as well as complexes with unsaturated molecules (metal- $\pi$ -complexes). Organometallic com-

pounds are considered to be produced by addition reactions and so they are named on an addition principle. The name therefore is built around the central metal atom name. Organic ligand names are derived according to the rules of organic chemistry with appropriate endings to indicate the different bonding modes. To designate the points of attachment of ligands in more complicated structures, the  $\eta$ ,  $\kappa$ , and  $\mu$ -notations are used. The final section deals with the abbreviated nomenclature for metallocenes and their derivatives.

*Comments on these recommendations are welcome and should be sent by 1 December 1998 to Prof. Dr A. Salzer, Institut für Anorganische Chemie, RWTH Aachen, D 52056 Aachen, Germany. Tel.: +49 241 804646, fax: +49 241 8888 288, e-mail: albrecht.salzer@ac.rwth-aachen.de*

## Analytical Chemistry Division Commission on General Aspects of Analytical Chemistry. Classification and Use of Terms for Amplification and Related Reactions

(Prepared by D. Thorburn Burns<sup>1</sup> and Alan Townshend<sup>2</sup>)

<sup>1</sup>Department of Analytical Chemistry, The Queen's University of Belfast, Belfast, BT9 5AG, N. Ireland, UK;

<sup>2</sup>Department of Chemistry, The University of Hull, Hull, HU6 7RX, UK

*Synopsis:* A systematic classification is given for the various types of amplification and related reactions. The report refines earlier IUPAC recommendations (*Pure & Appl. Chem.* 1982, **54**, 2553–2556,) to include non-multiplication reactions.

*Comments by 1 December 1998 to Prof. D. Thornburn Burns <H.Johnston@Queens-Belfast.AC.UK>*

# Conference Calendar

Visit <http://www.iupac.org> for complete information and further links

1998

### Medicinal Chemistry

6–10 September 1998

XVth International Symposium on Medicinal Chemistry, Edinburgh, Scotland, UK.

*Dr J.F. Gibson, The Royal Society of Chemistry, Burlington House, London, W1V 0BN, UK. Tel.: +44 171 437 8656/440 3321, fax: +44 171 734 1227.*

### Electrochemistry

13–18 September 1998

49th Annual Meeting of the International Society of Electrochemistry, Kitakyushu, Japan.

*Prof. Rika Hagiwara, Department of Fundamental Energy Science, Graduate School of Energy Science, Kyoto University, Sakyo-ku, Kyoto 606, Japan. Tel.: +81 75 753 5822, fax: +81 75 753 5906, e-mail: ise@g-chem.nucleng.kyoto-u.ac.jp*

### Chemistry of germanium, tin and lead

20–25 September 1998

9th International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin & Lead (ICCOG GTL-9), Melbourne, Australia.

*Prof. Dainis Dakternieks, School of Biological & Chemical Sciences, Deakin University, Geelong 3217, Australia. Tel.: +61 3 52 271318, fax: +61 3 52 271040, email: dainis@deakin.edu.au*

### Supramolecular science and technology

27 September–3 October 1998

1st International Conference on Supramolecular Science & Technology, Zakopane, Poland.

*Prof. Marek Pietraszkiewicz, Chairman, Institute of Physical Chemistry, ul. Kaszazaka 44/52, 01-224 Warsaw, Poland. Tel.: +48 22 632*

*3221 (ext. 3226), fax: +48 39 12 0238, e-mail: pietrasz@ichf.edu.pl*

### Chemistry of natural products

11–16 October 1998

21st IUPAC symposium on the Chemistry of Natural Products, Beijing, China.

*Prof. Xiaotian Liang, Chairman, Prof. Xibai Qiu, Secretary, c/o Chinese Chemical Society, PO Box 2709, Beijing 100080, China. Tel./fax: +86 10 625 68157, e-mail: qiuxb@infoc3.icas.ac.cn*

### Excitonic processes in condensed matter

2–5 November 1998

Third International Conference on Excitonic Processes in Condensed Matter, Boston, MA, USA.

