

Meeting of the IUPAC CHEMRAWN Committee, Paris, September 15-16, 2002
Minutes

A regular meeting of the CHEMRAWN committee was held on September 15-16, 2002 at the Maison de la Chimie in Paris. Committee members present were Erwin Buncel, Min Che Chon, Raymond Hamelin, Jerzy Kopytowski, Fedor Kuzetsov, John Malin, Patrick Moyna, Parry Norling, Ikenna Onyido, Alan Smith and Swaminathan Sivaram. Also attending were Nelson Wright of the Committee on Chemical Industry and Pierre Poitier of the Maison de la Chimie. Dr. Parry Norling, Chair of the committee, presided and Dr. John Malin served as Secretary.

Dr. Norling called the meeting to order and reviewed the proposed agenda.

CHEMRAWN XV. Dr. Hamelin reviewed the status of CHEMRAWN XV, a planned conference on water chemistry. The organizers envisioned holding the conference in Paris during 2002 with the help of the French Chemical Society and UNESCO. There were delays caused by illness of several key persons, the unavailability of the UNESCO site and financial difficulties at the French Chemical Society. Dr. Hamelin informed the committee that the organizing committee now hopes to hold the meeting in June 2004 at the Maison de la Chimie with the new Federation of French Chemical Societies as a co-organizer. UNESCO will be invited to participate, perhaps by holding the opening ceremony at UNESCO headquarters. The Royal Society of Chemistry has earmarked 5000 pounds Sterling to support the conference.

Committee members raised the following points:

- The organizers might consider holding small pre-CHEMRAWN XV meetings.
- Each year there are a significant number of conferences on water, but not usually on chemistry of water. The CHEMRAWN XV organizers would like to be informed of existing conferences. For example, a triennial forum on water will be held in Kyoto in 2003. Perhaps we could use that event to pose and develop questions for further discussion at CHEMRAWN XV.
- Dr. Norling is a member of the Chemical Sciences Roundtable organized at US National Academy of Sciences. The Roundtable organizes workshops on a variety of topics including environmental chemistry, and plans to hold one on Chemistry and Sustainable Development. The list of attendees might help identify persons to invite to CHEMRAWN XV.
- Prof. Gheorghe Duca, Moldovan Environmental Minister, is organizing an environmental conference to be held in September 2002.
- It will be important to maintain connections with UNESCO after Dr. Alex Pokrovsky retires in 2004.
- When the dates of projects are changed, committee members should inform IUPAC so the Union's webpage can be kept up to date. Information can be sent to Fabienne Meyers or to Parry Norling.

- If any committee member attends the Kyoto meeting, he/she should inform the CHEMRAWN XV organizing committee, particularly with suggestions for CHEMRAWN XV participants.
- There should be a preliminary meeting of the CHEMRAWN XV scientific committee, possibly a workshop to prepare for CHEMRAWN XV.
- IUPAC has special projects funds for workshops, monographs and papers. The CHEMRAWN XV future Actions Committee (FAC) might consider applying for such funds.
- A Canadian experience in the Ontario town of Wolcotton showed that improper water treatment sometimes causes widespread illness and even death. Perhaps the CHEMRAWN XV organizers could hold a workshop together with Canadian water specialists.

CHEMRAWN XII. Dr. Onyido distributed a summary report from the world summit on sustainable development (Appendix I). He noted that many people in southern Africa are starving as the world faces an unacceptable level of poverty and hunger. In that context he described efforts to continue organization of CHEMRAWN XII, a conference on food supplies in Africa.

The time and venue of CHEMRAWN XII remain undecided but holding the meeting at Stellenbosch University is still a possibility. HIV-AIDS has had a tremendous negative impact on the availability of funds for other purposes, such as this conference. Since CHEMRAWN XII is region-specific, it could be helpful to build a group of indigenous supporters within the region before seeking further funding. Because it takes such a very long time to do business in Africa, the projected date of CHEMRAWN XII is now sometime in 2005.

