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TWAS newsletter

THE NEWSLETTER OF THE THIRD WORLD ACADEMY OF SCIENCES



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The year 2001 was an eventful year for TWAS. A dramatic increase in international recognition, the continued growth in institutional partnerships, and the rising level and scope of our project activities have enabled TWAS to reach a new level of influence in the global scientific community.

Among the Academy's noteworthy accomplishments are: TWAS/InterAcademy Panel (IAP) efforts at capacity building for science academies in Africa, marked by an influential meeting in Trieste in May, attended by scientists, scientific administrators and science ministers from Africa and elsewhere, that was followed by the creation of a network of African science academies under the auspices of the African Academy of Science (AAS) in Kenya, in December; TWAS/Third World Network for Scientific Organizations (TWNSO) activities associated with the Global Environment Facility (GEF) project on the conservation and wise use of biodiversity in arid and semi-arid regions, marked

An Eventful Year

by an 'all-participants' meeting in Trieste in April followed by the project's first regional meeting in Mongolia in August; and the Academy's partnerships with the International Council for Science (ICSU), World Federation of Engineering Organizations (WFEO), International Social Science Council (ISSC), and IAP in the preparation of the report, Role and Contribution of the Scientific Community To Sustainable Development, which is one of nine 'dialogue' papers prepared for the upcoming World Summit for Sustainable Development (WSSD) to be held in Johannesburg, South Africa, this summer. TWAS also played a pivotal role in the development of SciDev.Net, which was officially launched in December. SciDev.Net is an internet portal for information on science, technology and development in the South that is receiving editorial support from Nature and Science. All of these efforts have placed TWAS at the centre of some of the most significant developments in the international science and technology arena.

TWAS's progress in 2001 – as virtually everything else – was interrupted and then overshadowed by the terrorist attacks in the United States on 11 September and the war in Afghanistan that followed. These events forced the Academy to cancel its 8th General Conference, scheduled to be held in New Delhi, India, in late October. It was an agonizing decision both for the TWAS Council and the local organizers – one that was made after much discussion and debate. However, I can ensure you that it was taken with the best interests of the Academy and its members in mind.

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CREDIT TO THE SOURCE

I am happy to report that the 8th General Conference has been rescheduled for 19-23 October 2002. More than ever, we are eager for your attendance. We urge you to mark your calendars and clear your schedule for what promises to be the most significant TWAS meeting to date. About 400 people are expected to be there, including some of the most prominent scientists and science administrators in the South and North.

As in the past, TWAS's success is in part due to the synergistic resources and talents generated by the Academy's close relationship with TWNSO, the Third World Network for Women in Science (TWOWS) and IAP. The secretariats of all these organizations are located in Trieste.

The Academy's involvement in science and technology cutting-edge activities have taken place side-by-side with efforts to strengthen TWAS's core responsibilities. These responsibilities have largely defined the Academy's success since its inception nearly two decades ago and remain the most important aspects of both the Academy's mandate and influence today. In 2001, the Academy awarded 102 research grants and 21 prizes. At the same time, TWAS helped finance 68 fellowship and associateship visits, cosponsored 38 scientific meetings, and sponsored 8 lectureships and professorships.

As always, the Academy expresses its sincere thanks to the government of Italy, the Swedish International Development Cooperation Agency (Sida) and Kuwait Foundation for the Advancement of Sciences (KFAS) for their generous contributions. The fact is that the Academy would not exist without their financial support. We hope we have justified their investment and we look forward to continuing our close relationships with these and other funding organizations in the future. In 2002, TWAS also took steps to reinvigorate our endowment fund campaign with the publication of a new brochure that includes testimonials to the Academy's value to scientific communities throughout the South from the presidents of Brazil, China, and Italy, the Amir of Kuwait, and the Director-General of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Our US\$10 million campaign is now two-thirds of the way towards its goal and we are firmly convinced that next year will bring additional good news for this initiative, which is the key to our long-term financial health and stability.

The tragic events of 11 September remind us all just how uncertain life is. The events also remind us of how important science can be not just for the material benefits that are derived from scientific research but for the global community of mutual understanding and respect that is created through efforts to learn more about the natural world and the forces that make it so. TWAS has been instrumental in advancing the cause of science throughout the South and it has played an increasingly important role as a bridge between scientific communities in the South and North.

As the events of last year show, the Academy's role in the global scientific community has never been more significant. ■

◆ **C.N.R. Rao**
President

Third World Academy of Sciences
Trieste, Italy

CATCHING UP WITH TRIESTE

When the late Abdus Salam (Nobel Laureate in Physics in 1979) first coined the term ‘Trieste System’ in the early 1980s, he envisioned the creation of a broad network of scientific institutions in this picturesque seaside city in northeast Italy – all dedicated to the advancement of science and technology in the developing world.

Once the major port and ship-building centre of the Austro-Hungarian empire, Salam called on Trieste to move beyond its dependence on shipping and insurance (Trieste is also the corporate headquarters of *Assicurazioni Generali*) to embrace science not only as a source of knowledge but as a fundamental tool for economic and social development.

If Salam proved to be several steps and 20 years ahead of most of his contemporaries in emphasizing the critical role that science plays in economic growth, he was even more prescient in his unwavering focus on the need to promote science and technology in the developing world.

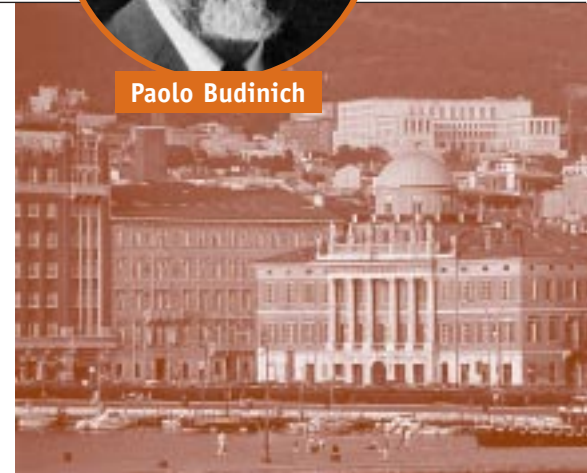
Trieste, in fact, has realized many

aspects of Salam’s dream. The International Centre for Theoretical Physics (an institution that now bears his name), which was launched in 1964, has become one of the premier training and research centres in physics and mathematics for scientists from the South. In 1983, Salam, still basking in the glow of the Nobel Prize, spearheaded the drive to establish the Third World Academy of Sciences (TWAS), which has emerged as one of the most respected scientific institutions in the world, recognized both for the accomplishments of its members and its efforts to support the work of young scientists in the South. Over the next two decades, other Trieste-based scientific institutions would follow:

- In 1984, the International Centre for Genetic Engineering and Biotechnology (ICGEB), which promotes advanced research in molecular biology and biotechnology with a special regard to the needs of the developing world.
- In 1988, the Third World Network of Scientific Organizations (TWNISO), which has grown into



Paolo Budinich



an organization with 154 members, largely ministries of science and technology, research councils and science academies from the developing world.

- In 1988, the International Centre for Science and High Technology (ICS), which designs training programmes for the development of public/private partnerships and the building of technology capacity, especially in the developing world.
- In 1993, the Third World Organization for Women in Science (TWOWS), whose membership now totals 2000 women scientists from more than 80 developing countries, making it the largest organization for women scientists in the world.



- In 2000, the InterAcademy Panel on International Issues (IAP), which consists of some 85 science academies from around the world. IAP, whose secretariat moved from The Royal Society in London to Trieste two years ago, is dedicated to increasing the involvement and visibility of science academies in discussions of international policy issues related to science.

Other scientific institutions that have helped expand the reach and scope of the Trieste System include the AREA Science Park, a collection of laboratories dedicated to the transfer of scientific innovations to industry; the Synchrotron Radiation Laboratory 'Elettra', an advanced electron accelerator that enhances investigation into such fields as material science and biology; and the International School for Advanced Studies (SISSA/ISAS), an Italian degree-granting research institution for postgraduate students in the fields of theoretical physics, mathematics, biophysics and cognitive sciences.

All of these organizations owe at least a part of their existence to Salam's tireless efforts to build a

'city of science' in Trieste. And all owe a deep debt of gratitude to the Italian government, which has served as the primary source of their funding since their inception.

But the very existence of these organizations does not mean that Salam's vision has been realized. In



fact, as each of these institutions has grown in size and stature, it has become increasingly difficult to focus on the system as a whole.

Events over the past several years, and particularly over the past several months, may now be reversing these long-standing trends.

