

means the US will continue to support UNESCO projects through existing State Department operations for developing countries, such as the Agency for International Development. If that happens, US participation in global science will suffer.

Anticipating this complaint, the State Department called on the National Research Council of the National Academy of Sciences and National Academy of Engineering last March to suggest alternatives to UNESCO. The Research Council responded on 31 August with a "preliminary assessment."

Troubled times. Withdrawing from UNESCO will cause many disruptions and difficulties, says the Research Council report. If US scientists are not funded and not invited to take part in UNESCO activities, the report argues, science itself will be the loser. It is not clear from State Department statements how it intends to replace UNESCO's programs—though Newell has suggested that the \$47 million that would have gone to UNESCO in 1985 as US dues will somehow be in President Reagan's fiscal 1986 budget request, which goes to Congress this month.

Through 1985, says the Research Council, "it will be hard to judge the true impacts of withdrawal on US science interests. . . . Even if they appear to be only modest, early provision of resources to ensure continued US participation must be made. In order to maintain confidence both here and abroad . . . withdrawal must be accompanied by a serious commitment, expressed in policy, institutional and budgetary terms to a continued and strengthened American role." The Research Council proposes that the US provide Funds-in-Trust or outright donations to such UNESCO operations as the Intergovernmental Oceanographic Commission and the Man and the Biosphere Program. Beyond that, the State Department could fund ICSU or other UNESCO activities through the National Science Foundation, say, or the Academy of Sciences.

The report also suggests that "considerable thought needs to be given to the kinds of multilateral entities that might be established to deal with the contemporary requirements of international science. . . . The time may have come [for] new models for facilitating international cooperation. . . . [Accordingly,] it may be necessary in the longer term to consider radical institutional changes ranging from the establishment of a separate entity for international science to a complete reorganization and restructuring of present institutions."

In bidding farewell to UNESCO, Newell indicated that US membership could be renewed if certain changes were made in its operations. —IG

Sampler of what UNESCO does in physics and other fields

Organized in 1946 with the worthy purpose of advancing and diffusing knowledge and understanding among people of all nations in the fields of education, culture and science, UNESCO has had mixed success. Among its contributions to world science, UNESCO:

► Founded and continues to support—together with the International Atomic Energy Agency, the United Nations Development Program and the government of Italy—one of UNESCO's most conspicuous and celebrated enterprises, the International Centre for Theoretical Physics in Trieste. The Centre, headed by its charismatic creator, Abdus Salam, a Pakistani physicist, brings together 1000 physicists from developing countries each year with about 1000 physicists from industrialized nations. Salam calls his institution "a singularity—the only one of its kind in the United Nations family." The Centre organizes conferences for Third World physicists, at Trieste and in developing countries, and usually through such meetings, attempts to plug more physicists into multinational projects.

► Established science and technology agencies in 13 developing nations to help set science policies. In its evaluation of science within UNESCO, the National Research Council says of this program: "It is difficult to make a convincing case that the UNESCO program on Science, Technology and Society occupies a central role either in the operation of UNESCO itself or in the scientific and technological affairs within or between countries." The current budget for this program, plus the overhead at the Paris Secretariat, is \$6.2 million per year, of which only \$3.8 million goes to actual activities in the member nations of UNESCO.

► Supplies about one-third of the funding of the International Council of Scientific Unions, a nongovernmental body organized in 1931, representing science academies in 20 countries as well as many scientific societies, including the International Union of Pure and Applied Physics, the International Union of Meteorology and Atmospheric Physics and the International Union of Geodesy and Geophysics. UNESCO's subvention to ICSU comes to about \$540 000 per year.

► Provides \$17.3 million annual support for research, training and international cooperation in physical and life sciences—though actual program costs, without overhead expenses in Paris, amounts to \$10.5 million. Non-UNESCO sources contribute another \$17.8 million per year to this large and important program, which is directed toward building more effective global networks of advanced research and training at the frontiers of mathematics, physics, chemistry and biology. This program supports a large number of activities of scientific unions such as ICSU and international institutions such as the Trieste International Centre for Theoretical Physics and the Johns Hopkins School of Hygiene and Public Health. Through this program, UNESCO provides a critical intergovernmental link to regional and global projects, especially in developing countries. Even so, says the National Research Council assessment, UNESCO's Natural Sciences program is only "reasonably good. . . . With improved management, even further contributions can be foreseen."

► Expanded the International Institute of Seismology and Earthquake Engineering in Japan, where participants from 35 countries are trained each year. This is part of UNESCO's Natural Hazards program, which is rated by the National Research Council as "technically competent. . . . UNESCO program provides an opportunity for US earth scientists to visit hazard-prone areas, study and evaluate disaster patterns and risks, and aid in the development of mitigation techniques, which could have a potentially beneficial domestic use." Another section of the Earth sciences program includes the International Geological Correlation Program, which has been sponsored jointly since 1973 by UNESCO and the International Union of Geological Sciences, with about 80 countries taking part. It is an outgrowth of a program originated by IUGS in 1969, largely by US Earth scientists. Even now, more than 300 US scientists are involved in some 50 IGCP working groups at any one time. "In terms of program management," says the Research Council's report, "the Earth sciences . . . are not immune to the bureaucratic cumbersome-ness that characterizes UNESCO activities in general. There is frustration at the comparatively small amounts of money that are available for actual project work as opposed to administration." Of \$5 million per year for Earth sciences, only \$1.4 million goes to projects in the field; the rest stays in the organization's bureaucratic system.

► Developed an important wide-ranging Marine Sciences program, which embraces the Intergovernmental Oceanographic Commission, Division of Marine Sciences, and Man and the Biosphere Program. Taken together, these have an annual budget of \$8.8 million, of which the projects receive about \$5.5 million per year. Support for program activities from such other sources as the United Nations Development Program and United Nations Environmental program comes to \$4.4 million, which is a significant share of the entire UNESCO effort in marine sciences. IOC was established within UNESCO in 1960 as an autonomous body to facilitate international collaboration in marine sciences. As part of this, the International Oceanographic Data Exchange Program collects data on subsurface ocean temperatures and salt contents gathered by merchant ships and research vessels of many nations. Says the Research Council: "In recent years, the interests of the developing world have received increased attention in the work of IOC. In the view of some US marine scientists, this has resulted in less attention to issues of science and more to political and organizational topics. There is some question pertaining to the management capabilities of the IOC, which are made more complex by the overall UNESCO bureaucracy." —IG