

News & Comment

NSF Education Head Makes Risky Bid

Bassam Shakhashiri has been making an unusual public push for a big budget increase, but he is up against the deficit and resentment within the foundation

LONG KNOWN to Washington insiders as a forceful promoter of the National Science Foundation education program he has headed for the past 5 years—and sometimes resented within his own agency for his pushy style—Bassam Z. Shakhashiri has been making an unusually aggressive public pitch this year for increased congressional funding. Instead of simply backing the Administration's budget request as a dutiful member of the Executive branch is expected to do, Shakhashiri has told Congress—and the press—that he needs \$600 million a year by 1992, about triple the prospective budget for the current year.

Part of these new funds, he says, should be used to put NSF more firmly in the business of raising the nation's general scientific literacy and improving science and math education for minorities. NSF has begun to move in this direction already, and it is about to announce some new initiatives aimed at minority students. If Shakhashiri gets his way, the focus would be broadened considerably from NSF's traditional concentration on the best and the brightest.

How these moves will play either on Capitol Hill or in the foundation itself is far from clear. In previous years, Congress has looked favorably on NSF's education programs, topping the Administration's budget requests every year since 1981, when the directorate was all but demolished by the incoming Reagan Administration (*Science*, 15 April 1988, p. 271). But, with the heavy pressure to cut the federal deficit this year, Shakhashiri has chosen a difficult time to make his move. NSF's budget is still being debated, but there is speculation that science education will end up with little, if any, increase above the Administration's request for \$190 million.

And Shakhashiri's pitch for what NSF colleagues may fear would be a bigger slice of NSF's pie seems likely to sharpen old antagonisms toward education within the foundation. Indeed, according to an article in the 15 October issue of *Science and Government Report*, NSF director Erich Bloch recently wrote to Senate appropriations subcommittee chair Barbara Mikulski (D—



Promoting science: "We're trying to [focus on] the bottom half of the student population."

MD), urging her to restore research funds cut by the House and to block a \$20-million increase that the House had approved for education.

While many who know Shakhashiri are not entirely surprised by his boldness in making public views he has expressed privately, the former University of Wisconsin chemist says he decided to take the plunge only when House Appropriations subcommittee chairman Representative Bob Traxler (D—MI) asked him point blank how much he had requested within NSF when the foundation's budget was being prepared. "So I responded to those questions very openly," Shakhashiri recalled in a recent interview with *Science*. His answers: \$600 million a year and 20% of the NSF budget. He says he would like to reach that level over the next 3 years. By contrast, the education program received \$171 million last year, just over 10% of NSF's total.

When Traxler pressed Shakhashiri for specifics, Bloch, who was also testifying, offered the wry comment, "You are going to find

out—Mr. Shakhashiri is an expensive person." Asked later by *Science* for his reaction to the \$600-million number, Bloch replied, "I don't want to deal with that. It's meaningless. If you look at the budget, education has enjoyed a higher percentage of growth than other parts of NSF." He says he expects education to "stay as a centerpiece."

If Bloch sees Shakhashiri's program as a favored child within NSF, why the change in Shakhashiri's tone and tactics? "I represent a viewpoint that is rapidly gaining momentum among the scientific community, the education community, and the political community. And I have decided to continue to push," Shakhashiri says. Then he adds: "I enjoy the support of the director, and I enjoy the support of the [National] Science Board and of Congress. And, most importantly, I enjoy the support of the [education] communities because they're coming forward with high-quality proposals."

While it may not be so obvious that NSF's hierarchy is behind him, it is clear that Shakhashiri is talking about an important new approach for NSF. Asked how the directorate's programs would differ from those in the past if he got his \$600 million, Shakhashiri noted that "the curriculum reforms [sponsored by NSF] in the 1960s were good for a relatively small number of people. The rest of public education lumbered on with virtually no effect."

In the postsputnik period, NSF was best known for supporting major revisions of high school science courses and retraining teachers to use them. "What [NSF] focused on in the past was the best and the brightest. That's good and we want to continue to do it, but that can't be the sole focus. What we're trying to get people to work on now is dealing with the bottom half of the student population. That's a tall order."