*Prof. William M. Yen, Department of Physics and Astronomy, University of Georgia, Athens, GA*

30602-2451, USA. Tel.: +1 706 542 2491, fax: +1 706 542 2492, e-mail: wyen@hal.physast.uga.edu

### Cuban Chemical Society

1-4 December 1998

III International Congress Cuban Chemical Society, Havana, Cuba.  
Prof. Alberto J. Nunez Selles, Sociedad Cubana de Quimica, Ave 21 & 200, Atabey Apdo 16042, CP 11600 Havana, Cuba. Tel.: +537 218 178, fax: +537 336 471, e-mail: ccf@infomed.sld.cu

1999

---

### Functional dyes

31 May-4 June 1999

4th International Symposium on Functional Dyes, Osaka, Japan.  
Prof. Yasuhiko Shirota, Faculty of Engineering, Osaka University, Yamadaoka, Suita, Osaka 565-0871, Japan. Tel.: +81 6 879 7364, fax +81 6 877 7367, e-mail: isfd@chem.eng.osaka-u.ac.jp

### CHEMRAWN

20-25 June 1999

CHEMRAWN XII—African Food Security and Natural Resource Management: The New Scientific Frontiers, Nairobi, Kenya.  
Dr Pedro Sanchez, International Center for Research in Agroforestry, PO Box 30677, Nairobi, Kenya. Tel.: +254 2 521003, fax: +254 2 520023, e-mail: p.sanchez@cgnet.com

### Biodiversity and Bioresources

27 June-1 July 1999

2nd International Conference on Biodiversity and Bioresources—Conservation and Utilization, Belo Horizonte, Minas Gerais, Brazil.  
Prof. Alaide Braga de Oliveira, Faculdade de Farmacia—UFMG, Av. Olegario Maciel 2360, 30.180-

112 Belo Horizonte, Brazil. Fax: +55 31 337 9076, e-mail: ferna@dedalus.lcc.ufmg.br

### Memorial K.I. Zamaraev

28 June-2 July 1999

International Memorial K.I. Zamaraev Conference on Physical Methods for Catalytic research at the Molecular Level, Novosibirsk, Russia.  
Prof. V.N. Parmon, Boreskov Institute of Catalysis, 5, Prosp. Akad. Lavrentieva, Novosibirsk, 630090, Russia. Tel.: +7 3832 343269, fax: +7 3832 343056, e-mail: parmon@catalysis.nsk.su

### Polymerization methods

12-15 July 1999

39th Microsymposium, Advances in Polymerization Methods: Controlled Synthesis of Functionalized Polymers, Prague, Czech Republic.  
Dr Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyovskeho na. 2, 162 06 Praha 6, Czech Republic. Tel.: +420 2 360341, fax: +420 2 367981, e-mail: sympo@imc.cas.cz

### Organo-metallic Chemistry

18-22 July 1999

10th International Symposium on Organo-Metallic Chemistry Directed Towards Organic Synthesis (OMCOS 10), Versailles, France.  
Prof. J.P. Genet, Laboratoire de Synthèse Selective Organique et Produits Naturels, E.N.S.C.P.—UMR CNRS 7573, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France. Tel.: +33 1 44 276743, fax: +33 1 44 071062, e-mail: genet@ext.jussieu.fr

### Carotenoids

18-23 July 1999

12th International Symposium on Carotenoids, Cairns, Australia.  
Prof. George Britton, School of Bio-

logical Sciences, The University of Liverpool, Crown Street, Liverpool, L69 3BX, UK. fax: +44 (151) 794 4349.

### Rheology of polymer systems

19-22 July 1999

19th Discussion Conference on the Rheology of Polymer Systems, Prague, Czech Republic.  
Dr Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyovskeho na. 2, 162 06 Praha 6, Czech Republic. Tel.: +420 2 360341, fax: +420 2 367981, e-mail: sympo@imc.cas.cz

### Ionic polymerization

19-23 July 1999

International Symposium on Ionic Polymerization, Kyoto, Japan.  
Dr Shiro Kobayashi, Department of Materials Chemistry, Graduate School of Engineering, Kyoto University, Kyoto 606-01, Japan. Tel.: +81 75 753 5608, fax: +81 75 753 4911, e-mail: kobayashi@mat.polym.kyoto-u.ac.jp

### Analytical science

25-30 July 1999

Analytical Science into the Next Millennium (SAC 99), Dublin, Ireland.  
Prof. Malcolm R. Smyth, Faculty of Science, Dublin City University, Dublin 9, Ireland. Tel.: +353 1 704 5308, fax: +353 1 704 5503, e-mail: smythm@dcu.ie

### Solution chemistry

26-31 July 1999

XXVI International Conference on Solution Chemistry, Fukuoka City, Kyushu, Japan.  
Prof. Hitoshi Ohtaki, Department of Chemistry, Faculty of Science and Engineering, Ritsumeikan University, 1-1-1 Noji-Higashi, Kusatsu 525, Japan. Tel.: +81 775 61 2777,

fax: +81 775 61 2659, e-mail:  
ohtaki@bkc.ritsumei.ac.jp

### IUPAC General Assembly

6–13 August 1999

Frontiers in Chemistry: Molecular Basis of the Life Sciences, Berlin, Germany.