In October 2001, Carlo Azeglio Ciampi, the President of Italy, ac-

companied the directors of Trieste's leading international science organizations to Tunisia for a two-day meeting with their counterparts in this north African nation. The purpose of the meeting was to discuss potential avenues of bilateral and international cooperation. The result was the signing of memorandum of agreement that will foster greater cooperation between Tunisia and Trieste's scientific community, especially in the areas of laser physics and science education.

Some eight months later, in March 2002, President Ciampi and Trieste's international scientific community were on the road again, this time to South Africa, to sign another set of agreements for bilateral and international cooperation. On this occasion, Ciampi met with Thabo Mbeki, President of South Africa, symbolizing the critical importance of the event. The resulting 'Cape Town Declaration' that was signed at the conclusion of the meeting calls for greater cooperation between the two countries, particularly on issues related to science-based sustainable eco-

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[CONTINUED PAGE 6]



conomic development that are likely to be at the centre of discussions at the World Summit on Sustainable Development (WSSD) scheduled to take place in Johannesburg in late summer.

In both Tunisia and South Africa, emphasis was placed on the Trieste System as a whole instead of on its individual components. And in both instances, the work of these international alphabet agencies – TWAS, TWNSO, TWOWS, ICS, ICGEB and IAP – was cited as instrumental both for the concrete impact that they have had on the development of science in each of these countries and for the credibility that these organizations have lent to Italy's growing interest in North-South cooperation in science and technology.

What accounts for the newfound visibility and strength of the Trieste System? Certainly, the events of 11 September have been a factor. The subsequent war in Afghanistan and the ongoing violence in the Middle East have only strengthened calls for greater North-South cooperation as a means of addressing the ills of

poverty, humiliation and hopelessness in the South and, consequently, serving as a means for easing tensions between the developed and developing world.

But I would contend that discussions taking place even before 11 September – at governmental meetings, diplomatic get-togethers, economic development workshops and foundation strategy sessions – were all raising the same issues and all pointing in the same direction. The recent endorsement of the Trieste System by the Group of 77, the most important voice for developing countries within the United Nations system, provides a critical confirmation of this growing consensus.

Successful strategies for sustainable economic development in the South will depend on wise investments in capacity building both for individuals and institutions. And no elements of this strategy are likely to prove more useful than those promoting scientific knowledge and training. To paraphrase an old adage, give people access to someone else's technology and you might help them for a brief time; give them the sci-

entific knowledge to recognize, assess, utilize and develop technologies that are appropriate to their own circumstances and you will send them on the path of sustainable economic growth.

This was the principle that drove Salam's thinking when he fought so hard to create ICTP, TWAS and the other international scientific institutions that now form the Trieste System. And this is the principle that has recently resurfaced on a global scale to give new life and purpose to his 30 year-old dream.

The momentum that has recently been generated, if sustained in the months and years ahead, could prove beneficial to both Trieste and, more importantly, the developing world. In today's global environment, that could prove a boon to the security and well-being of the developed world as well. ■

◆◆◆ **Paolo Budinich**
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WINNING THE WATER BATTLES

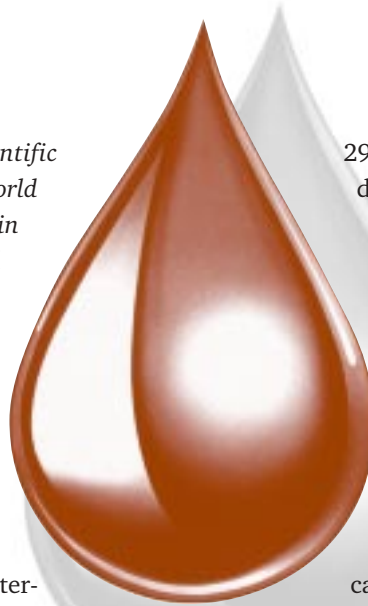
TWNSO'S NEWEST INSTITUTIONAL NETWORK FOCUSES ON ONE OF THE WORLD'S MOST CRITICAL PROBLEMS: ACCESS TO SAFE DRINKING WATER.

The Third World Network of Scientific Organizations (TWNSO) and the World Meteorological Organization (WMO), in close cooperation with the United Nations Educational, Scientific and Cultural Organization (UNESCO), has published TWNSO's newest 'case-study' monograph, Promoting Best Practices for the Conservation, Management and Sustainable Use of Water Resources in the South.

The volume, focusing on critical water-management issues in the developing world, is based largely on presentations made at a workshop held in Trieste, Italy, in November 2000 (see "To the Last Drop," *TWAS Newsletter*, January-March 2001).

Promoting Best Practices for the Conservation, Management and Sustainable Use of Water Resources in the South is the third TWNSO volume in an ongoing series of publications focusing on successful applications of science and technology in meeting critical social, environmental and economic problems in the developing world.

The first volume, published in 1998, consisted of



29 case studies. Topics ranged from the development of a simple, yet cost effective, "sugar and water" treatment in Bangladesh to combat acute dehydration, especially among young children, to the launching of sophisticated data-collecting satellites in Brazil for dealing with a host of resource-management issues related to air, water and soil.

The second volume, published in 2001, concentrated on successful applications in the conservation and use of medicinal and indigenous plants. This volume consists of 12 case studies, including an examination of the uses of medicinal plants in Madagascar for the treatment of diabetes and a government-led initiative in South Africa to commercialize the Buchu plant that has led to the creation of new profitable ventures with the potential to reach global markets.

Both of these volumes were published in partnership with the United Nations Development Programme (UNDP) Special for Technical Cooperation among Developing Countries (SU/TC-DC), which also provided funding for the workshops and publications.

“Water is a fundamental constituent of life and the environment,” says G.O.P. Obasi, secretary-general of the World Meteorological Organization (WMO), in commenting on the most recent case-study monograph. “It plays a major role in the history, culture and civilization of humankind.” As a result, Obasi notes, “water conservation and use impacts all aspects of sustainable socio-economic development.”

“The reality,” adds Mohamed H.A. Hassan, secretary general of TWNSO, “is that many developing countries lie in water-scarce arid and semi-arid regions, many depend on agriculture as mainstays of their economy, many have suffered food deficits, and many have experienced unprecedented urban growth over the past two or three decades. All of these factors have placed mounting pressures on the South’s fragile resources.”

Water is a fundamental constituent of life and the environment.

The nine case studies *Promoting Best Practices for the Conservation, Management and Sustainable Use of Water Resources in the South* deal with a wide variety of water-management issues faced by institutions in diverse settings throughout the developing world. For example, there are chapters on water conservation policies in China, water management strategies in Mexico, sustainable water use in Tunisia, and water-irrigation initiatives for agriculture in Kuwait (see “Strawberries in Kuwait” below).

The project, notes Obasi, is intended to allow countries from the South to examine “the best practices for sustainable water use” in the developing world that are based largely on “indigenous solutions to the problems.” At the same time, Obasi maintains, the overall effort is designed to foster “collaboration



STRAWBERRIES IN KUWAIT

You don’t need to be a climatologist to know that arid countries suffer from low rainfall and scorching temperatures. And you don’t need to be a soil scientist to know that such conditions create poor soils.

Yet, even the world’s most arid countries can develop productive irrigated agricultural land within their borders. Sparse rainfall, however, means that these regions must rely on groundwater aquifers as their primary source of water.

Over time – and time and again – the ability of these regions to keep their agricultural lands fertile and productive has been placed at risk by the increasing deterior-

ation of the quality of the groundwater due to rising levels of dissolved solids. That, in turn, increases the groundwater’s salinity. If left unchecked, rising salinity levels sap the soil of its fertility and ultimately renders it lifeless.

Kuwait, a country known more for oil than agriculture, provides a case in point. Annual rainfall in Kuwait averages less than 115 millimetres. Compare that to Italy where average annual rainfall exceeds 800 millimetres per year or Brazil where it is more than 1100 millimetres per year.

Despite being water-challenged, in the early 1960s, Kuwait successfully developed two regions – Wafra in the

among centres of excellence in the Third World that have expertise in hydrology and water resources management.”

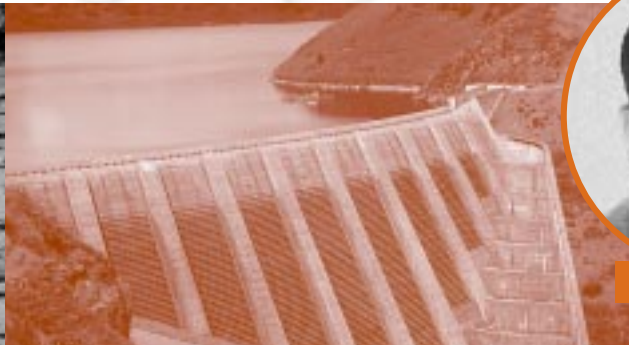
One of the project’s primary long-range goals is to create, under TWNSO’s administrative umbrella, an international network of water-management institutions to foster a continuous exchange of information and ideas on how to effectively manage and sustainably use water resources in developing countries. Participants at the conference have signed a declaration voicing their support for the creation of such a network.

