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This symposium of three half-day sessions was organized by Gary Christian (University of Washington, American Chemical Society), Koichi Oguma (Chiba University, Chemical Society of Japan), and Robert Cattrall (La Trobe University, Royal Australian Chemical Institute). The goal was to explore curriculum development and new modes of teaching of analytical chemistry in the three countries and others from contributors. Support was provided the American Chemical Society and the Division of Analytical Chemistry of the ACS in the U.S., the Analytical Chemistry Division of the RACI in Australia, and Sanuki Industry Co., Ltd., Kohkanankeisoko Corp., Tokyo Kasei Kogyo Co., Ltd. and Soma Optics, Ltd. in Japan.

There were twenty-two papers for the symposium covering a wide range of topics, from nationwide curriculum development to the needs of industry in training. Following are titles and authors, with email contacts for obtaining abstracts or more detailed information:

1. A Brief History of Time: Where Did Analytical Chemistry Come From?  
   Gary D. Christian, Department of Chemistry, University of Washington, Box 351700, Seattle, WA 98195-1700, USA, 206-685-3478, christian@chem.washington.edu.

   Koichi Oguma, Chiba University, 1-33 Yayoi-cho, Inage-ku, Department of Materials Technology, Faculty of Engineering, Chiba, 263-8522, Japan, 81-43-290-3502, oguma@galaxy.tc.chiba-u.ac.jp.

   Reg Cross, PO Box 218, Hawthorn, Victoria, Australia, 3122, 61-3-9819-0834, rcross@swin.edu.au.

   Alan Ullman, Glenn D. Boutlier, Procter & Gamble Company, 6100 Center Hill Avenue, Cincinnati, OH 45224, USA, 513-634-4472, ullman.ah@pg.com.
5. Connection Between Fundamental and Applied Analytical Chemistry.
   Kunio Ohzeki, Hirosaki University, 3 Bunkyo-cho, Materials Science and
   Technology, Hirosaki, Aomori, Japan,
   81-172-39-3541, ohzeki@cc.hirosaki-u.ac.jp.

   Chemistry Graduates.
   David N. Phillips, School of Applied Chemistry, PO Box U 1987, Perth, Western
   Australia, Australia, 6845,
   61-8-9266-2300, D.Phillips@info.curtin.edu.au.

7. MCPWeb: An Interactive, Web-Based Materials Characterization Project at the University of
   Arizona.
   Jeanne E. Pemberton, Neil R. Mackie, University of Arizona, 1306 E. University
   Blvd., Department of Chemistry, Tucson, AZ 85721, USA,
   520-621-8248, pemberten@u.arizona.edu.

   Charles Lucy, University of Alberta, Chemistry Center, Department of Chemistry,
   Edmonton, AB, Canada, T6G 2G2,
   780-492-8231, charles.lucy@ualberta.ca.

9. Ph.D.: Path to a Career or to a Job?
   Gary Hieftje, A150 chemistry Building, Indiana University, Bloomington, IN
   47405, USA,
   812-855-0958, hieftje@indiana.edu.

10. Analytical Chemistry Teaching in Materials Science to Life Sciences:
    What is Basic and Essential, and How to Select the Topics in Analytical
    Chemistry for Undergraduate Teaching? Makoto Takagi, Kyushu University,
    Hakozaki, Higashi-ku, Department of Chemical Systems and Engineering,
    Fukuoka, Japan,
    81-92-642-3603, takagtcem@mbox.nc.kyushu-u.ac.jp.

11. Flexible Learning Methods for Teaching Data Analysis, Quality Assurance Principles and
    Chemometrics to Analytical Chemistry Students.
    Mark Selby, Queensland University of Technology, School of Physical Sciences,
    Brisbane, Queensland, 4000, Australia,
    61-7-3864-1521, m.selby@qut.edu.au.

12. Problem-Based Learning in Analytical Chemistry.
    Thomas Wenzel, Bates College, Chemistry, Lewiston, Maine 04240, USA,
    207-786-6123, rwenzel@bates.edu.
Hideo Akaiwa, Kin-Ichi Tsunoda, Gunma University, Aramaki-cho 4-2,
Department of Chemistry, Maebashi, Gunma, Japan,
81-27-220-7019, akaiwa@sun.aramaki.gunma-u.ac.jp.