Several potential speakers have been identified. Dr. Buncel added that he met with Dr. Hjeresen of the Green Chemistry Institute in 2001 to discuss sponsorship of the conference, but the no commitment was made. Dr. Ikenna noted that the Third World Academy of Sciences (TWAS) has expressed interest in the conference and has suggested a number of possible participants. Other interested organizations are *Support Africa International*, the *Science and Industrial Research and Development Center* in Harare, the *World Phosphate Institute* and the *Natura Institute*.

Dr. Onyido informed the committee of his meeting with A. Lamine Ndiaye, senior scientist from Dakar, Senegal. Dr. Ndiaye, who would like to hold the conference in Senegal, noted that Senegalese President Wade is very interested in soil fertility. Dr. Onyido suggested that a letter be written to president Wade requesting his cosponsorship of the conference. The letter would be followed up by a visit of a small delegation to Dakar for a face-to-face meeting with President Wade, if possible.

Committee members made the following comments and suggestions:

- What is the proposed budget for the event? Can a workshop be held for less than \$100,000?

- The World Bank and the Carter Foundation might be contacted about funding. Also, the WSSD recommendations are just beginning to be published. They may include references to possible partners and funding sources. Finally, a meeting of the Third World Academy of Science is scheduled for October 19, 2002. The meeting agenda, listed on the TWAS website, might provide further contacts.
- If Senegal were associated formally with IUPAC it would be easier to hold the workshop there. One solution would be for someone to pay the \$50 fee on behalf of Senegal, in order to establish it as an IUPAC Observer country.
- If CHEMRAWN XII cannot be held in Senegal, that country might still be the venue for a follow-up regional workshop.
- An excellent article on sustainable agriculture appeared in a recent issue of *Science*.

Drs. Onyida and Buncel will continue seeking support and a venue for the conference. The committee recommended that if the meeting cannot be held by sometime in 2005 it should be canceled.

CHEMRAWN XIII. Cleaner Energy. Dr. Sivaram gave an update on events of the last year. He noted that in Brisbane the committee proposed to combine the proposed energy conference with a petroleum conference. He has now made formal connections with several companies to support such a conference and has been given a slot on their program for the next meeting in January 2004. The conference organizers have told him they will cover general funding (programming costs) but no travel expenses. Two small energy-related meetings have already been held in India, a meeting on gas hydrates in August 2002 and a meeting on coal gasification. A major commission from the government on fuel quality has been set up. Both the commission and the gas hydrate people have expressed interest in CHEMRAWN XIII participation. Dr. Sivaram is now Director of his laboratory, the largest chemical research laboratory in India. In view of his new circumstances he could organize a smaller meeting at his laboratory. It is not easy to pay international travel costs but his organization could help with local costs. A small group of scientists from his lab could participate in the meeting. A possible date for a conference would be in November-December 2003. The conference would be smaller in size than the usual CHEMRAWN, 100-150 in attendance for two or two and a half days.

Committee comments:

- Dr. Norling noted that there was a proposal at the Bureau to fund an IUPAC speaker at conferences.
- The committee discussed what to call the India conference, since it would be held jointly with an oil conference. The desire is to produce a discussion of energy topics in developing countries.
- Dr. Kuznetsov added that we don't want to lose the identity of CHEMRAWN in an oil conference. The oil industry has its own goals but CHEMRAWN could provide a broader view.

- Dr. Norling noted the CHEMRAWN terms of reference don't mention conferences and certainly don't require that CHEMRAWN activities be restricted to conferences.
- It was felt there are two ways of implementing Dr. Sivaram's proposal: (1) Use the India workshop to plan for larger workshop. (2) Expand the workshop in Pune by bringing 40 people from outside.
- There remains a need for a large conference on efficient use of energy. This could be related to global warming and ozone holes. It would be discussed on Sept. 16.
- Dr. Sivaram noted that if oil were left out, participation would be lost. In any case, a small meeting of 150-200 can be done in his laboratory.
- There is a desire to focus on the energy needs of emerging economies. One procedure would be to look at the energy options available. BP and Shell have become interested in solar energy. GE bought Zond (wind energy) from Enron. Dr. Sivaram is now very involved with wind energy.
- Financial support is wanted for foreign speakers' travel. There will be a fee for nonspeaking attendees, which would include about half of the participants.
- Q: Is nuclear energy still in the agenda? A: Yes. Must have chemistry and chemical technology but there is need to evaluate other options and to discuss the situation in developing countries.
- Currently there is discussion in India about the global model of large power plants. The large investments have not paid off as expected. Current interest is in 200-300 kW powerpack systems. What are the technology options for smaller plants, for example, distributed local energy sources that are self-sufficient within a zone of 200-300 km.
- Q: (Hamelin) What is the relevance of chemistry to these plans? Why not organize a meeting on gas hydrates? Can't cover everything in two days – only generalities. A: (Sivaram) A meeting on gas hydrates has taken place recently. One could still talk about chemistry of fuel cells. Both are chemistry-related.