“Development of sound science-based management programmes for the conservation and use of water resources in the South has never been more important,” observes Hassan. “Yet successful programmes are likely to remain isolated examples of progress unless mechanisms are put in place for the sharing of information and experiences.”

With the help of WMO, UNESCO and the institutions participating in this project, TWNSO hopes to bridge the information and knowledge gap that currently exists in addressing one of the developing world’s most critical issues: the conservation, management and sustainable use of water resources in the South. ■

*For additional information about this and other TWNSO projects, please contact ❖❖❖ **Helen Martin**, TWNSO secretariat, c/o the Abdus Salam Centre for Theoretical Physics (ICTP), 34014 Trieste, Italy, phone: +39 040 2240 683; fax: +39 040 2240 689; or e-mail: info@twnso.org.*

A copy of the monograph Promoting Best Practices in the Conservation, Management and Sustainable Use of Water Resources in the South may also be obtained by contacting the TWNSO secretariat.



G.O.P. Obasi

South and Abdally in the North – as major agricultural areas. Cucumbers, eggplants, tomatoes and even strawberries all have been cultivated using brackish groundwater that contains about 300 parts per million of dissolved solids – a level just about right for the cultivation of fruits and vegetables. As a result, the desert nation of Kuwait had become self-sufficient in the production of a wide range of food commodities.

This encouraging situation, however, proved unsustainable. A fragile environment conspired with poor irrigation practices, improper well designs, and insufficient awareness of the detrimental effects of evapotranspiration – the loss of water to the atmosphere – to cause a

rapid decline in groundwater quality in both regions. In fact, in some places dissolved solids skyrocketed to levels that reached 7000 parts per million. Such high levels of salinity undermined the fertility of the soil and forced many farmers to abandon the land. Experts estimated that if these trends continued, agriculture within the two regions would grind to a salty halt within a decade.

Kuwait’s Ministry of Electricity and Water acknowledged the seriousness of the problem and launched a major study to examine the causes and likely remedies to reverse the regions’ groundwater quality deterioration. For the government of Kuwait, the problem extended well beyond questions of ecosystem preservation – however

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worthy that goal may be. First of all, the government had spent hundreds of millions of dollars drilling wells and constructing irrigation systems in both Wafra and Abdally. If rising levels of groundwater salinity wound up forcing farmers to abandon the area, this large investment of public funds would have been wasted. Second, the loss of the nation's most productive agricultural areas would have forced Kuwait to turn to other countries to meet its domestic demands for essential food items. No nation likes to become dependent on others to meet the nutritional needs of its people. In fact, many nations view food security as a national defense issue.

Government studies showed that Kuwait's two-tiered aquifer system (a top aquifer known as the Kuwait Group and a lower aquifer known as the Dammam Formation) was plagued by significant leakage, particularly at the point where hydraulic connections enabled water within each aquifer to be exchanged. Researchers determined that better designed wells, particularly at the point of the hydraulic connections, would help minimize water loss due to leakage. At the same time, new smart 'water-withdrawal' technologies could also help tap 'good' groundwater by bypassing the pockets of salty water. Such readily available solutions would make more efficient use of the available groundwater and thus curb both the aquifer's drawdown and the water's salt content. That, in turn, would stem the rising levels of salinity.

Government studies also showed that the regions' irrigation systems, despite being state-of-the-art facilities, were plagued by evapotranspiration loss. Put another way, much of the systems' irrigated water was not reaching the plants' roots but instead was being lost to the atmosphere. Sub-surface, drip and night irrigation, as well as mulching, could help reduce such water losses, slowing the rate of groundwater quality deterioration.




To advance these efforts, researchers first drew and then analysed samples from more than 100 wells in Abdally and Wafra. In addition, more than 20 monitoring wells were installed in the lower aquifer – the Dammam Formation – for the purpose of pinpointing the leaks. Finally, a comprehensive mathematical model was developed to identify current groundwater 'dry spots' and anticipate future environmental problems.

Kuwait's insufferable summer temperatures and sandy terrain are constant reminders of how fragile the nation's ecosystem is. As a result, all Kuwaitis – and particularly the nation's farmers – have been receptive to the government's water-management initiatives. Irrigation wells built since the study's findings were first published have conformed to new, more environmentally rigorous, design standards. Highly vulnerable zones within the agricultural regions have been placed off-limits to additional irrigation. And future plans have been put in place for the construction of irrigation systems that draw on an ecologically sound mixture of clean- and waste-water – a strategy designed to reduce water use without jeopardizing public health.

The most important measure of success, however, has resided in the high annual yields that continue to characterize Kuwait's 'fruit and vegetable belt' in Wafra and Abdally. Virtually all environmental indicators suggest that the long-term environmental health of this at-risk agricultural zone is improving. That's good news for

Kuwait's farmers and citizens alike. Science has made the desert bloom here – and science is now working to allow the desert to bloom for many more years to come. ■

For additional information about Kuwait's agricultural initiatives, please contact  **Khaled M.B. Hadi**, The Kuwait Institute for Scientific Research, PO Box 24885, 13109, Safat, Kuwait, email: khadi@safat.kisr.edu.kw.



AFRICAN ACADEMIES ASSEMBLE NETWORK

AFRICA'S SCIENCE ACADEMIES HAVE JOINED FORCES TO PROMOTE SCIENCE-BASED DEVELOPMENT THROUGHOUT THE CONTINENT.

At a meeting held in Nairobi, Kenya, on 13 December 2001, eight of Africa's nine science academies (subsequently joined by the South African Academy of Sciences) agreed to form an institutional network – aptly named the 'Network of African Science Academies' (NASAC).

A key goal, as broadly outlined in the network's statutes, is to bring "together African academies of sciences to discuss...problems of common concern." In addition, the statutes declare that the network will seek to prepare "statements on major issues relevant to Africa and provide mutual support to member academies."

"NASAC," explains Mohamed H.A. Hassan, president of the African Academy of Sciences (AAS), who was chosen as the network's first president, "will attempt to bring African scientific expertise to bear on some of the continent's most critical problems, including food security, poverty eradication, the spread of such infectious diseases as AIDS and malaria, and the development of more efficient and sustainable water management strategies."

Hassan, who also serves as the executive director of TWAS, adds that "As a major part of this effort, the network plans to publish research papers on these sub-



G.B.A. Okelo

jects – produced not as academic reports but as part of a larger effort to help policy makers better understand and address the challenges that they face from an authoritative scientific point of view."

NASAC will operate under the umbrella of AAS, which signed a six-year agreement to serve as the network's host.

"The arrangement," says G.B.A. Okelo, AAS executive director and the network's secretary general, "ensures that the network will have a stable and secure home during its early years of development and growth."

"NASAC's roots," notes Hassan, "lie in a meeting focusing on capacity building among science academies in Africa sponsored by the InterAcademy Panel International Issues (IAP) in Trieste, Italy, which took place in May 2001 (see "Academies in Africa," *TWAS Newsletter*, April-June 2001, pp. 8-14). At the meeting, participants agreed that the creation of a network of African science academies could help strengthen the capacity of academies in African nations where they do exist and spur the creation of academies in nations where they do not.

As Hassan noted at the IAP meeting in May: "Africa, a continent with nearly 1 billion people, has less than

30,000 African-born scientists living and working there. At the same time, of the 53 nations that make up the continent, only nine have established merit-based science academies.”

The oldest among these academies is Madagascar’s National Academy of Arts, Letters and Sciences, which will celebrate its centennial anniversary this year. The youngest African science academy is the Uganda National Academy of Sciences, which held its first scientific conference, ‘Sciences for Sustainable Development,’ last October.

Each of Africa’s science academies is dedicated to two critical interrelated goals: improving the research environment in which scientists work and, more generally, advancing the role of science in society, especially in areas that will boost economic development.

Academy membership, consisting of the nation’s most accomplished scientists, is at the heart of each institution. The Nigerian Academy of Sciences, for example, has 96 members; Ghana’s science academy 74; and Cameroon’s 45.

The oldest science academy in Africa is in Madagascar, the youngest in Uganda.

In addition, virtually all of the academies have established an awards programme for young, promising researchers – either under their own auspices or in cooperation with other organizations like TWAS.

