

**Workshop of US and African Chemical Societies
Pretoria, South Africa
8-10 April 1999**

Summary Report

Introduction

The Workshop of US and African Chemical Societies was organized by the American Association for the Advancement of Science (AAAS) in order to develop tangible ways for the societies to work together to their mutual advantage, i.e., to strengthen African chemical societies while also providing benefits to US chemists, such as expanded research opportunities in challenging and important fields. The workshop, held April 8-10, 1999, at the University of Pretoria in South Africa, brought together representatives of five of the most active African chemical societies (Ethiopia, Ghana, Nigeria, South Africa, and Tanzania), plus the American Chemical Society (ACS), the International Union of Pure and Applied Chemistry (IUPAC), and the African Association of Pure and Applied Chemistry (AAPAC). The industrial perspective was also represented at the workshop through the participation of the Chemical and Allied Industries Association of South Africa. A complete participant list is attached as Appendix A. Although some of the participants had met previously as individual chemists (notably at a July 1997 IUPAC-AAPAC meeting in Durban), this event marked the first time they had convened as representatives of their respective chemical societies.

Rather than serving as a forum for the reiteration of the various challenges facing African science, the workshop focused on formulating specific action plans for useful collaborative activities and on forging long-term institutional relationships. Four primary objectives guided the workshop agenda: To identify and prioritize examples of significant research areas where there is a particular and mutual need for international collaboration; to improve the technical, financial, and managerial capacity of African chemical societies; to explore ways the societies can collaborate and pool resources on important value-added initiatives; and to ensure continued regular communication among the societies represented at the workshop as well as others that were not able to attend. See Appendix B for the detailed workshop agenda.

The workshop featured brief presentations from the institutions represented, highlighting activities, goals, and most pressing needs of each (thumbnail sketches of the participating societies can be found in Appendix C). Discussion sessions focused on synthesizing common themes, identifying targets for cooperative activities, setting priorities among the proposed activities, determining appropriate and feasible roles for the participating institutions, and ultimately producing a specific action plan. It is noteworthy also that the Honorable Ben Ngubane, the South African Minister of Arts, Culture, Science and Technology, honored us with a visit during the workshop, during which he noted the importance of chemistry and the chemical societies in contributing to a vital economy.

The rest of this report will summarize the discussions that took place and present the resolutions for followup action that emerged by consensus.

Workshop Discussions

Workshop discussions focused on how the African chemical societies might pool their resources to work together more effectively to address common concerns, as well as on how they might collaborate with US societies such as AAAS and ACS toward their mutual advantage. In addition, there was considerable discussion of the ways in which the societies might work more closely with industry in order to increase their sustainability and enhance their societal impact.

Common Challenges

From the presentations of the African chemical societies certain common themes emerged with regard to the challenges being faced. Prominent among these were the need to:

- ❑ enhance public and government recognition of the societies and increase the influence they enjoy in these spheres;
- ❑ bolster the sustainability of the societies, including the financial basis on which they operate, such as by increasing membership and attendance at meetings, and possibly by working more closely with industry and providing value-added goods and services;
- ❑ become more active in popularizing chemistry, in terms of increasing both student interest and public understanding;
- ❑ have a greater role in promoting educational standards and providing educational materials;
- ❑ improve communications among societies and with constituencies via electronic means; and
- ❑ establish more permanent headquarters, independent of the contact coordinates of whoever happens to be society president at a given time.

Intra-African Society Cooperation

In light of the common aspects of the challenges faced and the relative scarcity of the resources wielded by each of the societies, there was a great deal of interest in exploring ways the societies could pool their efforts to achieve some of their goals. The possibility of establishing a pan-African institution to subsume the functions of the existing societies was discussed, but ultimately rejected on the grounds that there was still a need for a uniquely national voice in each country, mainly for language and political reasons. However, it was agreed that mechanisms should be created by which the societies could coordinate their activities and share information to their mutual benefit.

Each of the eventual resolutions of the workshop reflect this desire to work more closely together on a sustained basis, including US-African cooperation as appropriate (addressed more specifically below). AAPAC, as an existing pan-African institution in the field of chemistry, emerged as a logical coordinating mechanism, and accepted primary responsibility for organizing two of the workshop's resolutions: a) establishing a database of chemists and chemical resources in Africa, and b) publishing a new electronic newsletter with input from each of the societies. More details on all workshop resolutions follow further below.

The most ambitious potential collaborative venture discussed at the workshop was the establishment of an online *African Journal of Chemistry*. Creating such a journal would be a significant and difficult undertaking requiring a high level of commitment on the part of the sponsoring societies. The arguments in favor of the undertaking may be summarized as follows:

- ❑ Such a journal would tend to make African science more accessible to the African educational, scientific, managerial, and other communities. Currently much African research is published outside of Africa.
- ❑ The volume of research conducted in many African countries, with a few exceptions, is increasing. This expanding volume requires a corresponding increase in publication media, a trend that indeed has been observed recently.
- ❑ A journal focusing on science produced in Africa would symbolize and represent the African scientific community and help to stimulate and promote the production of science on the continent.
- ❑ The results of the combined efforts of the chemical societies on a continent-wide scale may be a more marketable commodity and may be financially more viable than individual efforts. This approach has been used successfully in Europe: The *European Journal of Organic Chemistry* is a merger of the publication efforts of the chemical societies of France, Germany (two societies), Italy, Belgium, the Netherlands, and others.
- ❑ The journal could give a boost to the African chemical societies, many of which already have significant expertise in publishing.
- ❑ The World Wide Web, while carrying its own costs and requiring its own expertise, eliminates many significant costs of journal production and distribution, and greatly increases the potential accessibility of African research.