14. Using Videoconferencing and Telecommunications to Teach University Chemistry.
Kieran F. Lim, School of Biological and Chemical Sciences, Deakin University, Geelong,
Victoria, Australia, 3217,
61-3-5227-1040, lim@deakin.edu.au.

15. Quality Assurance Curricula for Chemistry Students.
David Klein, Stanley Israel, Southwest Texas State University, 601 University Dr.,
Waste Minimization and Management Research Center, San Marcos, TX 78666-4616, USA,
512-353-7329, dk02@swt.edu.

16. Assessment of Activities Related to Curricular Development.
Theodore Kuwana, Cynthia Larive, University of Kansas, 5070 Malott Hall,
Department of Chemistry, Lawrence, KS 66045, USA,
785-864-5396, ikuwana@eureka.chem.ukans.edu.

17. Trans-disciplinary Approach through Analytical Chemistry:
Developmental Cognitive Neuro-science for Future Learning and Education.
Hideaki Koizumi, Advanced Research Laboratory, Hitachi, Ltd., General
Manager, Hatoyama, Saitama, Japan,
81-492-96-6005, hkoizumi@harl.hitachi.co.jp.

Barry O’Grady V, University of Tasmania, PO Box 252-75, Chemistry, Hobart
7001, Tasmania, Australia,
61-3-6226-2858, barry.ogrady@utas.edu.au.

Joseph Pesek, Sam P. Perone, San Jose State University, PO Box 1418,
Department of Chemistry, San Jose, CA 95192-0101, USA,
408-924-4945, jpesek@hotmail.com.

20. Analytical Chemistry and Chemical Analysis.
Yohichi Gohshi, National Institute for Environmental Studies, 16-2 Onogawa,
Tsukuba, Japan,
81-298-51-2854, gohshi@nies.go.jp.

David Davey, Christopher Chow, John Bannigan, Jeremy Lucas, Spas Kolev,
A few highlights from each country:

Oguma (2) described efforts initiated by the Japan Society for Analytical Chemistry to establish a new and common curriculum of analytical chemistry for undergraduate students in Japan. Emphasis will be on methods of instrumental analysis such as spectroscopic, automated, hyphenated, and biological techniques, as well as quality assurance and quality control of analysis. Publication of a standard textbook is planned on the basis of the standard curriculum. Akaiwa (13) spoke of educational reform in Japan and the need to standardize and accredit educational programs, especially for engineers.

Lim (14) described the use of videoconferencing to provide broader access to courses, especially upper division classes, at the three linked campuses of Deakin University. Modern telecommunication technologies can bring together students and teachers at physically disparate locations into a single, real-time interactive electronic virtual classroom. Asynchronous computer conferencing is used for out-of-class student discussions, study groups, and delivery of lecture resources. O’Grady (25) reported on his use of computer simulation of hardware for dealing with resource limitations in instrumental analysis.

Kuwana (23) provided an update on the NSF supported workshops and the subsequent report on curricular developments in the analytical sciences, with an emphasis on problem-based learning. Ullman (4) presented the needs of the chemical industry in the training of analytical chemists, emphasizing the importance of problem solving skill, as well as effective communication.

Many of the other presentations provided specific examples of implementing some of the above recommendations, as well as additional novel approaches for teaching, and options for students.

The University of Arizona has a unique materials characterization lab, and they have developed a prototype of a Web-based, interactive version, intended to supplement the more conventional laboratory-based training in undergraduate analytical chemistry. The following description is provided by Jeanne Pemberton (7).
Report on 16th ICCE, Budapest, 5-10 August 2000

Peter E. Childs

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The International Conference on Chemical Education is held every two years in different countries. The first one I attended was in 1979 when the 5th ICCE was held in Dublin. I have been to a number of them since then but the last one I attended was in 1991 in York. Since then the ICCE has visited Brazil, Australia, Thailand and Egypt! The 17th ICCE will be held in Beijing, China in 2002.

The ICCE is a big international jamboree: over 500 people were present in Hungary (including over 200 from Hungary itself) for the 16th ICCE (Photo, 1 and 2). There were large groups from the USA and UK, and only one from Ireland. One problem with these large international conferences is that the fees are very high ($400) and this discourages teachers and people from developing countries from attending, especially when added to the cost of getting there. The attendance from Africa and S. America was noticeably small.