As part of their mandate, Africa’s science academies also have sought to promote public appreciation and understanding of science. The Kenya National Academy of Sciences, for instance, has launched a joint initiative with the nation’s Center for Science and Technology Innovation that is aimed at improving science education in primary schools. The centrepiece of the programme is the development and distribution of “science kits” to classrooms throughout Kenya. The Cameroon National Academy of Sciences, meanwhile,

has begun publication of the *Journal of the Cameroon Academy of Sciences*, which is intended to highlight the work of its scientists, both among policy makers in Cameroon and the global scientific community beyond its borders. And the Madagascar National Academy of Arts, Letter and Sciences has produced a series of memoirs designed to highlight the accomplishments of its most noteworthy members in a style that is accessible to citizens interested in learning more about their nation’s scientific community.

The often modest efforts of Africa’s scientific academies have been dictated by the institutions’ modest, often unstable, budgets. In fact, “one of the goals of NASAC,” says Hassan, “will be to raise the profile of academies in discussions of science-related issues to illustrate the critical role that science plays in development. We hope that such efforts will ultimately lead to increased government funding for scientific institutions throughout the continent.”

After two decades of neglect, several African nations, including Algeria, Tunisia, and Senegal, have taken encouraging steps to reinvigorate their scientific capacity and infrastructures. Among the most encouraging signs was the announcement last summer by Chief Olusegun Obasanjo, President of





AFRICA'S NINE ACADEMIES. *The nine academies that comprise the Network of African Science Academies (NASAC) represent the total number of merit-based science academies in Africa, a continent with 53 countries. One of the major goals of NASAC will be to help create science academies in nations where they do not currently exist. NASAC membership roster includes: the Cameroon Academy of Sciences, the Ghana Academy of Arts and Sciences, the Kenya National Academy of Sciences, the Madagascar National Academy of Arts, Letters and Sciences, the Nigerian Academy of Sciences, the Senegal Academy of Sciences, the Uganda National Academy of Sciences, the South African Academy of Science, and the African Academy of Sciences.*

Nigeria, that his government would allocate 3.7 billion naira (US\$28 million) to the Ministry of Science and Technology in 2002, representing a six-fold increase in funding for the ministry compared to 2001. At the same, he announced that Nigeria would provide a US\$5 million grant to the African Academy of Sciences for the promotion of inter-African scientific cooperation and joint projects. Obasanjo also stated that Nigeria was establishing an international scientific advisory council to help guide and promote science-based develop-

ment in Nigeria, marking the first time an African nation had sought external expert advice on science-related issues on a consistent and broad basis. (see "Nigeria's Science-Based Plans for Development," *TWAS Newsletter*, July-September 2001, pp. 3-5).

"While these unprecedented steps represent a new era in the history of science in Africa," says Hassan, "everyone recognizes that much more needs to be done. Not only must we continue to invest in scientific capacity building among science academies that currently exist, but we must also find the will power and funding to create academies in African nations that do

not now have such institutions in place."

"The fact is, "Okelo observes, "science academies in Africa must continue to improve their capacities before they will be able to offer critical services to their governments, communities and the public. They must also ultimately diversify their funding base not only to increase their meager budgets but to wean themselves from government financial sources that now serve as their sole source of revenue. Only then can the academies gain a measure of independence that will

be essential for forthright evaluations of critical problems. In short, the battle for sustainable science-based development must be fought on several fronts. We are hopeful that NASAC will soon make important contributions to this worthwhile campaign." ■

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SCIENCE FOR SUSTAINABILITY

TWAS AND HARVARD UNIVERSITY'S KENNEDY SCHOOL OF GOVERNMENT RECENTLY HELD A WORKSHOP IN TRIESTE TO EXPLORE THE ROLE OF INSTITUTIONS IN PROMOTING LONG-TERM SUSTAINABLE DEVELOPMENT.

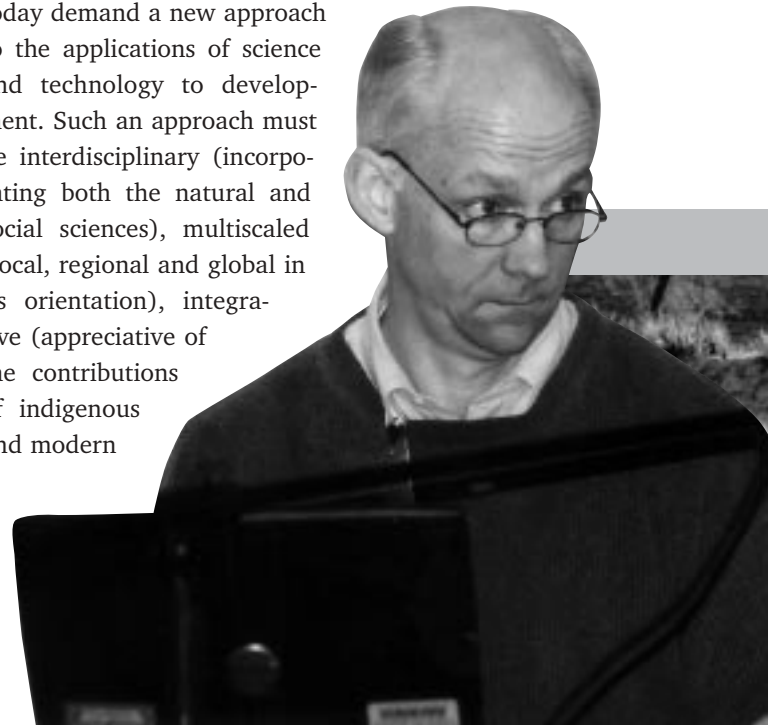
The Third World Academy of Sciences (TWAS), in collaboration with Harvard University's Kennedy School of Government, held a three-day workshop in early February focusing on a broad range of institutional issues related to "sustainability science." More than 50 experts from around the world, including university researchers, science administrators, community activists and private sector employees, participated in the workshop, which is part of a larger "initiative on science and technology for sustainability" funded by the David and Lucille Packard Foundation.

What exactly does sustainability science mean? Does it represent an effort to make science more sustainable? Hardly. After all, science has been making steady, sustainable progress ever since Galileo dropped two cannon balls, as legend has it, from the Tower of Pisa some 400 years ago.

Alternatively, do sustainability science advocates seek to meld scientific research and discoveries to issues related to sustainable economic and social development? Well, sort of. But what precise measurements would then apply to science-based sustainable development and, equally important, what concrete institution-based strategies should be put in place to

advance this goal? These are the kind of broad, complex issues that workshop participants were seeking to explore from their diverse perspectives.

The initiative on science and technology for sustainability is driven by a growing concern that the most critical issues that we face today demand a new approach to the applications of science and technology to development. Such an approach must be interdisciplinary (incorporating both the natural and social sciences), multiscaled (local, regional and global in its orientation), integrative (appreciative of the contributions of indigenous and modern



science) and synergistic (attentive to the multi-layered relationship between science and technology). It must also focus on the critical contributions that vibrant forward-looking institutions play in the process.

As William Clark, Harvey Brooks Professor of International Science, Policy and Human Development at Harvard University and one of the primary project organizers notes: “Participants at the Trieste workshop were particularly interested in examining factors that help explain why some science and technology institutions dedicated to sustainable development are able to function at a high level of effectiveness over time while others experience an initial burst of energy but then often stall and stagnate.”

“A key aspect of sustainability,” adds Clark, “lies in long-term institutional capacity building. Our thinking has been that if we can distill the lessons learned by successful institutions, we could provide a general framework for the promotion of sustainable growth. A critical principle behind this and the other workshops and conferences that we are organizing is that the transition toward sustainability will be cut short without sustainable institutions dedicated to the advancement of science and technology.”

Project organizers invited individuals with a broad array of experience derived largely from the administration and management of science- and technology-based institutions in the South and North. The partici-

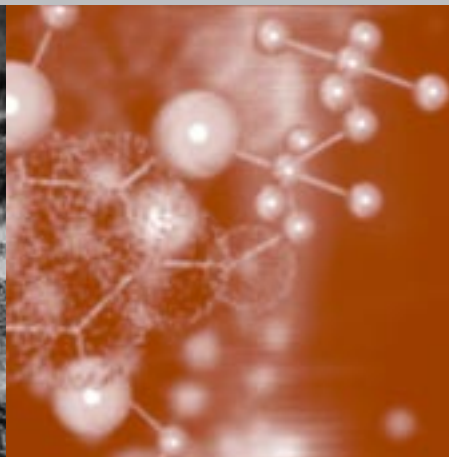
pant list included Lilliam Alvarez, director of sciences, Cuba’s federal Ministry of Science, Technology, and Environment; Gilberto Carlos Gallopin, regional advisor, Environmental Studies, Environment and Human Settlements Division, UN Economic Commission for Latin America and the Caribbean, Chile; Anil Gupta, founding director, Honey Bee Network and Society for Research and Initiatives for Sustainable Technologies and Institutions, India; Lydia Makhubu, vice chancellor, University of Swaziland, Swaziland;

Damian Miller, rural operations manager, Shell Solar B.V., The Netherlands; Thomas Tomich, principal economist and global coordinator, Alternative to Slash and Burn Programme, Kenya; and Grace Williams, former vice chancellor, University of Lagos, Nigeria.