The result of the workshop discussions, however, was an agreement that such an ambitious initiative, while potentially extremely desirable and well worth considering for the future, was beyond the immediate capacity of the workshop participants to address adequately. The electronic newsletter that the participants did agree to launch is an idea that emerged from this discussion, and can be considered a tentative first step towards a possible future journal produced jointly by the African chemical societies.

US-African Cooperation

Another major thrust of the workshop was an exploration of ways that African chemical societies and US institutions can collaborate effectively, with an emphasis on equal partnerships for ensuring mutual benefit. Two essential types of interaction were envisioned: exchanges of information, materials, and personnel, on the one hand, and promotion of collaborative research, on the other.

Exchanges of information were encouraged, where US researchers could benefit from understanding more about research developments and opportunities in Africa, and vice versa. In addition, African societies could benefit from the experience of US institutions in management and sustainability of nonprofit institutions, e.g., membership and marketing strategies, value-added products and services, and effective society-government relations. Other suggested exchanges included things like samples of educational and training materials, as well as professional exchanges of researchers, e.g., for training workshops or other opportunities.

There was also a great deal of interest in workshops and other means of promoting collaborative research in appropriate areas. Some discussion was devoted to determining what constitutes an appropriate area. It was the sense of the group that the most useful areas are those where there is:

a) a need-driven research topic, e.g., an environmental problem requiring analytical chemistry; and b) a clear opportunity for sharing/transfer of expertise.

In the interest of pragmatism, workshop recommendations were limited to a small number of followup projects that were seen as most attainable. A sample list of areas in which collaboration was seen as potentially useful is shown in Figure 1, providing an indication of the range of the discussion. The final consensus of the workshop was to pursue funding for two additional workshops. One would facilitate research cooperation in an important topical area, with the most likely candidates being “green chemistry” or natural products research. The other would be more of a nonprofit institution management seminar, providing training in sustainable management techniques, membership strategies, revenue generation, and so on.

Participants also agreed to share information regularly through the above-mentioned newsletter, and less formally through the exchange of sample educational materials, publications, and news and professional opportunities as they may arise. In addition, the American Chemical Society agreed to explore the possibility of incorporating African participants into its existing visiting scientist program, which to date has primarily emphasized Latin America and Central Europe. An electronic mailing list has been established for workshop participants to continue the process of planning these followup activities.

Collaboration with Industry

A great deal of interest was expressed at the workshop about how the chemical societies can improve their relationship with the chemical industry. Heretofore industrial chemists in Africa have often been discouraged from joining and becoming active in chemical societies, in contrast to the close working relationship in the US between ACS and private sector chemists. The concern in Africa now is two-fold, involving an interest both in how industry can contribute to the sustainability of the societies and in how the societies can become more relevant to industry. A consensus emerged that the best way to realize the former goal was by achieving the latter.

Several industry-relevant activities in which the societies could engage more aggressively were suggested during workshop discussions, and are enumerated below:

- ❑ Commercial bioprospecting: Societies may wish to encourage and participate in consortia with government, industry, and university representatives to share expertise and help set the policy agenda;

Figure 1. Potential Areas for US-African Collaboration in Chemistry

Biodiversity conservation
Natural products research
Waste management
Pollution prevention and amelioration
Green chemistry techniques
Industrial relations
High school education (monographs and science kits)
Encouragement of women and girls
Training opportunities (equipment usage)
Scholarly exchanges
Audio-video program provision
Exchange of publications
Working with policymakers
Ameliorating brain drain
Advertising professional opportunities
Equipment donation
Management seminars
Sharing laboratory facilities
Pooling resources for bulk purchases of chemicals

- ❑ Technology incubators: There may be a valuable role for the societies to play in facilitating the “laboratory to marketplace” transfer of new products and processes;
- ❑ Synthesizing compounds: It was suggested that the societies might play a role in identifying compounds that are needed in their countries as part of an import substitution strategy, and in brokering relationships between the industries that can use the compounds and the university students (for example) who can synthesize them;
- ❑ Job matching: Here the societies could play an important information clearinghouse role that would serve both chemists and industry;
- ❑ Holding meetings and issuing publications on applied chemistry for industry;
- ❑ Offering short courses to train people in chemical practices of immediate pragmatic interest to industry;
- ❑ Information centers: The chemical societies may be able to do more in terms of becoming “fountains of information” with regard to a wide range of matters, including educational standards, chemical regulations, natural products research, intellectual property rights matters relating to bioprospecting, and who is doing what in terms of both research and industry;
- ❑ Awards: This is an area that some of the societies are already involved in, and one that could possibly be expanded. Awards can be given to researchers for notable research as well as to private sector concerns for good chemical practices; and
- ❑ Regular reports: Another aspect of this role as information broker is in reporting on chemistry-related news, e.g., through a regular electronic newsletter (plans for which have in fact been launched as a direct product of the workshop).