Members of the RSC's Education Division can apply for a grant and I would like to thank them for a grant of £250 towards the registration fee. Hungary is also fairly expensive to get to and accommodation is not especially cheap, although meals are very good value.

Whenever I attend one of these large meetings I ask myself 'was it worth it?' and "what is the benefit of this sort of conference?" In my opinion the main value of the ICCEs is that they enable local teachers and lecturers, from the country or region where it is held, to benefit from hearing a range of international speakers and become part (for a short time) of the international chemical education network. Too often, particularly if you attend several successive conferences, it seems that little new is being said, that the wheel continues to be reinvented, and the same speakers say much the same thing conference after conference. However, for the people from the host country or region this is new and valuable, and this justifies the expense of such meetings. More effort needs to be made to raise scholarships for people coming from less-developed countries, so they feel part of the chemical education scene and can share their unique contributions.

I had been looking forward to the plenary lectures by two Nobel laureates: Sir Harry Kroto (for his discovery of buckyballs) and Paul Crutzen (for his work on ozone depletion). Harry Kroto talked mainly about the popularisation of science and the work of Vega Trust, which he's set up to produce science programmes for TV. He is an enthusiastic and engaging speaker, as you will know if you saw the Horizon film Molecules with sunglasses on the discovery of buckyballs. A research proposal to continue this work was turned down by the funding council in the UK on the same day that his Nobel Prize was announced! They later said that this was a mistake and gave him the money. Paul Crutzen gave an overview of his work on ozone depletion and the current status of this
work (Photo 3).

However, the best plenary lecture, both in presentation and content, was that given by V.K. Obendrauf, an Austrian chemistry teacher on 'low-cost experiments with gases'. This was a tour de force of chemical demonstration and modern AV technology. He showed how to make and test gases safely on a small scale, using plastic syringes, backed up by an effective use of modern technology: Powerpoint slides interspersed with live video showing the experiments in close-up to an audience of 500. Very impressive and educative.

There was whole series of parallel symposia and workshops on a wide variety of topics, which meant one could only sample a small amount of what was on offer. I was involved in a symposium on Industry-Education Cooperation chaired by Peter Towse (Leeds), who I first met nearly 30 years in East Africa. Peter has just produced the latest edition of Chemical Education Journals, giving details of science/chemistry/education journals around the world. There was also an extensive display of posters, and an exhibition on the History of Hungarian Science and on Justus von Liebig (in German). Another interesting aspect of the building the conference was held in was a display of sculpture inspired by chemistry, by a member of the chemistry department at Eotvos University.

There was a display of posters on the conference themes, including many put on by local teachers. The large crowd of enthusiastic and energetic Hungarian second-level teachers (photos 4, 5 and 6) was a major feature of the conference. There were also several commercial displays of equipment and books, not to mention Gordon Woods' periodic table collection of ties, scarves, tea cloths, mousemats etc.(photo7)

Budapest is a lovely city to visit and one of the main things to strike someone from Ireland (or the UK) is the excellent, integrated transport system. Nearly all the major European cities have a cheap, integrated system of bus, tram and metro running frequently and making getting around a painless operation. Instead of scrapping trams in the 1950s (as in the U.K. and Ireland) these systems were retained, developed and modernised to provide a clean, safe and efficient public transport system. I also found the air pollution monitor on a busy junction quite interesting and a good illustration of urban air pollution.(photo 8)

The conference tour and banquet was to a vineyard 2 hours drive away, near Lake Balaton, where the highlight for me was seeing someone pipette litres of wine out of barrel and then into people's glasses (photos 9 and 10). A good example of chemistry in action!