A key aspect of sustainability lies in long-term institutional capacity building.

“Successful institutions come in many shapes and sizes,” notes Calestous Juma, Director of the Science, Technology and Innovation Program at Harvard University and a key conference organizer. “As a result, it is important to draw on the experience of as many institutions as possible when trying to outline a general framework for long-term institutional productivity. That’s why we made sure we had a diverse group of participants involved in the Trieste workshop.”

“One valuable lesson to be learned from our varied experience,” notes workshop participant Anil Gupta, “is that good news travels slowly and bad news travels fast. For this reason, it’s essential for all institutions —



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and especially those with small staffs and budgets — to prepare their agendas with care and skill. In today’s fast-paced environment, a key question is how can resource- and staff-starved institutions find the time and money to devise a methodical, comprehensive plan of action that attains immediate results. Being a short- and long-distance runner at the same time is no easy task.”

“Two important concepts lie at the centre of the initiative on science and technology for sustainability science initiative,” says Clark. “The first is that research motivated by scientific curiosity and research motivated by development problems are often shaped by different questions and different agendas. The former advances basic knowledge, while the latter addresses economic and social concerns.”

“The second notion that has been shaping our discussions on sustainability science is that funding agencies have sometimes placed too much emphasis on specific programmes and not enough on building and sustaining the institutional capacity that is essential for the

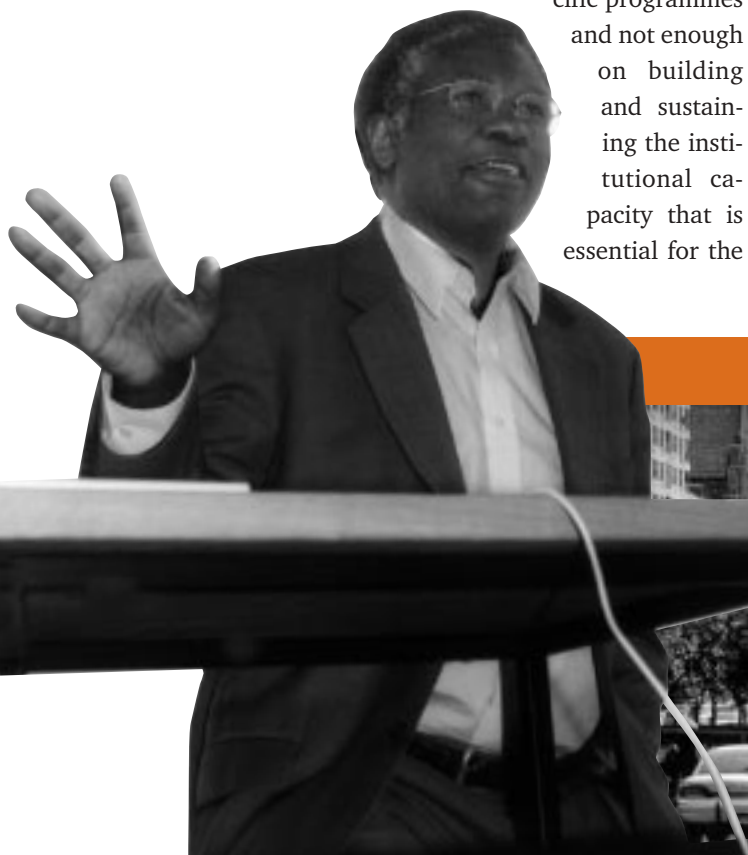
Research motivated by scientific curiosity and research motivated by development problems are often shaped by different questions.

promotion of scientific discovery and technological innovation over the long term.”

“Most funders prefer to invest in programmes rather than infrastructure — and for good reason,” notes Clark. “Yet, while it’s true that progress towards sustainable development must take place on the ground and not just in office buildings, there’s nonetheless a growing need both to recognize and value the important role that institutions play in sustainable development. Among other things, strong institutions help reduce uncertainty, resolve conflicts, coordinate action and provide continuity.”

“Overall,” observes Juma, “the initiative on science and technology for sustainability science represents a response to UN Secretary General Kofi Annan’s observation, made in the UN’s Millennium Report to the General Assembly, that the world in the 21st century will likely face three great challenges: freedom from want, freedom from fear, and the freedom of future generations to sustain their lives on this planet.”

While notable progress has been made on the first two fronts (at least in terms of developing reasonably systematic approaches to addressing these concerns), advocates of science and technology for sustainable development maintain that we are only just beginning to examine the methodologies and infrastructure that



must be put in place to address issues related to sustainability.

“Our goal,” Juma notes, “is to develop science-based institutional infrastructures for sustainability that compare favourably to the institutional infrastructures that now exist for national defense and food security systems.”

“The upcoming World Summit on Sustainable Development (WSSD), scheduled to take place in Johannesburg, South Africa, 26 August to 4 September 2002,” adds Mohamed Hassan, TWAS Executive Director, “offers an important forum for presenting the principles of sustainability science to a large, influential, yet diverse group of political and corporate leaders, science administrators and researchers and grassroots and labor union activists.”

“The international scientific community,” Hassan continues, “is eager to lend its voice to the discussions that will take place in Johannesburg and, equally important, to help shape the follow-up activities that are likely to be outlined at the conclusion of this global event. The ideas emanating from the workshops and conferences on science and technology for sustainability over the next six months could prove instrumental in meeting these goals.”

A follow-up meeting, focusing on financial issues, will take place at Harvard University’s Weatherhead Center for International Affairs on 10-12 April. Meetings focusing on regional issues are also being conducted in Abuja, Nigeria; Chiang Mai, Thailand; Bonn, Germany; Santiago, Chile; and Ottawa, Canada.

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SUSTAINABILITY’S MANY SHAPES AND SIZES

As the Trieste workshop illustrated, successful institutions come in many shapes and sizes. Here’s a sampling of the institutions that were represented.

- **African Centre for Technology Studies (ACTS)**, Nairobi, Kenya, was created in 1988 to conduct policy research and contribute to the creation of knowledge needed for Africa’s development. The overall mission is to enlarge the range of policy choices available for sustainable development in Africa through technological change and environmental management. Major focus has been placed on the policy-related provisions of Agenda 21 and effective implementation of the international conventions on biological diversity, climate change and desertification. Today the African Centre for Technology Studies, which has four member states (Kenya, Malawi, Malta and Uganda), has a staff of 20 as well as a dozen research associates. It has emerged as one of Africa’s most prominent policy ‘think tanks.’ For additional information, see www.acts.or.ke.

- **Bangladesh Centre for Advanced Studies**, founded in 1984, is dedicated to the building of individual and institutional capacity for sustainable development on national, regional and international scales. Its wide-ranging national programs have focused, for example, on agriculture’s impact on water quality, sustainable fisheries strategies, entrepreneurship, and flood control management; regional programmes have focused on climate change; and international programmes on the relationship between environmental degradation and poverty. The centre has organized a continuous series of workshops, most recently on arsenic contamination of drinking water in Bangladesh and photovoltaic technology development in southeast Asia. It also oversees an extensive training and publication programmes. For more information, see www.bcas.net/org_profile/index.html.

- **Comité Regional de Recursos Hidráulicos/Sistema de la Integración Centroamericana (CRRH/SICA)**, Costa Rica, has developed a ‘virtual’ climate centre that takes advantage of the new tools provided by the internet and advanced information technologies to supply up-to-date climate and weather forecast information and services throughout the seven-nation Central

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America region. While climate- and weather-related information in the past was largely used to assist agricultural production, today it increasingly focuses on providing timely information to officials in emergency management agencies, especially during such extreme weather events as Hurricane Mitchell in 1998, which upended the lives of more than 3.5 million people and caused more than US\$6 billion in damage. The result was a 2.5 percent decline in the region's annual gross domestic product. For additional information, see www.sgsica.org/institucionalidad-regional/crrh.html.

- **Honey Bee Network and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI)**, in Gujarat, India, seek to promote and protect the economic value derived from the work of local innovators and inventors, especially in fields related to the conservation of biodiversity. The organizations place special attention on the protection of intellectual property rights, the sharing of successful experiences, and the development of strategies that integrate traditional cultural values with modern science. What began modestly in the early 1990s has expanded into a global network currently operating in more than 70 nations. For additional information, see www.sristi.org.