To accomplish that goal, Shakhashiri envisions NSF in the role of brokering partnerships between a variety of players in science education. "We want to work with key decision-makers at the state level—governors, legislators, commissioners of higher education, chief state school officers. We want to work together with mayors, with

Getting Energy into the Schools



Watkins: "A burning issue."

Energy Secretary James Watkins is fast emerging as a new force in the federal government's campaign to improve science teaching in primary and secondary schools. He demonstrated his impatience for action last week at a brainstorming session in California, which he cochaired with physicist Glenn Seaborg. The Math/Science Education Action Conference, held at Berkeley's Lawrence Hall of Science, assembled leaders from education, industry, science, and government to map out programs to be implemented within the year by the Department of Energy, through its national laboratories.

"[Science education] is a burning issue with me personally," Watkins told *Science*. But he said the DOE initiative is driven by more than his own personal passion. The department faces a manpower shortage if schools fail to produce high-quality scientists and skilled technicians. "Let's put it [in terms] of need and self-serving objectives," he said. "We need these people desperately. I have had serious problems finding qualified people to fill critical positions in . . . waste management and even nuclear engineering. And I ask myself: How much worse will it get in 10 years if we don't get our act together?"

Watkins acknowledged that the Administration is unlikely to come up with large amounts of money. But he argued that by encouraging volunteerism on the part of scientists and graduate students, and by turning research resources into education aids wherever possible, DOE can be effective with little new funding. "We have the places; we have the computers; we have the minds," he said.

Indeed, many DOE laboratories have independently created education programs for both teachers and students. But this is the first time the order for such efforts has come from the top. Watkins plans to include science education "at the core" of the DOE's mission and to pay particular attention to the needs of disadvantaged, inner city, and minority students. "I expect to have the 20 national laboratories fully involved in action programs within the year," he promised.

New ideas for those action programs were to come from the participants in the conference. Among the consensus objectives: establishment of science and mathematics as "core subjects," taught to all students, every year, and a call for DOE to create communication networks through which science and math teachers could share information about high-quality resource materials.

The participants also proposed financial aid programs designed to offset the education expenses of bright students who choose teaching as a career. And Seaborg argued for changes in the teacher accreditation system to allow mid-career scientists and engineers with degrees in science or mathematics to become certified teachers without education degrees. Such a change, implemented several years ago in New Jersey, has produced an excess of precollege science and math teachers in that state, he said.

The working groups urged DOE laboratories to establish teacher training programs for the school systems in their areas and to try to reach as many as 10% of the science and math teachers in those communities annually. Effective programs could then be copied by other government agencies or scientific institutions near population areas not reached by the national labs.

Watkins promised to publish the conclusions of the meeting within 2 weeks, to get to work immediately implementing the best suggestions, and to include the plan as a chapter of the national energy strategy, to be published next spring.

How do Watkins' plans fit in with other federal efforts? He told *Science* he's not trying to "upstage" the Department of Education or the National Science Foundation. He said he plans to coordinate DOE's efforts with those of other federal agencies and will share with them the recommendations that emerged from the meeting.

■ **MARCIA BARINAGA**

school boards, with city councils, with business leaders as well as with the public school systems, and to bring into the picture institutions of higher education."

Shakhshiri puts strong emphasis on enlisting academic scientists and engineers in the cause of education reform. However, he wants the pattern of participation to be different from that in the postspatnik period when most of those active were in teams working on major curriculum reform projects. "What we would really like to see," he says, "is faculty members of the University of Pennsylvania involved in improving the quality of teaching of physics or math or chemistry in Philadelphia. We'd like to see faculty at UCLA be concerned about Los Angeles. The University of Chicago, Columbia, Berkeley. . . ."

NSF has never made a major effort aimed specifically at improving science and math instruction in urban schools with large minority enrollments where retention rates and academic performance are generally lowest. But Shakhshiri says the agency has given the subject a "sharper focus in the past couple of years as we realized that the inner city schools problem has to be dealt with."

