

UNESCO ADOPTS AUSTERE BUDGET, JETTISONS NEW INFORMATION ORDER

Meeting in Paris last November for its biennial session, the General Conference of UNESCO had its first opportunity to pass judgment on the reform program adopted by the organization's new director general, Federico Mayor Zaragoza, and to take such steps as it pleased to woo back the United States, Great Britain and Singapore. The General Conference approved Mayor's six-year medium-term plan but refused his request for a 2.5% budget increase for the next two years, freezing the budget instead. At the same time, the General Conference adopted a communications program that firmly commits UNESCO to freedom of the press and the free flow of ideas, but that also calls on the organization to help promote a "wider and better balanced dissemination of information" between rich and poor countries.

The new communications program has done much to appease critics of UNESCO who were alarmed by suggestions made, in the context of UNESCO's proposed "new world information order," to license reporters covering Third World news for audiences and organizations in rich countries. Leonard Sussman of Freedom House in New York has called the program the best communications plan ever produced by UNESCO: "Commitment to free flow is repeated to the point of boredom. The operative part of the resolution would facilitate and guarantee for journalists 'the freedom to report and the fullest possible access to information.'"

Sussman was a member of a panel organized by the United Nations Association of the United States that recommended, shortly before UNESCO's General Conference convened last fall, that the United States rejoin the organization, assuming the General Conference expressed confidence in Mayor's leadership by approving his medium-term plan. "By remaining outside the agency after the General Conference has approved policy reforms the United States has long

sought, America will sacrifice any credibility to press for further reform," the panel said.

While the UNA panel was a distinguished and select group—its chairman was Robert T. Stafford, a former US Senator from Vermont—its influence in the inner circles of the Bush Administration may be slight, at best. Critics of UNESCO in the Administration do not necessarily agree with the panel that the organization has already adopted and implemented the policy reforms the United States was seeking—in Washington it is said that Mayor is "in thrall" to his predecessor, Amadou-Mahtar M'Bow, and that M'Bow's allies remain in positions of influence. Even if the Bush Administration were fully satisfied with Mayor and the new positions adopted by the General Conference, budgetary worries alone would virtually preclude the US rejoining any sooner than it feels it absolutely has to. And even if the Administration decided it wanted to rejoin right now, it still would have critics to contend with.

Physics News in 1989

Since 1984 a special supplement called *Physics News* has appeared each year in the January issue of *PHYSICS TODAY*. Prepared by the public information division of the American Institute of Physics, this annual review was originally intended for use by science journalists. The review for 1989 is aimed primarily at that audience, and so it has been decided to publish *Physics News* only as a separate brochure and not to include it in *PHYSICS TODAY* this year. *Physics News in 1989* is priced at \$5 for single copies, \$3 a copy for 10–20 copies, and \$2 a copy for more than 20 copies. Orders should be addressed to the Public Information Division, AIP, 335 East 45 Street, New York NY 10017.

Judging from leading organs of business-oriented opinion in the United States and Britain, political conservatives—and not just conservatives—remain highly critical of UNESCO. *The Wall Street Journal*, in an editorial written before the General Conference had ended, expressed itself as follows on 1 November: "He [Mayor] hasn't been able to replace the M'Bow cabal. Soviets remain in charge of education programs, a former head of an African military tribunal for executions is in charge of culture, and a hard-line Polish communist in exile directs the human-rights and peace division. Of the agency's 2750 staff members, 230 are in the field working on actual projects, such as literacy and oceanographic research."

In much the same vein, on 2 December *The Economist* of London ran a feature article on the United Nations in which UNESCO was sized up in the following terms: "The new man, Mr. Federico Mayor Zaragoza, looked good on paper. A suave Catalan biochemist, his candidacy was supported by 100 Nobel-prize winners. Two years later, what has Mr. Mayor been able to achieve? UNESCO seems to be as unfocused as ever, with 182 'sub-programs,' more even than there were under Mr. M'Bow."

