

science activities. And, in 1997, even the job classification that gave science specialists a predictable career path within the department was dropped.



NEUREITER

Albright responded to the concern about the decline by asking the National Research Council (NRC), in April 1998, for a comprehensive study of what the State Department needed to do to make diplomats more aware of science.

By September of that year, an NRC panel offered several recommendations, including the appointment of a science adviser to the secretary of state. The full NRC study was published in October 1999.

The decline of science at the State Department was due largely to cuts in the agency's resources—somewhere around 40% during the past decade—Albright and other officials say.

"Things [at State] seemed to be going not only not well, but in the wrong direction," says John Boright, the executive director of the National Academy of Sciences office of international affairs. "Fewer and fewer of the supposedly scientific positions worldwide were being filled with anybody with serious experience, with any sort of direct relevance," says Boright, who directed the staff that put together the NRC report.

Boright, a PhD particle physicist who describes himself as "lapsed" because of his many years in government, says Neureiter is "a good appointment. He knows the State Department, the White House, the NSF [National Science Foundation], and industry. I have worked with him and he knows the ropes, absolutely."

Neureiter worked in a variety of positions at Texas Instruments from 1973 to 1996, most of them related to international business operations both in Europe and Asia. He worked from 1969 to 1973 as an international affairs assistant with the Office of Science and Technology, as OSTP was called at the time. He helped develop science and technology cooperation programs that President Nixon initiated with the Soviet Union and China. He was a deputy science attaché in the US embassy in West Germany in the mid-1960s and was the first US science attaché in Eastern Europe. Before joining the State Department, he worked in the international affairs office of the NSF and was program

director of the US-Japan Cooperative Science Program created by President Kennedy.

Neureiter obtained his PhD from Northwestern University in 1957, and worked as a research chemist at Humble Oil (now part of Exxon). He did research in butadiene chemistry, organic sulfur compounds, and the development of antioxidant systems for polypropylene. Neureiter has registered 10 patents and written a number of scientific publications on organic reaction mechanisms. In addition to his science background, he reads and speaks German, Russian, Polish, French, Spanish, and Japanese.

Building a record

Richard Getzinger, a PhD chemical engineer and director for international programs at the American Association for the Advancement of Science, is also pleased with the choice of Neureiter. "We at AAAS have been lobbying [for the position to be filled] for the last two or three years, and this is satisfying," he says.

Despite Neureiter's late arrival, riding into town as the sun sets on the Clinton administration, Getzinger says it was important to get a person in place to "have an opportunity to build a track record in the next few months."

Neureiter says he is "working the

building" at the State Department, talking to all of the division heads in an effort that he hopes will make everyone more aware of science issues. He also wants to learn which units of the department can benefit most from outside scientific advice.

"Priority one, the most important thing I can change in the short term, is to build a bridge to the scientific community," Neureiter says. "I hope to draw on the assistance, advice, and counsel [of the scientific community] quickly and make it available to any unit of [the State Department] that is interested." The initial response to his efforts from scientists and State Department employees has been enthusiastic, he says. "Now we just have to make it all work."

A review of the "science complements" in embassies around the globe is under way, he says, and from that assessment Neureiter will have to determine the right mix of increased science and technology training of foreign service officers and the recruitment of new people with scientific backgrounds.

While Neureiter is dealing with the science deficiencies within the State Department, he says he wants to "show the scientific community that something is definitely happening here in response to their recommendations."

JIM DAWSON

Pluto Mission Falls Victim to Climbing Costs

Stop all work in support of PKE [Pluto-Kuiper Express] development as currently conceived," came the order from NASA headquarters on 12 September. The agency's associate administrator for space sciences Edward Weiler called for a rethink of the Pluto flyby largely because its estimated cost, taken together with a trip to Jupiter's moon Europa, has more than doubled in two years, to \$1.4 billion. Disappointed planetary scientists wonder whether the public appeal of the search for life plays too big a role in steering NASA.

Given the cost overruns, postponing the Pluto-Kuiper Express in favor of Europa Orbiter "was a done deal," says Weiler. "The choice wasn't made by me. It was made when the outer planets line was made in the budget. Europa has higher scientific potential." Weiler told the Jet Propulsion Laboratory, which oversees both missions, to find a way to get to Pluto—the only unex-

plored planet in our Solar System—by 2020, seven years later than with the planned 2004 launch. Ironically, the delay means missing a cost-saving chance to get to Pluto by swinging off Jupiter's gravity.

The Pluto-Kuiper Express is supposed to map the morphology and makeup of Pluto and its atmosphere, its moon Charon, and other objects in the Kuiper Belt, a disk of comets and debris left over from the formation of the giant planets. "Pluto-Charon is a wonderland—an opportunity to explore everything from chemistry and organics to the origin of planets," says Alan Stern, a planetary scientist at the Southwest Research Institute in Boulder, Colorado. Adds University of Arizona planetary scientist and astrophysicist Jonathan Lunine, "Our understanding of how planetary systems form is being revolutionized, and Pluto is a key piece of the puzzle to know if our system is typical or atypical."

Delaying the mission is unfortunate.”