Next step: Dr. Sivaram will produce a list of speakers and topics.

CHEMRAWN XVI: Innovation and the Chemical Industry. Dr. Kopytowski reported. He noted that there is need for new ideas to advance technology from pure to applied chemistry. Dr. Kopytowski contacted CEFIC on the general subject of innovation but they were not responsive. However, a workshop on innovation was held recently in Washington at the Chemical Sciences Roundtable.

Dr. Kopytowski distributed his outline of 5 points describing the innovation process leading from 'pure' or 'curiosity driven' chemical research to application by the industry.

It was suggested that CHEMRAWN should start with a small workshop or forum at the IUPAC General Assembly in Ottawa, which is scheduled for August 9-17, 2003. Everyone from the CHEMRAWN committee could prepare a small paper on innovation in his country, as was done with the Chemical Education conference in Brisbane. After putting all this together in a monograph, the committee would decide on whether to organize a major CHEMRAWN conference on the subject.

Committee members added the following comments:

- We can develop conclusions after comments are received from technological institutions, presumably once the pilot conference has been held and the first monograph has been distributed.
- The organizers should be sure to involve COCI, since there has been concern that IUPAC does not deal sufficiently with the concerns of industry.
- How should participants be identified? Talk to divisions, COCI.
- The IUPAC Congress takes place August 10-15th, 2003. There are meetings on Monday and Tuesday, but we could hold a workshop on Sunday, August 10.
- The Future Actions Committee could meet on the Wednesday, since the CHEMRAWN committee is planning to meet with COCI and Education committee on Tuesday.
- It's important to inform the IUPAC Congress organizers about this special session.
- If the event were held off-Congress, participants wouldn't have to pay the \$200 Congress registration.

Dr. Norling suggested the committee should move ahead by soliciting input from COCI, asking the Divisions to canvass their members, and selectively issuing invitations to pull together some 25 papers. The committee should come up with a discussion of issues, possibly by a panel, then pull the exposition together in a publication with recommendations. He cautioned that a general call for participants won't work - it will be necessary to make specific invitations to desired participants.

CHEMRAWN XVII: Dr. Buncel suggested holding a CHEMRAWN conference on greenhouse gas mitigation strategies related to developing sources of clean energy. The topic includes a great deal of chemistry and a meeting could be organized jointly with the Canadian organization BIOCAP, perhaps with seed money from them. Dr. Buncel noted that the BIOCAP's budget, coming from Canadian oil and steel companies, is firm until 2004. The conference might be held at his base at Queens University or it could be organized for the IUPAC General Assembly in Ottawa.

Comments from the committee:

- Forests are disappearing as people chop down trees for fuel. Bush burning is part of traditional agriculture. Gas flaring practices and use of inefficient older vehicles in Africa contribute to the worldwide greenhouse gas production. (Onyido)
- Q: What would the Future Actions Committee do that's noteworthy? (Hamelin)
A: In part, the conference agenda will consider what to do with biomass and how to sequester carbon dioxide.
- Closing the carbon cycle should also be included (Hamelin).
- Q: Isn't this a continuation of issues considered in CHEMRAWN VII? (Malin)
A: Yes. The organizer should contact the CHEMRAWN VII people. (Buncel)

- Natural processes have to be included. For example, tundra emits various greenhouse gases. We should emphasize what was done in CHEMRAWN VII and relate other sources. We need to prepare a message to public, governments and scientists.