Under the circumstances, it seems probable that the United States, Britain and Singapore will bide their time. The official State Department position is that the actions of the General Conference are under review, but that nothing at this point would change standing US policy. Friends of UNESCO in Washington do not expect to see a change in the months immediately ahead.

Looking ahead

For the bulk of the US physics community, the world does not exactly depend on whether or not the United States does or does not rejoin UNESCO. On the other hand, it is generally appreciated that UNESCO is a name that still carries considerable weight

outside the United States, and especially in the Third World. While the United States continues to participate in the UNESCO activities that are most directly pertinent to the working physicist—the copyrights convention, for example, and the Oceanographic Commission—at a time when a variety of global issues are of increasing concern, the absence of the United States from UNESCO threatens to leave some US physicists on the sidelines in new global research efforts. In short, UNESCO continues to have great potential, and it will remain an important symbol in the global physics community.

▷ CERN, the preeminent particle physics laboratory in Geneva, was established under the auspices of UNESCO, and UNESCO still is its parent organization. Newly joining members of CERN go to Paris to deposit their affiliation documents, and CERN's director general and the new director general of UNESCO make a point of staying in touch. (Mayor is the first director general in UNESCO's history to visit CERN, which he did last year on the occasion of a commemoration for I. I. Rabi.)

▷ Since 1970 UNESCO also has been a cosponsor, with the International Atomic Energy Agency in Vienna, of the International Centre for Theoretical Physics in Trieste. While ICTP is almost wholly funded by the Italian government, UNESCO continues to have an important voice in its affairs.

▷ UNESCO is a cofounder of the Latin American Center of Physics, an organization with 13 member states based in Rio de Janeiro.

▷ UNESCO initiated and helps publish *Asia-Pacific Physics News*, a magazine that appears twice yearly.

▷ It organizes an annual program of workshops on specialized topics in science; the 1990 program includes workshops on composite media, the physics and characterization of lasers and optical fibers, Fourier optics and holography, and high-temperature superconductors and related materials, among other things.

Physics activities

Within UNESCO's science sector, which includes about 60 staff professionals, a unit for the basic sciences is headed by a Russian, Vladimir Zharov. The unit includes one chemist, one mathematician, two biologists, and one physicist, Siegbert Raither, a German who studied at the University of Illinois and who taught at Harvard.

Of the two-year physics budget, which comes to about \$1.5 million, Raither says that roughly half goes to ICTP, which produces 4000 physics

trainees per year. The rest of the physics resources are devoted largely to education and relatively inexpensive infrastructure projects, in which the general objective is to train Third World physicists and provide them with opportunities to work constructively in Third World locations.

For example, UNESCO is cooperating with the American Association of Physics Teachers in the preparation of an education-oriented book on chaos. It has launched an international project to assist developing countries to improve the quality and effectiveness of introductory university courses in physics, chemistry and biology, "motivated [according to a UNESCO memo] by the widely shared view that existing courses in most countries do not adequately cover key topics of modern, contemporary science and that insufficient emphasis is given to experiments and student laboratory work." The project bears a kinship to the Introductory University Physics Project that is being carried out by the American Institute of Physics, the American Association of Physics Teachers and The American Physical Society (see *PHYSICS TODAY*, May 1987, page 87, and October 1987, page 107). Raither is interested in that project and also in the computer-assisted education projects promoted by Jack Wilson, the outgoing executive officer of AAPT (see *PHYSICS TODAY*, January 1989, page 34).

While UNESCO has shied away from big enterprises in particle physics, on grounds that they are inappropriate for most resource-poor countries, it has helped along a number of synchrotron radiation projects. It cosponsored a conference in Brazil in 1985, which led to approval for construction of a synchrotron radiation facility in Campinas, Brazil. A similar conference was held in 1986 at ICTP in Trieste, where a synchrotron radiation ring is under construction. A 1989 conference took place in the People's Republic of China at Hofei just as the 800-MeV synchrotron radiation machine was coming into operation. A similar conference will take place in 1991 in India, which also is interested in the idea of building a synchrotron source.