Photos are available at url = http://
Environmentally Benign Chemistry
Including Microscale and Small Scale Laboratory

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Environmental protection is an important issue in chemical education. Papers included in this symposium are classified into three topics:

1. **Environmentally Benign Laboratory: an Approach to Green Chemistry in Academia**
   Morning Session of Dec. 15 in Elima, Hyatt Regency
   Environmentally Benign Chemistry in the Undergraduate laboratory
   M. Gheorghiu, M. Gardner, J Steinfeld, Massachusetts Inst of Tech (MIT)
   Microscale chemistry across the chemistry curriculum at all levels of chemical education: Its benefits and efficiency as a pedagogical tool.
   M. Singh, *Natl Microscale Ctr, Department Of Chemistry, Merrimack College.
   Microscale and green Chemistry; complementary pedagogies
   Simple, easy and safe microscale and small scale experiments for high school chemistry
   K. Ogino*, K. Shoji, *College of Medical Sciences, Tohoku University
   The recent development o microscale chemistry in China
   N. Zhou, Chinese Microscale Ctr, Hang Zhou Teachers College
   90010039 Experimental quality and the small scale laboratory
   S. Teratani, K. Habara, A. Ikuo, Tokyo Gakugei Univ
   Comparing chemical cost and waste generation for microscale versus macroscale organic chemistry laboratory programs on a per student basis
   R. Silberman, I. Maffetore, State U of New York/Cortland, Dept. Of Chemistry

   Evening Poster Session in Hilton Hawaiian Village, Mid-Pacific – Coral, Ballroom III starting at 7:30 PM Sunday, Dec. 17
   Comparison of small-scale experiments with ordinary-scale experiments.
   K. Shoji*, K. Ogino, *Sendai Ikuei Gakuen High School
Microscale determination of potassium content in beverages by ion-selective electrode
A Yamasaki, Japanese Red Cross College of Nursing

Microscale experiment to isolate lipase producing bacteria and demonstrate their metabolic activity
D.C.Doria-Serrano, L.Pedraza-Segura Univ. Iberoamericana

2. Educational Perspectives of Green Chemistry
Afternoon Session of Dec. 15 in Elima, Hyatt Regency

Green chemistry - A new approach to pollution prevention

Green chemistry; Aspects of benign synthesis

Green & sustainable chemical activities in Japan
M. Kitajima, Japan Chemical Innovation Institute

Green chemistry; Alternative reaction media
J. Scott, Monash Univ., Centre for Green Chemistry

Greenness (green Index) of R&D toward sound development of green/sustainable chemistry
M. Misono, Kogakuin U, Department of Environmental Chemical Engineering

Activation of Hydrogen peroxide for rapid, selective, wood pulp bleaching: Green chemistry in action

Morning Session of Dec. 16 in Elima, Hyatt Regency
Have you greened your chemistry curriculum?
M. Cann, U of Scranton, Chemistry Department University of Scranton

Clean technologies and recyclable solvents in research laboratories
T. Kitazume, Tokyo Institute of Technology

Green chemistry- trends and experiences from the activities to advance green chemistry sustainable chemistry
D.L. Schutt, R. J. Garant, B. B. Beadmore, B. B. Beadmore, American Chemical Society, Office of Legislative and Government Affairs

Green chemistry resources for the undergraduate curriculum: an ACS/EPA collaborative project
M. A Ryan, American Chemical Society, Higher Education

3. Understanding Environment through Chemistry
Morning Session of Dec. 16 in Elima, Hyatt Regency

Mode of neutralization function of humus( f layer) for acid precipitation
S. Yamaguchi, Tohoku Gakuin Univ

Evening Poster Session in Hilton Hawaiian Village, Mid-Pacific – Coral, Ballroom III starting at 7:30 PM Sunday, Dec. 17

Acid rain: Electrochemical effects in greenplants and soil
S. Kelly, A. Labady, J.Mwesigwa, Oakwood College

Preparation of low cost and reliable NO2 sampler and its application to simultaneous measurement of NO2 at 63 cities
F. Yasuhara,* S. Yamaguchi, Sendai National College of Technology
16th International Conference on Chemical Education

and

19th Conference of Hungarian Teachers in Chemistry


György, Várnaıı,
Chairman of the Org. Comm.
kokelvar@mail.matav.hu

The IUPAC CTC assign the organizer of the international conference every two years. In 1996 the Hungarian Chemical Society Section of Teachers in Chemistry submitted its detailed application and in 1998 was granted with organizing the 2000th annual conference.

The Conference was opened on 5th August under ideal circumstances in a building of Eötvös Loránd University (ELTE) situated on the bank of river Danube. This building simultaneously accommodated the Conference of Hungarian Teachers in Chemistry which takes place also in every second year. The closing ceremony of the six days running programme happened around noon on 10th August. The organizing office of ELTE continuously provided conditions meeting every requirement, technique and exemplary cleaness. The restaurant established at the place, the globular assembly hall for the receptions and the politeness of the staff- all represented Hungarian hospitality.