Dr. Norling noted, since we now have conferences scheduled for every year until 2005, that there might be a scarcity of CHEMRAWN resources. Is this a problem? Dr. Buncel responded that Canadian agencies are very interested in this topic. He expressed the belief that a conference might be organized for late September or early October of 2004 if the CHEMRAWN XV Water conference is held in June of 2004.

CHEMRAWN X (Chemical Education). Dr. Norling noted that, although all CHEMRAWN X activities have been completed, they have not all been documented yet. He is working on this.

CHEMRAWN XIV (Green Chemistry). The highly successful CHEMRAWN XIV is completed. Dr. Malin noted that remaining funds are being held for use in Future Actions Committee projects. *Chemical and Engineering News* has published a number of articles on Green Chemistry and CHEMRAWN XIV. Dr. Norling informed the committee he is working on a report at RAND Corporation describing applications of Green Chemistry to industrial processes. Dr. Paul Anastas of the White House Office of Science and Technology Policy requested the report. Dr. Anastas chairs CHEMRAWN XIV's Future Actions Committee.

Dr. Kopytowski noted that Dr. Hjeresen, Chair of the CHEMRAWN XIV organizing committee, hasn't returned a conference evaluation form. He asked whether the committee wants to continue making evaluation requests. Dr. Norling responded that IUPAC itself is doing an evaluation. Since Dr. Hjeresen will be responding to IUPAC's request, we probably don't need to duplicate their efforts.

The meeting adjourned at 5:45 PM.

Monday, September 16, 2002: Dr. Norling called the meeting to order at 9:15 AM.

Discussion of Committee Strategic Plan

Dr. Norling reviewed the terms of reference of the CHEMRAWN committee, including length of members' service terms. He again noted that, since the terms of reference don't specifically mention the production of conferences as a committee activity, committee activities are not limited to the organization of conferences.

Members of the committee made the following comments with reference to the strategic plan:

- It is important to be mindful of progress made in the past. Much has happened since the committee met in Korea. (Hamelin).
- There must be continuity in committee operations and good information needs to be made available for CHEMRAWN stakeholders and the general public. We should, as a matter of routine, provide information and publicize the results of CHEMRAWN activities (Kuznetsov). This in part is being done by the Education committee (Smith).
- The Secretariat now has a Chemical Communicator whose job is to work with newspapers and public media. It is important to put CHEMRAWN results into language that the average citizen or politician can understand.
- It was noted that IUPAC published the Proceedings, but didn't publish the papers for the Materials CHEMRAWN.
- CHEMRAWN II and CHEMRAWN VII did distribute proceedings to government figures (Malin).

Members listed the following strengths for the CHEMRAWN committee.

- 1) We have good brand name recognition for CHEMRAWN, good publicity for a number of very successful conferences and global recognition for particularly relevant ones.
- 2) Future Actions Committees have proved to be an excellent concept.
- 3) Volunteers and the working committees have been enthusiastic and effective. Leadership is strong.
- 4) There has been considerable thoughtful deliberation and planning for each conference. We don't proceed before finances are assured. Discussions are open, factual and incisive.
- 5) IUPAC considers CHEMRAWN conferences to be important. There is good support from the Bureau.
- 6) Former committee members have "bought in" to the process and are willing to continue their support of CHEMRAWN projects.
- 7) CHEMRAWN projects are often multidisciplinary. They consider socioeconomic aspects as well as scientific ones.
- 8) There has been good industrial support and relevance.

Dr. Buncel noted that *Chemical and Engineering News* articles on committee activities have appeared. Anyone can now go to GOOGLE, plug in CHEMRAWN and obtain these archived articles. But good publicity is not a foregone conclusion. For example, COCI may not have received the publicity it deserved for the chlorine and estrogen booklets. Is there a way of institutionalizing this kind of publicity?

Dr. Norling noted that many bodies are working with the chemical industry to help publicize these achievements. The World Business Council for Sustainable Development (Geneva) is one.