Of course UNESCO does not have the resources to directly support the construction of expensive experimental equipment. But it is able to help organize relevant conferences that otherwise might not happen, and when physicists in the Third World are trying to persuade their governments to fund projects, UNESCO's imprimatur sometimes can help tip the

balance in their favor.

"What you want to do is look for something that is just a little more advanced than what a country has now," Raither observes. "The developing countries need a good reason for doing physics, and synchrotron radiation is a strong one. It's cross-disciplinary, and it involves basic sciences, engineering and industrial applications."

Global objectives

A very large proportion of UNESCO's science budget goes to environmental activities, and much of that is not for basic science in the sense in which many physicists understand the term. A lot is spent on studying things like range management and deforestation, that is to say, scientific techniques of agriculture and forestry. The environmental program as a whole encompasses disciplines such as geology, hydrology, ecology and the marine sciences.

As a scientist, Mayor looks favorably on UNESCO's program in the basic sciences. Physics as well as biology, Mayor's own field, got hefty increases in the new zero-growth two-year budget. At the same time, environmental concerns are dear to Mayor's heart, and political support for the environmental program is strong, especially in the northern European nations.

In an interview with *PHYSICS TODAY* conducted at UNESCO headquarters on 3 November, at a time when the General Conference was in session (see page 65), Mayor left no doubt about his commitment to the environmental program. From meetings with government leaders, he said, he knows that they are "very worried." But he said there is always the trend to say, "No, it is too soon, let us wait because we must do more research, we must study more."

"But you know," Mayor said, "I worked for many years as a biological analyst identifying childhood brain diseases. And sometimes if you wait too much in order to have a perfect diagnosis, when you have the perfect diagnosis, the irreversible damage has already been produced. Therefore the perfect diagnosis is not necessarily the complete diagnosis. It is the timely diagnosis that enables you to prescribe treatment before it is too late. As a scientist, I believe that we must already start acting, before we have a complete diagnosis, because otherwise irreversible damage may occur in the biosphere."

Despite all the criticism of M'Bow's high-handed methods, Mayor left no doubt that he intends to be a strong leader, albeit within a framework of

UNESCO Director General Addresses US Complaints about Organization

Federico Mayor Zaragoza, a Spanish biochemist trained at the University of Madrid, was elected director general of UNESCO in November 1987. He previously served as special adviser to the director general in 1983-84 and as deputy director general in 1978-81. A cofounder of the Center for Molecular Biology at the University of Madrid, one of the most prestigious research organizations in Spain, he received a professorial appointment at the University of Granada in 1963 at the unusually young age of 29. He is the author of *Mañana Siempre es Tarde* (Espasa-Calpe, Madrid, 1987), "Tomorrow Is Always too Late." Excerpts follow from an interview that was conducted at UNESCO headquarters in Paris on 3 November 1989.



Federico Mayor Zaragoza

PT: I understand that the International Council of Scientific Unions functions at once as an expert advisory body to UNESCO and an outreach arm that enables UNESCO to draw in people and get things going.

Mayor: Exactly. I asked the president of ICSU to address the plenary of the General Conference. He said we must provide to governments elements for decision making based on science. Today there are many heads of state and many governments that have the will to adopt measures that are effective for the future, even if they are expensive or unpopular, but they lack the scientific basis for decision making.

PT: Apart from ICSU, are there other organizations that play a similar role?

Mayor: Yes, there is the International Association of Universities, the International Council of Social Sciences, the International Council of Philosophy and the Humanities.

PT: Tell us about your priorities for UNESCO.

Mayor: Literacy. The 1980s have been a lost decade for the developing countries. Because of the debt burden, there has been a net capital flux from the South to the North, and where there are structural adjustment problems, services suffer. This is economics, this is not my job. But my job is to say clearly that education has been worsening qualitatively and quantitatively in the decade of the 1980s. This is why we have agreed—the World Bank, the UN Development Program, UNICEF and UNESCO—to really try to create public awareness and government concern

and commitment to education for all. We have convened a very big conference for next March in Bangkok, "Education for All: Access to Basic Learning." The world environment is another major concern. I have been asking the other UN organizations—the UN Environmental Program, the Food and Agriculture Organization, ICSU, the World Meteorological Organization, the World Health Organization—to work together on an annual statement on the world environment. This would be a very concise statement addressed to top government decision makers.