Establishing Priorities for Followup

In order to establish action priorities from among the many useful types of activities that had been identified during the course of the workshop, we returned to the four points that guided the workshop agenda: US-African collaboration; improving the technical, financial, and managerial capacities of the African chemical societies; intra-African collaboration on value-added initiatives; and ensuring continued and expanded communications. Thus we resolved that our selected followup activities would involve something in each of these areas.

Priorities were ultimately established through a process of reviewing the possibilities, voting on their relative importance, and finally vetting a proposal for an overall followup action plan, which is presented below.

Action Plan

Toward satisfying our four objectives, participants agreed to undertake three followup activities immediately, and to explore additional funding possibilities for a minimum of another two activities.

Immediate followup activities:

- ❑ **Establishment of “virtual headquarters”** for each society, through a common website with links to individual society pages. The number one priority on the “wish list” established in the voting process was the need for a permanent national office, independent of the particular coordinates of the president at any given time. Having a permanent presence was seen as a prerequisite for improving visibility and legitimacy and for attracting new members, i.e., it is a fundamental precondition for building technical, financial, and managerial capacity. This web-based strategy is a partial solution in that it provides a permanent presence that will not change with each new leader. It may not be as ideal as having a physical headquarters complete with full-time staff, but it is an extremely cost-effective measure with significant benefits. A central website with the domain name “www.africhem.org” (or something similar) and links to separate pages and permanent email addresses for each African chemical society will serve as a dependable information repository and contact mechanism. AAAS is responsible for the initial establishment of the site, in cooperation with each of the African societies and with support from IUPAC. Since the website approach does not resolve the need for fax and postal contacts, it was also suggested that the societies seek to pool resources with other scientific societies in their respective countries to share a common PO box and fax machine, possibly under government auspices. This approach has already worked in Ethiopia.
- ❑ **Creation of a subscription-based electronic newsletter** featuring news items contributed by all the African chemical societies, to be coordinated by AAPAC. This plan arose out of a discussion about the feasibility of establishing a new pan-African online journal of chemistry, and is intended to serve in part as a first step toward that eventual goal. The newsletter itself is significant in that it can become an important source of information on developments in African chemistry, as well as a vehicle through which the societies can learn from and foster collaboration with each other. As such, it is an intra-African value-added initiative that is expected to lead to still more ambitious future collaborations.
- ❑ **Establishment of a database** of African chemists and institutional capacities. The need for such a database is widely recognized, as currently there is no central repository of information on who is doing what in chemistry in Africa. Some work toward compiling the database has already been started, by AAPAC as well as Professor Nkunya in Tanzania, and AAPAC will take the lead in coordinating these efforts with assistance from IUPAC and ACS. The database will eventually be expanded to include chemical industries in Africa. This initiative relates to the goals of fostering intra-African as well as US-African and society-industry collaboration. It should be noted here that, while some significant progress can indeed be made without new grant support, in order to realize the goal of creating a truly comprehensive database--a time and labor-intensive endeavor--additional support will ultimately be needed.

Additional activities requiring additional funding:

- ❑ **A scientific workshop** of US and African chemists in an important sub-discipline where international collaboration can be particularly fruitful. The leading candidates discussed at the workshop are the fields of “green chemistry” and natural products, although other possibilities have not been excluded. A full-scale followup effort of this type, based on

workshop discussions, was seen as necessary in order to serve the goal of promoting US-African collaboration effectively. The African chemical societies and the ACS will take the lead here to determine the most useful form that such a project should take, but our discussions pointed to an intensive workshop with the goal of practical knowledge transfer and genuine scientific collaboration.

- **A training workshop** for African scientific societies (chemistry and otherwise) to explore nonprofit management, membership, marketing, and sustainability issues. A variety of tools exist to enable this sort of training, and much expertise is available to foster creative approaches to sustainability and engender good management practices. Such a workshop would most likely involve specialized management consultants as well as personnel from appropriate sections of US scientific societies, e.g., development and membership officers from AAAS, ACS, and/or other similar institutions.

A private electronic mailing list has been created for workshop participants to communicate about these followup activities, continue workshop discussions, and otherwise maintain momentum towards sustained collaboration. The list will be expanded in the near term to include representatives of other African chemical societies that were unable to participate in the workshop itself. In this way, the products of the workshop can be extended to include the larger community of African chemists.

Future AAAS Role

It is expected that most of the followup to this workshop will be led by the African chemical societies and ACS. As a multidisciplinary general science organization, AAAS see its most useful role as that of catalyst in similar initiatives within other disciplines. In each case, the continuation of these efforts in each discipline will depend on the needs, desires, goals, and enthusiasm of the US and African societies in the respective fields. However, AAAS remains open to the possibility of continued participation in subsequent projects in particular disciplines, if such involvement is deemed appropriate and desirable by all parties.