- **Shell Solar B.V.**'s Rural Operations Division, headquartered in Amsterdam, The Netherlands, specializes in the selling and servicing of solar photovoltaic systems in developing countries. The consumer base consists of rural homes and businesses without electricity or with chronic and lengthy power shortages. The division has established local subsidiaries in India, Sri Lanka, and the Philippines, which sell directly to rural customers through a network of trained door-to-door sales agents and technicians. In South Africa, it has created a joint venture with a local utility to provide up to 5000 solar home systems on a fee-for-service basis. In Xiangan, China, it has forged a local partnership under a Dutch funded aid project to supply some 78,000 solar home systems. The most successful operation to date is in Sri Lanka, where the sale of small 40- to 50-watt peak units, costing from US\$400 to US\$500, now reaches more than 8000 customers. For more information, see www.shell.com.



And a “synthesis” workshop designed to bring together the wide ranging ideas discussed in the previous get-togethers, as well as ideas and issues raised at activities organized by TWAS and the International Council for Science (ICSU), will take place in Mexico City in May.

All of these events are designed to help create an intellectual pathway for directing science and technology issues towards sustainable development issues at the upcoming World Summit on Sustainable Development meeting in late summer.

“Our hope,” says Clark, “is to turn scientific knowledge into action for addressing critical economic and environmental issues related to sustainability.” ■

For additional information, contact
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SCIENCE, MEDIA AND THE MESSAGE

AN IAP WORKSHOP ON SCIENCE AND THE MEDIA, ORGANIZED JOINTLY WITH SCIDEV.NET, EXPLORES THE COMPLEX AND OFTEN CONTENTIOUS RELATIONSHIP BETWEEN SCIENTISTS AND SCIENCE COMMUNICATORS.



What would you do? A nongovernmental grassroots organization (NGO) has challenged a recent government report assessing arsenic levels in the city's drinking water. The organization charges that, contrary to government declarations, arsenic levels far exceed public health standards for safe drinking water. Worse yet (at least from a political perspective), a subsequent NGO 'leak' to the press claims that the report had been prepared by the mayor's brother, who was under contract with the city, and that the mayor, who faces re-election in just four weeks, may have deliberately withheld and then distorted the information.

That was the scenario presented to a group of scientists, science journalists and public information officers at a 'mock media event' held as the centrepiece of an InterAcademy Panel (IAP) Workshop on Science

and the Media, organized jointly with SciDev.Net, which took place from 26 to 28 February in Trinidad and Tobago, West Indies. The event, which was hosted by the Caribbean Academy of Sciences, received funding from the IAP, TWAS, SciDev.Net, TWAS, the US National Academy of Sciences, the Knight Science Journalism Fellowships at the Massachusetts Institute of Technology (MIT), the French Academy of Sciences and CARISCIENCE (a network of research and development and postgraduate programmes in the basic sciences in the Caribbean).

As the 'mock media event' unfolded, the city's ability to mount a credible defense seemed beyond hope. After all, the NGO press release contended that government officials had cynically misled the public to improve the mayor's chances for re-election. And the leak appeared to confirm this viewpoint. Nepotism, in



the form of a “brotherly” contract, only darkened the city’s public relations nightmare. It appeared as if elected public officials were handing out lucrative favours to their relatives at the expense of the public’s health and that the city’s scientific advisors were either being duped or playing the role of willing accomplices.

Yet, the event turned out much different than what you might have expected. The journalists proved unwilling to accept the NGO’s unsubstantiated claims, hesitating to publish news stories until they were able to obtain information from additional independent sources. Meanwhile, city officials, assuming that they would be “blasted” by the media, decided they had no choice but to hold a news conference “to get ahead” of the story.

Deftly turning scientific complexity and uncertainty into an art form that created a successful smoke-screen which the journalists were unable to penetrate, Nobel Laureate Sherwood Rowland, playing the part of the mayor’s brother, cast enough doubt on the statistics to suggest that the truth would have to await additional research. A black-and-white story of political misconduct had been transformed into a science story marked by shades of gray complexity.

By encouraging scientists, journalists and public information officers to enter each other’s work worlds, even under circumstances that were a bit contrived, workshop organizers hoped that participants would gain greater appreciation for the challenges that each

faces. Given the reactions of some of the participants that is exactly what happened.

As Abiodun Raifu, editor, Saturday Tribune, Ibadan, Nigeria later observed: “For too long, the relationship between scientists and journalists has been characterized by mutual suspicion. Yet, it is clear that journalists and scientists must come to terms with their symbiotic relationship — not only because journalists serve as a mediating influence between the scientific community and the larger society but because scientists and journalists share a mutual goal of advancing the frontiers of science in

For too long the relationship between scientists and journalists has been characterized by mutual suspicion.

the public’s quest to fully understand the global environment and to apply science to help solve current and future problems. The Tobago workshop made it clear to both sides that misunderstanding each other’s roles may be due largely to misconceptions and a communication gap. The workshop was helpful in bridging this gap. But more such initiatives are needed.”

In all, about 50 participants from some 25 countries attended the workshop, including Yves Quéré, IAP co-chair; Boyce Rensberger, director, Knight Science Journalism Fellowships at MIT; David Dickson, director, SciDev.Net; and Susan Turner-Lowe, former communications director, U.S. National Academy of Sciences. Harold Ramkissoon, foreign secretary and



immediate past president of the Caribbean Academy of Sciences (and a member of IAP's executive committee), headed the organizing committee and served as the local host.

In addition to the "mock event," participants also listened to presentations on the overall state of science and the media in developed and developing countries; case-study examinations of science communication in the United

States, Nigeria and China; analyses of the state of science journalism in the United Kingdom, Argentina, and India; and an overview of the practical issues involved in preparing materials for the press and addressing the needs of journalists, especially from the perspective of public information officers.

The workshop, which was organized in response to IAP's interest in exploring the evolving relationship between science and the media, was driven by the following considerations:

- While the primary challenge of science academies continues to focus on building and maintaining national research capacities, these institutions can no longer ignore the challenges posed by science communication. This is particularly true in a world where scientific research and training activities are increasingly shaped by the potential impact that these activities will have on a nation's economic and social well-being. As a result, more and more scientists throughout the world are being asked to explain and justify the importance of their work to the larger societies in which they operate. In light of these trends, scientists also find

themselves frequently called upon to meet demands from both politicians and the press to engage in public dialogue on science-related issues. Meeting such challenges requires high-level skills in communicating both to government officials and the public.

- While it is by no means clear that science journalism necessitates greater know-how and skills than, say, reporting on political or economic issues, it is clear that the relationship between science journalists and scientists remains somewhat different than the relationship that journalists have with other groups they report on. Scientists continue to believe that journalists rarely get it right. Journalists, on the other hand, often come to view scientists as a protected elite fervently believing that what they do is inherently in the public's interest and therefore requires little public explanation, let alone justification. The complexity of this relationship finds its greatest expression in the North. Nevertheless, many identical elements of the relationship can also be found in the South where an already troubled relationship is usually exacerbated by economic and political tensions.

- While North/South differences in available resources and levels of expertise in science communication cannot and should not be ignored, the norms of practice of good science communication are universal and are guided by accuracy, fairness, balance, comprehensiveness and clarity.

- Science communication in both the North and South can – and should – be improved. A key goal of IAP will be to promote the capacity of science academies to work with professionals in the media to communicate more effectively with the larger public.

Will better, more open communication among scientists, journalists and public information officers lead to better, more open science communication overall? That is the abiding assumption behind the IAP science and media initiative. The Tobago workshop indicated that the assumption has merit but, like all other initiatives, success will depend on sustained commitments of resources and personnel. ■

For additional information about the IAP Science and Media Workshop, see the IAP webpage at

❖ www.interacademies.net/iap, section on 'Science and the Media.'

For additional reporting and texts of many of the presentations, visit the SciDev.Net webpage at ❖ www.scidev.net, dossier section, Communication of Science.



RESEARCHERS GET MAIL

A NEW ELECTRONIC DELIVERY SERVICE PROMISES TO HELP SCIENTISTS IN THE DEVELOPING WORLD GAIN ACCESS TO THE MOST CURRENT LITERATURE IN THEIR FIELDS.

“Limited access to scientific literature has been a long-standing problem for researchers working in the developing world,” says Hilda Cerdeira, who heads the Abdus Salam International Centre for Theoretical Physics (ICTP)/Third World Academy of Sciences (TWAS) Donations Programme. “That’s why the ICTP/TWAS Donations Programme, which has distributed books and journals free-of-charge to institutions in the South for the past two decades, was established in the first place.”

“Equally important, well before the term ‘snail mail’ was coined, we realized that our strategy had serious shortcomings,” Cerdeira adds. “The effort was expensive and slow and the information provided often did not fit the needs of the researchers that it was designed to help. In other words, we had established a shotgun approach to a problem that, under ideal circumstances, would entail a rapid-fire, carefully targeted response.”