PT: What about the United States?

Mayor: The US made a considerable contribution to UNESCO—25% for 40 years—because it wanted to be the main supporter of the one world organization in which scientists and artists, educators and journalists, participate directly. And now of course we miss very much that contribution. But money is not the main thing. Most important is that the leading knowledge-producing nation of the world cannot be absent.

PT: What about the complaints that were made during the Reagan years about UNESCO?

Mayor: Until a few weeks ago there were just the views of the director general, but now that the General Conference is taking place, I can tell you what 156 ministers said. They realize that you cannot change everything in staff policy in 18 or 19 months. But they see many improvements in staff and management policies—decentralization, transparency [or openness], austerity, reduction of volume of publications, reporting to

member states. I have appointed a deputy director general who is a manager, and I have asked Knut Hammar-skjold—a former head of the International Air Transport Association—to chair an international commission, so as to have advice from very distinguished specialists in staff policy. What is more important, this is a very democratic organization now, in which the member states and governing bodies fully exercise their constitutional prerogatives.

PT: What about the complaints about politicization of the organization?

Mayor: We are not a technical organization, frankly. We are asked in our Charter to build peace in the minds of men through education, science, culture and communications. When you are dealing with cultural identities, content of education, communications issues, you are dealing with political issues. And it is for this reason that I always say, This is an intellectual organization. This is the organization of freedom. And therefore I will never try to suppress any kind of debate on these matters. At the same time, we only deal with matters within our competence, and we will not allow our organization to be used for [extraneous] political purposes.

PT: The new information order?

Mayor: This was a profound misunderstanding for which we paid a high price. Sean MacBride [the UN leader and human rights activist] wrote a report to UNESCO, not from UNESCO. This was never the position of the General Conference. The new strategy adopted at this General Conference will be to address disparities in communications resources, consistent with our constitutional mandate to assure the free flow of ideas.

PT: Isn't it possible, even after the reforms you have described, that the Bush Administration and Thatcher government still will not wish to associate with UNESCO simply because it is seen as too intimate with the centrally managed socialist countries of Eastern Europe and the Third World?

Mayor: The only thing I can tell you is that I always have been in the struggle for freedom myself, and I consider that there is only one way to freedom, and that is through education. And so even when I go to countries in which there is a completely autocratic system, I know that I am planting the seeds of freedom by promoting education, science, culture and communications.

democratized governance and streamlined management. Reminded of another United Nations leader who came to grief when he tried to lead faster than the world's major powers wished to follow—Dag Hammarskjöld—Mayor pointed out how different the times are in which we now live: The Cold War is ending, and with it, the superpower rivalries that have rendered UN organizations so ineffective through much of their history; new powers such as Japan have emerged, and are ready to assume global responsibilities; UN peace-keeping actions have been accepted as indispensable in places like Iran-Iraq, Afghanistan and the Middle East; and we are faced with global

problems of obvious urgency—the ozone problem, the threatened melting of the Polar caps.

Mayor served his political apprenticeship in Spain, a country that has moved in just 20 years from an autocratic dictatorship, based in an aristocratic-agrarian society, to full-fledged social democracy based in an industrial economy. It was a good setting, perhaps, in which to learn the art of political reconciliation. In the interview, Mayor seemed intent on setting a moderate path for UNESCO that will satisfy North and South, East and West, old and new. But having set that course, he left no doubt that he intends to steer.

—WILLIAM SWEET

WORLD LAB PROMOTES RESEARCH IN THE THIRD WORLD

Speaking in French to an assembly at the World Lab last May, the institution's president and founding father, Antonino Zichichi, drew attention to the fact that today in the world one billion privileged people—most of his audience among them—consume ten times as much as another four billion. What sense does it make, he asked, to offer science to people who are dying of starvation or tuberculosis?