The most important organizers of the Conference were the Hungarian Chemical Society and its Section of Teachers in Chemistry. The Chemistry Department of ELTE and the General and Inorganic Chemistry Department of University of Veszprém supported the organization. English speaking students from ELTE ensured the smooth course of events. The helpful students group is worthy of public recognition for its work. The leader of the group was a Ph.D student, Viktor Mihucz, other members were Orsolya Kovács, Bence Tamássy and Tamás Várádi at the poster sessions, Krisztián Demmel and Timea Szabó on the plenary lectures, Viktória Csengeri, Katalin Miskei, Friderika Himics, Anikó Rupert on the symposia, Júlia Dégi and Gábor Viszok on the keynote lectures, Viktor Mihucz, Virág Somogyi and Ilona Szamosújvári at the workshops. Students from University of Veszprém carried out the professional simultaneous interpretation and guidance in English language. With their excellent contribution the conference became profitable for the Hungarian teachers of Chemistry, too. The translation of Krisztina Vigh, who is a professional interpreter, was outstanding and the other members, Gertrúd B. Kiss and Zoltán Lendvai as well as the group leader Gergely Szintay also performed well. Furthermore, Balázs Srej and Bálint Szele guided a tour round Lake Balaton with expertise.

Due to our sponsoring institutions and firms we were able to organize the conference on a high level as it has been qualified in written indications by our partners for Germany to Japan. We would like to express our thanks the following patrons and supporters for their help: Zoltán Pokorni Minister of Education, Ferenc Ligetvári Minister of Environmental Protection, György Matolezy Minister of Economy, Norbert Kroó Secretary General of Hungarian Academy of Sciences, Government Office for Hungarian Minorities Abroad, Foundation for the Technological Progress of the Industry, Hungarian Museum for Science and Technology, Hungarian Millennium
The world conference was supported with cooperation by these international organizations: IUPAC, UNESCO, FECS, ICASE. We were helped by the personal assistance of the International Advisory Committee (13 members), National Scientific Committee (16 members), and the Organizing Committee (14 members). The members of the Organizing Committee were charged with different concrete tasks either: Attila Fész with the technical and electronically equipments, Gábor Hornyánszky with the displays, Emma Jakab with the chairmanship. Mrs Csilla Csányi Kovács arranged the programmes in Hungarian language and the vocational training certificates. István Mártrai undertook chairmanship and helped with professional translations, Mrs Emília Horváth Nagy took part in registration, Miklós Riedel made the English language summary ready to print promoting the systematisation of the programme at the same time. Zoltán Tóth and Judit Wajand also undertook chairmanship, while Attila Villányi organized the poster session.

The opening ceremony was lead by Academician Alajos Kálmán, the president of Hungarian Chemical Society and the 16th ICCE. The Ministry of Education was represented by Academician Gábor Náray-Szabó who was the president of the Scientific Committee as well. The UNESCO was represented by Alex Pokrovsky, the IUPAC by Hans Bouma (The Netherlands), the IUPAC CTC by John Bradley (South-Africa), the FECS by Michael Gagan (UK), the Hungarian Academy of Sciences by Norbert Kroó Secretary General, and the host was Gyula Záráy the assistant dean of the Science Department of ELTE.

After the official greetings the “Csillagszem_” children dance group presented some pieces from Hungarian folk-dance. The lively and colourful show cheered the meeting up.

On the basis of the application forms we registered 554 persons from 53 countries.

The distribution of the participants is the following:

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The 7,039 % of the registered persons were not able to attend because of certain difficulties. The number of companions was 36 from the effective 515 participants, 271 from abroad and 208 Hungarian. 26 foreign chemistry teachers who teach in Hungarian language could take part in the programmes free of charge. Moreover, providing reductions solved some other financial problems.

The Conference was regarded an accredited course so the participants were given official certificates.
The plenary and keynote lectures were lead by the members of the National Scientific Committee: László Harsányi Secretary General of HCS, Ferencz Hudecz Academician, József Hlavay professor, Emma Jakab Hungarian Academy of Sciences scientist, Ferenc Kilár professor, László Markó Academician, István Mátrai secondary school teacher, Ernő Pungor Academician, Csaba Szántay Academician, Imre Szébényi professor, László Velkey secondary school headmaster.