Putting off the trip may mean seeing a snowball when we do get there: In 1989, Pluto made its closest approach to the Sun in 247 years, and as it moves away its atmosphere is expected to collapse and freeze. It's not clear when that will happen, but “a few years' delay could easily make the difference between arrival when Pluto has an atmosphere and when it does not,” Stern says.

An exciting, limited vision

NASA's “better, faster, cheaper” motto is at the base of the Pluto problem, says Michael Drake of the University of Arizona, who chairs the agency's subcommittee on Solar System exploration. “Frankly, we went too far on the cheap side,” he says, referring to last year's double loss of the Mars orbiter and lander. “The process of reevaluation is a no-brainer: Increase reliability. That means increased testing. That drives up costs.” Internal costs for the Pluto–Kuiper Express and Europa Orbiter missions grew by about 20%, according to NASA officials. But the extra cost, they add, is mostly for launch vehicles and power supplies, which NASA buys.

Did it have to come down to a choice between Pluto and Europa? “No,” says Lunine. “It's a false dichotomy. There may have been ways to trim the entire planetary program to preserve all the missions.” For its part, the American Astronomical Society's planetary sciences division is asking NASA to request more money from Congress, although division chair Robert Nelson admits that the chances of getting an increase are slim.

“I support going to Europa first, but we shouldn't throw out Pluto in the process,” says Drake. “Currently, the paradigm driving the space sciences program is, Are we alone in the universe? We are looking for Earthlike planets, life on Mars, life on Europa. It's an exciting, and limited, vision. I think we should not be driving the space program on a single paradigm.” Adds Lunine, “My concern is that the space program is becoming politicized—a tool to fuel public interest in science—which can cause an imbalance. We do not understand nature to the extent that we are ready to focus in on just two targets.”

At press time, planetary scientists were preparing to meet in late October, and hoped to rescue the Pluto mission. Perhaps, Drake says, “by putting it out for competitive bid.”

TONI FEDER

Study Calls for Better Conditions for Postdocs

It's official: Postdocs are underpaid, they often lack health care and other benefits, and the duration of postdoctoral training is increasing. But the lot of postdocs could improve, if they—and their advisers, host institutions, funding agencies, and professional societies—heed the advice in *Enhancing the Postdoctoral Experience for Scientists and Engineers*, a recent report by the National Academies' Committee on Science, Engineering, and Public Policy (COSEPUP).

Over the past 20 years, the number of postdocs in the US has more than doubled, to roughly 52 000. At some universities they outnumber students, and more than half of US postdocs are foreigners. COSEPUP surveyed 40 institutions—universities and government and private labs—and found that conditions for postdocs vary greatly among disciplines and from institution to institution. Says Mildred Dresselhaus, an MIT physicist and head of the Department of Energy's Office of Science, who chaired the COSEPUP study, “One of the obstacles was that there was almost no data—institutions didn't even know how many postdocs they had.”

Postdocs can fall between the cracks, says Caltech vice provost David Goodstein, who is responsible for postdocs' welfare at the university. “They are the least protected of all classes in the academic world. Nobody particularly looks after postdocs, who are extremely vulnerable—they can't get another job if they fall out with their adviser.” Adds University of Southern California president Steven Sample, who chaired a 1998 study on postdocs for the Association of American Universities, “The postdoc has become the de facto terminal academic credential in the sciences. The PhD has become a way station toward full membership in the research community. I find it very encouraging that a second study [on postdoctoral training] has found basically the same thing that we had. It makes it more likely that something will be done about it.”

In some ways, postdocs fare better in physics than in other sciences. For example, the median annual salary in 1997 for academic postdocs in physics was \$34 000, compared to \$27 000 in the life sciences, which has both the most and the longest postdoctoral appointments. But the reliance of

postdocs on a single adviser, and other concerns detailed in the COSEPUP report, apply across all science and engineering fields: “Postdocs need better mentoring, better compensation, more information on employment opportunities, more assistance in planning their careers, and opportunities to learn a number of career skills,” according to the report. (The full report is available for free on the Web; see <http://national-academies.org/postdocs>.)

The COSEPUP guidelines give “a more savvy approach to making the best use of those important years of the training process,” says Dresselhaus. The report advises postdocs to ask prospective advisers about their authorship policies, whether they have adequate research money, and if

To enhance the postdoctoral experience, the COSEPUP report says postdoc advisers, institutions, funding organizations, and disciplinary societies should

- ▷ award institutional recognition, status, and compensation commensurate with the contributions of postdocs to the research enterprise

- ▷ develop distinct policies and standards for postdocs, modeled on those available for grad students and faculty

- ▷ develop mechanisms for frequent and regular communication between postdocs and their advisers, institutions, funding organizations, and disciplinary societies

- ▷ monitor and provide formal evaluations (at least annually) of the performance of postdocs

- ▷ ensure that all postdocs have access to health insurance, regardless of funding source, and to institutional services

- ▷ set limits for total time of a postdoc appointment (of approximately five years, summing time at all institutions), with clearly described exceptions as appropriate

- ▷ invite the participation of postdocs when creating standards, definitions, and conditions for appointments

- ▷ provide substantive career guidance to improve postdocs' ability to prepare for regular employment

- ▷ improve the quality of data, both for postdoctoral working conditions and for the population of postdocs in relation to employment prospects in research

- ▷ take steps to improve the transition of postdocs to regular career positions