“Over the past decade, we have also recognized that the advances in electronic communications have

created unprecedented opportunities for bridging the North-South ‘information’ divide. We simply did not have the wherewithal to take advantage of this opportunity. Like so many other observers, we were extremely concerned that, in many instances, the internet was making

things worse, not better, for scientists in the developing world.”

Now through a series of agreements with Academic Press, the American Physical Society, and World Scientific Co., the ICTP/TWAS Donations Programme hopes to help close the scientific information gap between the developed and developing world by providing easy cost-free access to a wealth of current scientific literature via email. The cooperative effort is called eJournals Delivery Service.

“Scientific institutions in the South are increasingly connected to electronic networks,” says C.N.R. Rao, president of TWAS and TWNSO and Linus Pauling Research Professor and Honorary Director of the Jawarhalal Nehru Centre for Advanced Scientific





Research at the Indian Institute of Science in Bangalore, India. “The problem is that these connections are both expensive and slow, making it virtually impossible for researchers to access information and data in a reasonable way.” The value of the eJournals Delivery Service is that it enables researchers with email addresses to download the texts even if their systems are handicapped by narrow bandwidths, which is often the case.

“In short,” Rao notes, “internet connections for many researchers in the developing world are prohibitively expensive and, for those who can afford it, the process is painstakingly tedious and time-consuming.”

Scientists from the developing world who are interested in gaining access to eJournals Delivery Service must fill out an application form that is available through the ICTP website (see below). The project’s publishing partners, which have made the service possible by signing extended off-site licensing agreements with ICTP and TWAS, have established a set of criteria for those who will be able to use the service. In addition, they have set limits to the number of articles per journal that can be accessed each day (3), week (12) and year (100). The arrangement represents a delicate balance between the publishers’ need to generate adequate revenue flows through paid subscriptions and their desire to make information – the lifeblood of the global scientific community – easily available to all scientists.

“Under the agreement,” Cerdeira adds, “everyone wins. Developing world scientists will now have access to a much wider range of current scientific information and findings than ever before. The publishers will be

able to reach researchers who would otherwise not have either the technical or financial means to read articles in their journals in a timely fashion. And ICTP and TWAS will broaden their ability to assist scientists from the developing world” – this time by taking advantage both of new information technologies and a growing willingness on the part the scientific community to forge public/private partnerships for the advancement of scientific knowledge. ■

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*For additional information
about the ICTP/TWAS Donations Programme’s
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Or browse the website at
www.ictp.trieste.it/ejournals.*

TWAS

ALBERT RAKOTO-RATSIMAMANGA

ALBERT RAKOTO-RATSIMAMANGA (TWAS FOUNDING FELLOW) POSSESSED A RARE COMBINATION OF SKILLS THAT ALLOWED HIM TO ACHIEVE UNPARALLELED SUCCESS AS A RESEARCHER, CLINICIAN AND DIPLOMAT.

Albert Rakoto-Ratsimamanga recently passed away at the age of 94 in his home village of Avarabohitra, on the outskirts of Antananarivo, Madagascar, where he had spent most of the past half century building the Malagasy Institute of Applied Research (IMRA) into one of most renowned scientific and medical research centres and public health clinics in the developing world.

Rakoto-Ratsimamanga was born at Antananarivo in 1907. His grandfather, Prince Ratsimamanga, uncle of the last Queen of Madagascar, Ranaivalona III, was shot in 1896 on orders of the French military that had colonized Madagascar. Despite the difficult and often oppressive conditions that followed these tragic events, Rakoto-Ratsimamanga successfully completed his undergraduate degree at the School of Medicine in Antananarivo in 1929.

Rakoto-Ratsimamanga's pathway to higher education was assisted by his musical talent. A skilled violinist, he was one of the artists and craft people who represented Madagascar at the Paris Colonial Exhibition of 1930. Taking advantage of this journey, Rakoto-Ratsimamanga decided to remain in France, where he spent a long period of hard work and intense study, serving as a researcher at the *Institut de*

Médecine Exotique, Institut Pasteur, and the Ecole des Hautes Etudes Internationales, while earning two doctorates at the *Université de Paris* – one in science in 1938 and another in medicine in 1939.



After receiving these degrees, Rakoto-Ratsimamanga entered the *Ecole Pratique des Hautes Etudes* and the *Centre National de la Recherche Scientifique*, serving as one of four initial research directors. In this position, he pursued innovative research projects in biochemistry, hormone physiology and medicinal plants, mainly from Madagascar. His research focused on the presence of hormones in food, their role in body development and the existence of hepatic detoxification substances.

Throughout his career, Rakoto-Ratsimamanga proved successful as a therapy-oriented investigator capable of translating research findings into medical practice. His successes include the development of Cortine, an adrenocortical extract for treating postsurgical shocks; Patelen for treating hepatitis and allergic reactions; and Madecassol, a major cutaneous wound-healing agent isolated from the plant *Centella asiatica*.

In 1958, Rakoto-Ratsimamanga invested royalties from his discoveries to establish the Malagasy Institute of Applied Research (IMRA). The institute has focused on understanding the mechanisms by which local

medicinal plants and medical practices may serve as the basis of inexpensive, yet effective, treatments, especially for the poorest and least fortunate people of Madagascar.

Over the last half century IMRA has developed numerous therapeutic preparations for curing malaria, leprosy, asthma, renal stones, arterial hypertension, hepatitis and other illnesses. The development of an effective and safe antidiabetic medicine from a Malagasy plant, *Eugenia jambolana*, which is now widely used, represents the institute's most outstanding success.

IMRA is now a globally recognized research centre comprised of an excellent team of scientists working in partnership with national and international organizations under the direction of Suzanne Urverg Ratsimamanga (TWAS Fellow 1989), widow of Rakoto-Ratsimamanga.

Rakoto-Ratsimamanga also applied his scientific curiosity and talents to anthropology, where his research findings added evidence to arguments that the earliest inhabitants of Madagascar were of Malaysian-Polynesian origin.

Rakoto-Ratsimamanga published more than 250 scientific articles and 10 books. He was also awarded five patents. For many years, Rakoto-Ratsimamanga served as dean of the *Académie Nationale Malgache* and professor emeritus of the *Faculté de Médecine d'Antananarivo*. He was one of the founders of the Third World Academy of Sciences (TWAS) and the African Academy of Sciences; vice-president of the executive council of United Nations Educational, Scientific and Cultural Organization (UNESCO); and corresponding member of the French *Académie de Médecine* and *Académie des Sciences* and of the *Accademia Nazionale dei Lincei* in Italy. He was also an expert consultant to the United Nations Food and Agricultural Organization (FAO), World Health Organization (WHO) and Organization of African Unity (OAU).

Beyond all of these scientific responsibilities and accomplishments, Rakoto-Ratsimamanga was highly



respected both within his own country and abroad as a great patriot, having fought for Madagascar's liberation from French colonial rule during the 1950s. After his nation gained independence in 1960, Rakoto-Ratsimamanga was appointed ambassador to France, the Federal Republic of Germany, the Soviet Union, China, North Korea and Sierra Leone.

A charismatic personality and fervent humanist dedicated to the cause of humble and unfortunate people, Rakoto-Ratsimamanga's fellow citizens recently designated him "Malagasy Man of the 20th century" in honour of his unparalleled scientific achievements, his life-long service to his community and country, and his boundless tolerance – all of which were the driving passions of his life.

The deep love of Rakoto-Ratsimamanga for his country created an unbreakable bond between him and his fellow citizens – a bond confirmed during the national funeral ceremonies held to honour his life and mourn his death. Thousands of persons from all walks of life – political officials, scientists, artists and, most notably, common Malagasy people – came to pay their last respects to this humble and treasured person of undeniably broad merits and accomplishments.

In today's world, few people are blessed with the range of skills and the glint of character to be a world-class scientist, humanitarian, and statesman. Rakoto-Ratsimamanga was one of those people. His death is everyone's loss but his life's work will continue to inspire all of us. ■

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CHARREAU HEADS CONICET

• **Eduardo H. Charreau** (TWAS Fellow 1999) has been elected director of Argentina's National Research Council (CONICET). Charreau, who is trained as a mo-



Eduardo H. Charreau

lecular endocrinologist, most recently served as director of the Institute of Biology and Experimental Medicine in Buenos Aires – an institute founded by Bernardo Houssay who, in 1947, became the first scientist from the developing world to win a Nobel Prize in Medicine. Charreau, who received both his undergraduate and graduate degrees from the University of Buenos Aires, where he is now a professor of biological chemistry, has won numerous awards, including Argentina's Academy of Medicine Award (on five different occasions), the Argentina's Society of Endocrinology Award (1993), and Argentina's Chemical Association Award (1993). He was recipient of the TWAS Award in Basic Sciences (1997).