IUPAC Secretariat, Tel.: +1 919 485 8700, fax: +1 919 485 8706, e-mail: secretariat@iupac.org

### IUPAC Congress

14–19 August 1999

Berlin, Germany.

Gesellschaft Deutscher Chemiker–GDCh, PO Box 90 04 40, 60444 Frankfurt Am Main, Germany. Tel.: +49 69 7917 358/360/366, Fax: +49 69 7917 475, e-mail: tg@gdch.de

### Macromolecule–metal complexes

6–10 September 1999

8th International Symposium on Macromolecule–Metal Complexes (MMC–VIII) Tokyo, Japan.

Prof. Eishun Tsuchida, Waseda University, Tokyo 169-50, Japan. Tel.: +81 3 5286 3120, fax: +81 3 3209 5522, email: w169988@mn.waseda.ac.jp

#### How to apply for IUPAC sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advanced Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available on line

2000

### Bio-organic chemistry

February 2000

5th IUPAC Symposium on Bio-Organic Chemistry (ISBOC-V), New Delhi, India.

Prof. S. Ranganathan, Biomolecular Research Unit, Regional Research Laboratory, Trivandrum 695 019, India. Tel.: +91 471 491 459, fax: +91 471 490 186.

### High temperature materials chemistry

4–10 April 2000

10th International Conference on High Temperature Materials Chemistry, Aachen, Germany.

Prof. K. Hilpert, Forschungszentrum Jülich GmbH, Institut für Werkstoffe der Energietechnik (IWE 1), 52425 Jülich, Germany. Tel.: +49 2461 61 3280, fax: +49 2461 61 3699, e-mail: k.hilpert@fz-juelich.de

### Organic Synthesis

1–5 July 2000

13th International Conference on Organic Synthesis (ICOS-13), Warsaw, Poland.

Prof. M. Chmielewski, Institute of Organic Chemistry, Kasprzaka 44, 01-224 Warsaw 42, PO Box 58, Poland. Tel.: +48 22 631 8788, fax: +48 22 632 6681, e-mail: ichos@ichf.edu.pl

### Macromolecules

9–14 July 2000

38th International Symposium on Macromolecules (MACRO 2000), Warsaw, Poland.

Prof. Stanislaw Penczek, Polish Academy of Sciences, ul. Sienkiewicza 112, 90363 Lodz, Poland. Tel.: +48 42 81 9815, fax: +48 42 684 7126, email: spenczek@bilbo.cbmm.lodz.pl

### Polymers In Medicine

17–20 July 2000

40th Microsymposium Polymers In Medicine, Prague, Czech Republic.

Dr Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Science of the Czech Republic, Heyovskeho na. 2, 162 06 Praha 6, Czech Republic. Tel.: +420 2360341, fax: +420 2367981, e-mail: sympo@imc.cas.cz

### Chemical Thermodynamics

6–11 August 2000

16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, Canada.

Dr Peter G. Kusalik, Department of Chemistry, Dalhousie University, Halifax, Nova Scotia B3H 4J3, Canada. Tel.: +1 902 494 3627, Fax: +1 902 494 1310. e-mail: kusalik@is.dal.ca

### Natural products

1 September 2000

22nd International Symposium on the Chemistry of Natural Products, Sao Paulo, Brazil.

Dr M. Fátima das G.F. da Silva, Universidade Federal de Sao Carlos, Depto. de Quimica, Via Washington Luiz, km 235, CP676, Sao Carlos, Brazil. Tel.: +55 16 274 8208, fax: +55 16 274 8350, e-mail: dmfs@power.ufscar.br

### Biotechnology

3–8 September 2000

11th International Biotechnology Symposium, Berlin, Germany.

Prof. G. Kreysa, DECHEMA eV—c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany. Tel.: +49 69 7564 205, fax: +49 69 7564 201, e-mail: info@dechema.de