CHEMRAWN Committee Weaknesses:

1. Financial resources are limited.
2. There is always the possibility of competition from other national and international organizations, for example on environmental aspects and policy issues.
3. There is a dearth of activity in-between committee meetings. This can produce a lack of continuity.
4. Involvement of the entire committee in a given conference is limited. Considerable discussion of this point follows:
 - Some members didn't agree that this is a weakness, since not all members are needed in all steps, but there is a general belief that a greater level of interest would encourage the CHEMRAWN organizers.
 - We could formalize the procedure more effectively i.e., we might ask the Secretary-General to suggest how better committee involvement might be achieved.
 - Perhaps we need a better-articulated relationship between the CHEMRAWN committee and conference organizers. Since the 1997 committee meeting in Korea we have had only one large conference, on Green Chemistry. We are moving ahead now, but current events tend to be committee-organized workshops.
 - A world conference is taking place in Johannesburg, and meetings elsewhere are discussing upper level socioeconomic problems. Perhaps we could use CHEMRAWN to compile and evaluate what others are doing. For example, the energy community could employ CHEMRAWN as a sounding board. Dr Norling noted this is somewhat similar to what COCI did on chlorine. Dr. Kopytowski added that this level of vision is important; otherwise we will produce only lower level conferences. In any case, we must find an appropriate context in which to place ourselves regarding whom we address, what we do and what we are judging. Dr. Onyido advised that a pragmatic approach would address that issue. We should determine the status of a problem and categorize what efforts are being made.
 - Dr. Sivaram: CHEMRAWN is not very well known or identified in many national venues. What can we do to change that? This is one of the issues relevant to the organization of large, high-visibility conferences.
 - CHEMRAWN could become a kind of think-tank-addressing regional issues. Could we have more impact on governments that way? In the developing part of the world this could be important.
 - We must realize that conferences have a lifetime. Results must be brought forward while still relevant.
 - IUPAC can bring expertise. It might be possible to have a group of people who look at regional issues, then bring them to a debate utilizing the existing network of chemical scientists through IUPAC. However this takes time.
 - Questions: Could we have more people on the committee? More liaisons? Could we discuss commissioning a study of a regional problem? CHEMRAWN could identify experts and organize discussions.
 - The committee should represent more nations. We need people from China, India, Thailand, Philippines, for example. Underrepresented countries with strong chemistry should be identified and invited.

- We don't have to have every member travel to the meeting if we take the think tank approach and use e-mail.
- Half of the committee will be changing in 2004. Probably should have someone from Northern Africa.
- Dr. Norling: We can commission a task group as well as a committee. In January IUPAC will ask the National Adhering Organizations to suggest persons who would be representatives to Divisions. We should also do this for CHEMRAWN.
- Dr. Sivaram: Problems are global; solutions are local.
- Dr. Moyna: We could have something like a CHEMRAWN Scholar. If such a person were available to work, study and plan on a particular topic, it might yield an even better conference than the opportunistic structuring we have tended to follow.
- Dr. Kopytowski: Think tank activities should be better related to the conference activities but does CHEMRAWN's purview extend beyond chemical research?

Weaknesses (continued):

5. Involvement with other IUPAC divisions, committees and conferences is limited.
6. CHEMRAWN should focus and prioritize more. We should discard ideas that are not broadly supported and also define the potential "customer" early in our planning.
7. Processes and procedures need to be better spelled out, such as how to propose and organize a conference and how the committee is staffed.
8. Committee membership is limited. Dr. Norling noted that other divisions are allotted more titular members, more associate members, plus six members from countries not represented. We could operate in that way. Dr. Moyna: Twelve is a good number. We know each other. We know each other's attitudes. This wouldn't be true if we had a bigger rotating membership. Should we have something like a Senate – like this – then a lower House?
9. The length of time from concept to conference needs to be shortened.
10. Mechanisms to implement recommendations from conferences should be specified.
11. In many countries, CHEMRAWN is not recognized as a resource.
12. The committee should spend more time defining critical "world needs. Dr. Hamelin: What are world needs for a region? Energy, and water are too broad as subjects. A second key concept is chemistry as a science and as an industry. A third is Future Actions.