PAL HONOURED

• **Sankar K. Pal** (TWAS Fellow 1998) has been given the Federation of Indian Chambers of Commerce and Industry (FICCI) 2000-2001 Award in Engineering and Technology. The award was

granted in honour of Pal's contributions to "pattern recognition, image processing and data mining in soft computing framework." Pal, who was educated at Calcutta University, India, and Imperial College, UK, is a distinguished scientist and head of the machine intelligence group at the Indian Statistical Institute, Calcutta. He is a recipient of the Bhatnagar Prize (1990), Bhasin Award (1998) and G.D. Birla Award (1999) in India and the Khwarizmi Award (2000) in Iran. His major fields of interest include computer science, pattern recognition, image processing, soft computing, fuzzy logic, data/web mining, neural nets and genetic algorithms.

CLIMATE MEETING

• The First International Symposium for Physics-Mathematical Problems Related to Climate Modeling and Prediction, sponsored by the Chinese Academy of Sciences, TWAS, and the World Meteorological Organization (WMO), took place in Beijing, 25-29 September 2001. More than 200 scientists from 20 countries were in attendance. **Yong Xiang Lu** (TWAS Vice



Lu Yong Xiang

President), President of the Chinese Academy of Sciences, and **Virulh Sa-yakanit** (TWAS Fellow 1991) gave opening addresses. Other ma-



Virulh Sa-yakanit

for presentations were made by David Carson, director of the World Climate Research Programme (WCRP), and Peter Lemke, chairman of the Joint Scientific Committee of WMO/ICSU/IOC for the WCRP. The conference focused on multidisciplinary issues related to climate change. Conference participants explored problems related to climate variability, anomalies and prediction. Participants also examined the impact of climate change on economic and social development, especially in developing countries. For additional information about the symposium, contact the Division of International Organizations of the Chinese Academy of Sciences, e-mail: wanyang@cashq.ac.cn.

ATTA-UR-RAHMAN HONOURED

• Pakistan's Minister for Science and Technology **Atta-ur-Rahman** (TWAS Fellow 1985) has been awarded the Islamic Educational, Scientific and Cultural Organization (ISESCO) Prize in Chemistry for 2001. The prize is given once every two years to the most eminent scientists in the Islamic world. Atta-ur-Rahman was honoured for his original contributions to the field of medicinal and natural products chemistry. In addition to his



ministerial responsibilities, Atta-ur-Rahman serves as director of the H.E.J. Research Institute of Chemistry, Karachi, Pakistan, and coordinator general of the Organization of Islamic Conference's (OIC) Standing Committee on Science and Technology Cooperation (COMSTECH). Atta-ur-Rahman has won several national and international prizes, including the Federation of Asian Chemical Societies award and the Pakistani government's Hilal-I-Imtiaz prize, both in 1997. In 1999, he became the first scientist from the Muslim world to be given the prestigious UNESCO Science Prize.

TWAS, IAP MOBILE

- Honda Automobili Italia has provided a new Honda Stream free-of-



charge to the Third World Academy of Sciences (TWAS) and Inter-Academy Panel (IAP). The initial agreement is for a 6-month period with provisions for an extension. Use of the van represents an unprecedented partnership between Trieste's international scientific community and the private sector. Access to the van will improve TWAS's and IAP's ability to provide transportation to participants during the organizations' research and training activities.

PALIS ELECTED

- TWAS General Secretary **Jacob Palis**, professor of mathematics at the Institute of Pure and Applied Mathematics, Rio de Janeiro, and president of the International Mathematical Union, has been elected a foreign associate of the French Academy of Sciences. His primary research interests have focused on dynamic systems evolving from hyperbolic theory to chaotic systems and from typology to a more probabilistic global approach. As the citation highlighting the reasons for his election into the French Academy of Sciences notes: "His vision, in constant evolution, has considerably enlarged the field." Palis, who has won numerous national and international awards, is one of the most influential mathematicians in Latin America and has gained additional stature as one of the most thoughtful advocates for the development of mathematics in the developing world. He is a member of the Brazilian Academy of Sciences and a foreign member of the Chilean, Indian, Mexican and U.S. academies of sciences.

TWAS AT AAAS

- TWAS members were well represented at the 2002 American Asso-



Peter Raven



Raghunath Anant Mashelkar

ciation for Advancement of Science (AAAS) meeting held in Boston, Massachusetts, in February 2002. Among those giving presentations were **Peter Raven** (TWAS Associate Fellow 1993), who serves as president of the AAAS and director the Missouri Botanical Gardens, and **R.A. Mashelkar** (TWAS Fellow 1993), director general of India's Council of Scientific and Industrial Research (CSIR) and former vice president of the Indian Academy of Sciences. Raven spoke on issues related to science-based global sustainability and Mashelkar outlined the broadbased activities of CSIR's science and technology initiatives.

NEW LOGO



- The TWAS Council recently approved a new logo for TWAS. The scripted logo, in which the italicized initials of twas are presented in lower case, is designed to convey a more modern, dynamic and holistic look for the organization. TWAS will celebrate its 20th anniversary in 2003.

WHAT'S TWAS?

THE THIRD WORLD ACADEMY OF SCIENCES (TWAS) IS AN AUTONOMOUS INTERNATIONAL ORGANIZATION THAT PROMOTES SCIENTIFIC CAPACITY AND EXCELLENCE IN THE SOUTH. FOUNDED IN 1983 BY A GROUP OF EMINENT SCIENTISTS UNDER THE LEADERSHIP OF THE LATE NOBEL LAUREATE ABDUS SALAM OF PAKISTAN, TWAS WAS OFFICIALLY LAUNCHED IN TRIESTE, ITALY, IN 1985 BY THE SECRETARY GENERAL OF THE UNITED NATIONS.

At present, TWAS has 580 members from 76 countries, 62 of which are developing countries. A Council of 14 members is responsible for supervising all Academy affairs. It is assisted in the administration and coordination of programmes by a small secretariat of 9 persons, headed by the Executive Director. The secretariat is located on the premises of the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy. UNESCO is responsible for the administration of TWAS funds and staff. A major portion of TWAS funding is provided by the Ministry of Foreign Affairs of Italy.

The main objectives of TWAS are to:

- Recognize, support and promote excellence in scientific research in the South.
- Provide promising scientists in the South with research facilities necessary for the advancement of their work.
- Facilitate contacts between individual scientists and institutions in the South.
- Encourage South-North cooperation between individuals and centres of scholarship.

TWAS was instrumental in the establishment in 1988 of the Third World Network of Scientific Organizations (TWNISO), a non-governmental alliance of 154 scientific organizations from Third World countries, whose goal is to assist in building political and scientific leadership for science-based economic development in the South and to promote sustainable development through broad-based partnerships in science and technology. ❖ www.twniso.org

TWAS also played a key role in the establishment of the Third World Organization for Women in Science (TWOWS), which was officially launched in Cairo in 1993. TWOWS has a membership of more than 2000 women scientists from 87 Third World countries. Its main objectives are to promote the research efforts and training opportunities of women scientists in the Third World and to strengthen their role in the decision-making and development processes. The secretariat of TWOWS is hosted and assisted by TWAS. ❖ www.twows.org

Since May 2000, TWAS has been providing the secretariat for the InterAcademy Panel on International Issues (IAP), a global network of 82 science academies worldwide established in 1993, whose primary goal is to help member academies work together to inform citizens and advise decision-makers on the scientific aspects of critical global issues. ❖ www.interacademies.net/iap

WANT TO KNOW MORE?

TWAS offers scientists in the Third World a variety of grants and fellowships. To find out more about these opportunities, check out the TWAS web-pages! Our main page is at:

www.twas.org

FELLOWSHIPS

Want to spend some time at a research institution in another developing country?

Investigate the fellowships and associateships programmes:

www.twas.org/Fellowships.html

www.twas.org/AssocRules.html

GRANTS

Need funding for your research project?

Take a look at the TWAS Research Grants:

www.twas.org/RG_form.html

TWNSO runs a similar scheme, for projects carried out in collaboration with institutions in other countries in the South:

www.twnso.org/TWNSO_RG.html

EQUIPMENT

But that's not all TWAS has to offer.

For instance, do you need a minor spare part for some of your laboratory equipment, no big deal, really, but you just can't get it anywhere locally? Well, TWAS can help:

www.twas.org/SP_form.html

TRAVEL

Would you like to invite an eminent scholar to your institution, but need funding for his/her travel? Examine the Visiting Scientist Programme, then:

www.twas.org/vis_sci.html

CONFERENCES

You're organizing a scientific conference and would like to involve young scientists from the region? You may find what you are looking for here:

www.twas.org/SM_form.html