Speakers of Keynote lectures:
Frederic Bettelheim (USA), A.F.M. Fahmy (Egypt), Erika, Fodor (Hungary), Pamela Garnett (Australia), Michael Schallies (Germany), Ben Selinger (Australia), Sándor, Papp (Hungary), Albert Pilot (The Netherlands), István, Pais (Hungary), Yoshiho Takeuchi (Japan), Béla, Tóth (Hungary), Yu.D. Tretyakov (Russia), Uri Zoller (Israel).

The seminars were lead by the organizers: professor Hans-Jürgen Schmidt (Germany), prof. Dorothy Gabel (USA), prof. István Horváth (Hungary), prof. J.J. Lagowski (USA), prof. Christer Gruvberg (Sweden), prof. Zakra Lerman (USA), prof. Dori Yehudit (Israel), Erik Onkelinx (Belgium), Attila Sebestyén assistant Rector (Hungary), prof. Yoshiho Takeuchi (Japan), Judit Wajand associate professor (Hungary), prof. Pamela Garnett (Australia), Attila Füzé secondary school teacher (Hungary), Jack Holbrook Secretary General of ICASE (Cyprus), prof. Péter Csermely (Hungary), prof. Anthony Smith (France), Csilla Csányi Kovács leading consultant (Hungary), prof. Maria Elisa Pestana (Portugal), prof. Ognian Serafimov (Germany), prof. Peter Towse (UK), prof. Loretta Jones (USA), István Mátrai secondary school teacher (Hungary), Katalin Harka leading consultant (Hungary), prof. de Jong Onno (The Netherlands), prof. Mary Virginia Orna (USA), prof. Michael Gagan (UK), prof. David Waddington (UK), prof. Miranda Stephenson (UK), prof. Tsung-Tsan Sun (Taiwan).

The six-day programme included the work of both the lecturers and the authors of the announced presentations. Each working day of the scientific meeting was started with plenary lectures then 5 or 6 symposia were running in simultaneous sessions. After lunch the programme was continued with two lectures and was finished with 9 parallel workshops which were carried out in different venues. The poster session was opened on 6th August in the afternoon and it was displayed during the whole conference. The professional work, lasted from 9am to 6pm, involved 6 plenary lectures, 14 keynote lectures, 120 symposia, and 18 workshops. The plenary and keynote lectures were translated into Hungarian by simultaneous interpreters.

All of the plenary lectures proved to be highly valuable such as Science, A Round Peg in a Square World by Nobel-laureate Harold Kroto, The Ozone Hole: A Manmade Chemical Instability of the Atmosphere. What Should We Learn from It? by Nobel-laureate Paul Crutzen, the spectacular Micro-scale Experiments with Gases by Viktor Obendrauf, the Teaching University Chemistry in the Context of Materials Science by Miklós Zrínyi, What Can We Learn from Research on Students’ Misconceptions? by Hans-Jürgen Schmidt as well as Environmental Sciences by D.J. Miyamoto.

Two of the 14 keynote lectures were in Hungarian language on useful topics in education: Cyanide Pollution of the River Tisza Through the Eye of a Chemist by Sándor Papp and the Nuclear technologies and the Environment by Béla Tóth. The lecture of Professor István Pais is also remarkable and was considered a great honour to hear. The Professor founded the Conference of Hungarian Teachers in Chemistry within the Hungarian Chemical Society 38 years ago.

From the 120 symposia there were 15, from the 18 workshops there were 7 and from the 154 posters there were 28 in Hungarian language. Over the scheduled programmes an extra workshop
was announced, the *New Directions in Chemistry Teaching* by John Bradley the president of IUPAC CTC and Alex Pokrovsky president of the scientific division of UNESCO.