Opportunities: CHEMRAWN provides the following actual and potential opportunities:

1. Open discussions on controversial and multidisciplinary issues.
2. Collaboration with other IUPAC committees (such as COCI) and divisions.
3. Other products besides conferences, such as studies, discussions and reports. The committee can act as a "think tank" as given in the terms of reference.
4. Video, reporting of conferences and greater use of the Internet.
5. Many issues to address coming out of the WSSD in Johannesburg.
6. Possible impact on solutions to Third World problems

7. Contact can be made to invoke chemistry “illuminati” for suggestions on areas for CHEMRAWN efforts.
8. Assure that we focus on the three concepts: Chemistry, World Needs and Future Actions (note: We are concerned about chemistry or chemical resources, not only chemical research). Possible areas include chemistry in the Middle East; biodiversity, natural resources, intellectual property rights. The WIPO site should be investigated.
9. Act as a clearinghouse to alert NAOs and others to emerging issues.

Threats:

1. It is sometimes difficult to raise financial resources to fund CHEMRAWN efforts, but that can be done when there is interest.
2. There may be danger of becoming irrelevant. A lack of impact could bring less or no support from IUPAC and the chemical community.
3. Competition with other organizations could make CHEMRAWN “second rate”. Professional meeting organizers present a kind of competition - but they are generally addressing other, more profitable targets.
4. Lack of a broad committee membership causes development of poor conferences. An insufficient number of countries are involved.
5. Competition from other conferences may begin to include some aspects of CHEMRAWN conferences.
6. There is impending significant turnover in committee membership.
7. The existence of a scientific gulf between developed and developing nations may cause a lack of communications and loss of interest in dealing with issues of importance to the developing world. Idea: Why not have a CHEMRAWN meeting on leveling the playing field between developed and developing countries.

In closing the morning session, Dr. Norling posed the following questions for continued consideration by committee members.

- 1) How can CHEMRAWN obtain resources? Should we adjust, do different types of work – not only conferences? Do we need to get more good fundraisers involved, use adhering organizations more?
- 2) What can CHEMRAWN do besides holding standard conferences? Think tank activities?
- 3) How can CHEMRAWN enhance its impact?
- 4) How can we get the “right” people with necessary talents to be members of the committee?
- 5) What others questions should we consider? Could people give ideas by e-mail?

Note: The results of this strategic planning exercise are now summarized separately in the committee’s strategic plan.

In the afternoon session, members presented several “Briefing Papers” and comments on topics related to forthcoming CHEMRAWN conferences and workshops: These included Cleaner Energy/Greenhouse Gas Mitigation (Buncel, Chon, Kuznetsov, Sivaram);

Innovation (Kopytowski, Norling, Smith, Malin); Water issues (Hamelin, Onyido, Smith). They are not summarized here because many of the papers were handed out at the session or are available from the presenter.

The exercise of preparing such papers tests the think tank approach. It was noted that the papers could be circulated and discussed electronically.

Committee members made the following comments or contributions:

1. Carbon Management: A book is available from Chemical Sciences Roundtable discussing control and mitigation of carbon dioxide. Dr. Norling will send copies to those who expressed interest.
2. Dr. Sivaram noted the Brown Haze danger. A committee member inquired about remediation of an airfield site. Pierre Fillet is studying a treatment of contaminated soils.
3. Regarding the proposed conference in India, Dr. Sivaram requested advice on where to find individuals who can discuss the impact of Chemistry on cleaner energy. He will have at his disposal some 16-17 hours of presentation time to include 30-35 speakers and 4-5 thematic areas. Dr. Hamelin suggested the scientific committee decides this, but first the needs must be defined and a future action program should be organized. Dr. Sivaram will suggest a few names and requests suggestions of more. Other questions arose: How do you bring nuclear energy into the conference? What about the proliferation of the two-cycle engine? From IUPAC, Dr. Sivaram will request sponsorship and some funds to support a speaker. Alan Smith offered to help in contacting IUPAC. The Future Actions Committee should be charged to recommend projects in chemistry and chemical technology related to cleaner fuels. They might look at the topic of inexpensive energy storage in phase change materials. Dr. Sivaram indicated he doesn't want to concentrate on energy efficiency in processes. He prefers to focus on direct sources of energy.
4. Dr. Buncl's Proposal: How will Chemistry be related to the greenhouse gases problem? Next year IUPAC is in Ottawa. What about having the Greenhouse conference in Ottawa rather than Kingston? A: How much can BIOCAP support? The BIOCAP document on agriculture and climate change was very well written, he says.
5. Dr. Chon presented his very thoughtful paper—"Energy Problems of the World" discussing, among other topics, the relocation of industry closer to the energy and raw materials wellheads. China has been relatively careful with planning for resource use. Dr. Chon discussed fuel cell development. He said it would be desirable to form a study group to look into this subject from an economic viewpoint.
6. Dr. Kopytowski provided some additional comment on the proposed Ottawa workshop
 - The organizers must invite 2-3 persons to show innovation systems in the developed countries. He will prepare a special questionnaire to go to companies.