Answering his own question, Zichichi told a Confucius story. To somebody who asked for a fish to relieve his hunger, Confucius said, "If I give one to you, you'll just come back tomorrow and ask me for another; that is why I say no, and instead teach you to fish." If one were to address only the urgent nutritional and medical needs of poor countries, Zichichi continued, one would be contenting oneself with the fish of Confucius. "To provide scientific instruction," on the other hand, "would indicate that one has understood the profound meaning of his maxim."

Acting on the inspiration of that story, several years ago Zichichi persuaded like-minded scientists at CERN and others in Europe and around the world to create a new institution with the mission of training scientists from poor countries and improving opportunities for them to do constructive work in their native lands. The World Lab was formally established on 12 July 1986 in Geneva. It now is based in Lausanne, Switzerland, and already it has an operating budget of 100 million Swiss francs—more than \$50 million. The lion's share of the funding comes directly from the Italian government: Prime Minister Giulio Andreotti was

persuaded that the developing countries need science and culture in addition to food and medical care.

As the major sponsor of the International Centre for Theoretical Physics in Trieste and of the World Lab in Lausanne, the Italian government can now safely be characterized as the world's leading benefactor of physics for development. And with the Italian government's \$50 million contribution secured, the World Lab can be said to have eclipsed UNESCO as the world's leading organization fostering advanced physics education.

As presently constituted, the World Lab has four major programs:

- ▷ Archimedes, a program of global monitoring and modeling in seismology, volcanology, climate and environment, as well as in education and health

- ▷ Eloisatron, encompassing plans for establishment in the People's Republic of China of advanced science and technology centers; for neutrino and cosmic-ray studies at Italy's Gran Sasso laboratory and elsewhere; and for a visionary project to build a giant collider, perhaps 100 on 100 TeV, perhaps in Sicily

- ▷ Improvement of Modern Life, a series of projects in food technology, medicine, environmental science and ecology, and new resource and energy technologies

- ▷ Controlled nuclear fusion.

Already the World Lab has been instrumental, with crucial guidance from T. D. Lee of Columbia University, in setting up China's Center for Advanced Science and Technology in Beijing. With guidance from Ahmed Ali at DESY, the lab is helping set up something similar to CCAST in Paki-

stan. The World Lab also sponsors a large group of third world students—23 from China, 13 from India and 11 from Pakistan—working on the L3 detector at LEP, headed by Sam Ting, a founding member of the World Lab.

Perhaps its most important current program provides 1000 postdoctoral scholarships enabling students from third world countries to spend one or at most two years at institutions in advanced industrial countries. In principle, students are to return to their native labs after a year, unless renewal is recommended by their sponsoring instructors. In cases of exceptional first-year performance, students may be recommended for participation in projects the World Lab is inaugurating.

Applications to the scholarship programs should be addressed to A. Zichichi, President of the World Laboratory, Palais de Rumine, Place de la Riponne 6, CH-1005 Lausanne, Switzerland.

—WILLIAM SWEET

TEXAS INSTRUMENTS RECEIVES CHIP PATENT IN JAPAN

After a nearly three-decade ordeal, Texas Instruments Inc has been awarded the Japanese patent for the integrated circuit. The patent, first applied for in 1960 and finally issued on 30 October 1989, credits Jack S. Kilby with being the sole inventor of the integrated circuit. Kilby was an engineer with Texas Instruments when he devised the IC.

Integrated circuits, or chips, are now used in nearly all sophisticated electronic devices, from computers to toaster ovens to automobile parts. At the time the patent application was filed, however, few people had a clue to their full potential. "I don't think anyone imagined it would be as significant as it turned out to be," Jim Comfort, a lawyer in the Texas Instruments patent office, told us. "Nobody is smart enough to tell you what technology is going to be the prevailing technology 10 years from now."

That the Japanese patent office took 29 years to award the integrated circuit patent is not surprising: Credit for the integrated circuit was long disputed in the United States. The US patent application for the "miniaturized electronic circuit"—an electronic circuit with all of its components integrated on a piece of semiconducting material—was first filed by Kilby in January 1959. Robert N. Noyce of Fairchild Semiconductor,