*The lectures and workshops included educational processes* 72.7%

The distribution of the topics was the following:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology</td>
<td>32.1%</td>
</tr>
<tr>
<td>Primary and secondary schools</td>
<td>10.6%</td>
</tr>
<tr>
<td>Higher education</td>
<td>6.6%</td>
</tr>
<tr>
<td>Possibilities of multimedia and Internet</td>
<td>18.1%</td>
</tr>
<tr>
<td>Microtechnical experiments</td>
<td>5.3%</td>
</tr>
<tr>
<td>“Green Chemistry”</td>
<td>10.6%</td>
</tr>
<tr>
<td>Relations between industry and chemistry teaching</td>
<td>9.4%</td>
</tr>
<tr>
<td>Science of chemistry</td>
<td>7.3%</td>
</tr>
</tbody>
</table>

The educational processes indicated there main tendencies:

1. Chemistry teaching should be based on the experience, materials and phenomena of everyday life. Scientific study and understanding of chemistry should be built on them.
2. Gaining experiences is necessary to extend to the area of science and environmental chemistry.
3. The use and publication of information should be carried through Internet and interactive CDs.

In the spirit of the year Hungarian Millennium the Museum for Science and Technology arranged an exhibition about Hungarian scientists. Éva Vámos director general of the museum opened the exhibition called *Hungarian Chemists in World*. The Museum for Science and Technology presented another exhibition about Liebig’s life entitled *Justus von Liebig – Everything is Chemistry*. This exhibition was intended to express the internationality of science and was opened Prof. Ferenc Szabadváry. A special part of the exhibitions was the display *Chemistry in Sculptures* of Béla Vizi, lecturer from University of Veszprém. There was a wonderful composition, *A Helping Hand for the Sick Heart*, which showed a heart medicine formed to palm shape. Educators from all over the world could admire the united product of the chemist and artist in Budapest.

In an other show-case the collection of Peter Towse (Leeds) was displayed from the *Chemical Education Journals* included the Periodical of Chemistry for Grammar School Students. This bibliography was published in floppy, CD, as well as print.

Márta Szeness Maleczki (University of Veszprém) made a collection *Problems and Solutions in Chemistry* based on the material of János Irinyi National Secondary School Competition in Chemistry. The Hungarian Chemical Society has organized the competition for more than three decades. The collection was issued both in English and Hungarian languages for the participants.

The descendants of a traditional blue painting family from Győr introduced the tools and technology of the Hungarian blue dyeing in a spectacular and interesting show.

Traditionally, the exhibitors from industry and publishing presented their latest products on the conference. This year few exhibitors, 6 Hungarian and 3 foreign ones took part in this event.

The closing meeting was chaired by Academician Gábor Náray-Szabó. J. Lagowski the new vice-president of the IUPAC CTC was also present, who followed Hans Bouma after the expiry of
his mandate. Professor Wenxiang Zhu, leader of the Chinese delegation, announced that the 17th ICCE would be held in Beijing (Peking) in 2002, according to the decision of IUPAC CTC in Budapest on 7th August.

The high quality of the professional work, the accommodation and meals, the social programmes, all contributed to the pleasant atmosphere and the value of the conference. The accommodation was satisfactory for each participant, neither the foreign nor the Hungarian guests made any complaints about it. The morning coffee and the lunch were ensured with polite and careful service at the locally established restaurant. The first day Welcome Party was held in the tastefully decorated great hall with glass cupola (“Gömb” great hall) where plenty of various food was offered. The closing banquet was settled in the several hundred year old Esterházy-cellar in Szigliget at Lake Balaton. Nine coaches carried the guests to Szigliget through the marvelous and sunny countryside in the northern part of Balaton. The students from University of Veszprém commented on the sights in English language. The wine cellar was built at the foot of Szigliget Castle among the Volcanic hills. During the dinner the guests could enjoy different ceremonies and folklore programme. Hundreds of participants in the hope of further blossoming cooperation and friendship.

Summarizing the events of the 16th ICCE we can say that we are worthy of the former world conferences in Bangkok, San Juan (Puerto Rico), Brisbane and Cairo. Hungarian chemistry teachers considered a great honour that two Nobel-laureates and the most outstanding experts in educating chemistry has accepted our invitation. Beyond that a lot of qualified educators came to lead lectures, workshops or make posters. As a result, a great number of the 500 participants visited each venue. The international meeting was a significant occasion for the Hungarian teachers in chemistry, either. It was the first time that they were able to take part as equal partners and to extend their knowledge on a world conference.

Many thanks to our supporters, individuals as well as institutions at home and abroad for their help.