- He will prepare a white paper to submit to COCI asking whether they can respond to questions on innovation. He proposes organizing a CHEMRAWN/COCI panel and will talk with Michael Droescher.

7. Dr. Smith announced he has produced a booklet on “Trends in Research Priorities in Chemical Industries”. He looked at trends at UK pharma companies with particular discussion of moving from pure to applied chemistry. He noted that the Washington Chemical Sciences Roundtable seminar had been very helpful. Dr. Smith added that UK is doing a Foresight Study – like Vision 2020 - to see what the needs will be in 20 years time. It is presented as an updated roadmapping exercise. Some 50 roadmaps are on the Web. Dr. Smith noted he has been very active in setting up an MSc course in Chemical Technology and Management. It is a distance learning course based at Strathclyde University. Please see <http://www.strath.ac.uk/Departments/ChemEng/igds/main.html> for details. Dr. Smith noted that that the UK is setting up Faraday partnerships.

A committee member noted that new industrial enabling tools, such as combinatorial chemistry, microreactors, and computer controls that allow operators to run plants around the clock, are now very important to the industry. A common economically driven decision nowadays is to bypass the pilot plant stage of process development.

Dr. Malin reported on a recent trip to Brazil during which he and colleagues interviewed planners at the Brasilia headquarters of CGEE, a group organizing the use of government-earmarked “sectorial funds” for innovative industrial development. He noted that the dynamics of industrial development in Brazil should be very interesting, especially after the 2002 presidential election.

8. Chemistry and Water Conference: Dr. Hamelin distributed his proposal for the conference.

9. Dr. Onyido distributed a paper on “Water Issues in Nigeria”. He noted that the oil industry has caused significant environmental problems. Simple purification procedures are not used and there is a high level of ignorance. Many strategies are being proposed and an integrated approach is needed. In his view, the basic education of people is even more important than chemical research.

10. Dr. Moyna distributed a paper on how to identify young people who would become chemists. He referred to a contribution in the Swedish publication *Ambio*, Vol 31, No. 4, June 2002 by Partha Dasgupta, entitled “Is Contemporary Economic Development Sustainable?” Mr. Dasgupta, who studies developed, developing and least developed countries finds the latter countries plan for poorer circumstances while more developed countries plan for richer ones. The approach can be described mathematically. Dr. Moyna would like to study sustainability by quantitative means.

In closing, Dr. Norling listed the following plans for the Ottawa IUPAC Congress and General Assembly.

- 1) Include an extra day for the innovation conference.
- 2) Ask Drs. Smith and Chon to attend both COCI and CHEMRAWN
- 3) Determine who will be at the Congress whom we can co-opt for our day.
- 4) Be sure each committee member is aware of his assigned follow-up activities and carries them out.
- 5) Try by the Ottawa meeting to put all our relevant information on the Web, including CHEMRAWN X.

Dr. Norling thanked all participants. He asked that each person who leaves CHEMRAWN Jan. 1, 2004 please consider nominations of persons who might replace them on the CHEMRAWN committee.

Respectfully submitted,

John M. Malin
Secretary
CHEMRAWN Committee