To carry out this mission, NSF is creating a new category of programs with the working title of state and urban initiatives. An important endeavor under this rubric is the establishment of "career access centers" for minority students in major urban areas. Three were started last year—in Atlanta, New York City, and Puerto Rico—and NSF is expected to name six more this year. Eventually, says Shakhshiri, "our goal is to have about a dozen and a half of those centers for minority students." They would cut across all levels, from kindergarten through college, but for the time being, the emphasis is on the precollege level.

If funded as he envisions, these centers would support local efforts to encourage minority students to pursue careers in science and technology. All would be expected to sponsor both in-school and out-of-school activities—such as Saturday academies—for students, programs for teachers, and activities to motivate minority students "within the context of science, mathematics, and engineering experience." The center programs will vary, however, in the prevailing spirit of letting a hundred flowers bloom.

The career access centers exemplify the change of focus and style under Shakhshiri. In the postspatnik era, NSF emphasized large-scale, centralized projects. Now, the stress is on more and smaller efforts. One thing Shakhshiri has shied away from is comprehensive curriculum reform. In his view, such projects have been too expensive and he recognizes that they have drawn

criticism from conservatives that NSF was attempting to impose a national curriculum. "We don't want one curriculum at either the undergraduate or at the precollege level. We need high quality options for states to select from and adopt."

These new thrusts may be popular on Capitol Hill, but, by staking his claim for a big burst of growth for education, Shakhshiri is perceived by many in the foundation as putting education in direct competition with the support of research. The research directorates dominate the NSF budget and have traditionally wielded the most power in agency politics.

Resentment against education at NSF was blunted in most recent years because a growing budget for NSF overall exerted a rising-tide-raises-all-boats effect. But in the present budget atmosphere, a common rank and file view within the foundation is that more for education means less for research. As one staff member put it, "Anybody in the foundation who advocates robbing somebody else to fund his own program—that does not sit well."

On that subject, Bloch, who as director must balance demands from all sectors of the NSF budget, is explicit: "If there are any rivalries between Shakhshiri and others in the foundation, I have no patience with that." But what of rumors that there is growing friction between Bloch and Shakhshiri? Neither man seizes an invitation to discuss it. But Shakhshiri does comment on the broader issue of his relations with the NSF hierarchy in general, saying, "It's had its toll. But the environment is somewhat less hostile than it was."

As for Bloch, he sometimes seems to support Shakhshiri's vision. He consistently describes education and human resources as a high-priority area and says that he is "upset that when Congress talks about education, they stop at high school. When academics talk about education, they start at the graduate level." On the other hand, alluding to the 1970s when the NSF education program ran into difficulties that contributed to its being dismantled, he says, "I'm worried that we will move at a rate that we can't maintain [and want to make sure] that we don't do dumb things."

Asked to characterize the revived education program to date, Bloch seems equally ambivalent—or at least cautious. He is "satisfied in general," he says, but adds "we don't have the results. It's too early to assess how useful it's been. How do you judge?"

Although Congress has annually given more than Bloch asked for, many members have also asked questions about the impact of the program. The directorate last year had to respond to Senate Appropriations Com-

mittee concern over reports that textbooks and teaching materials were less than adequate. There were also suggestions that NSF failed to evaluate the teaching materials objectively after they had been developed and was weak in promoting the use of materials of superior quality. For now, the questioners appear satisfied with the directorate's reply that relatively few of the new programs are out of the pipeline yet and that a rigorous evaluation process is in place to guarantee quality control. Nevertheless, as the resuscitated NSF education effort continues to mature and its funding grows, demands for accountability may grow more insistent.

In addition, there are signs that the legislators are dissatisfied that in precollege education support, NSF offers what one congressional staff member termed "the only game in town." A main purpose of hearings held early this year by the House Science, Space and Technology Committee was to explore what other agencies were doing and might do in the cause of science and math education. Energy Secretary James D. Watkins' well-informed interest in the subject seems to have made him the star of the show, and since then he has been arguing for a stronger role for DOE in education (see box).

So an emerging question may be: Will Shakhshiri, harassed from within, receiving mixed signals from on high, and no longer necessarily the Administration's only advocate for science education, stay the course? If it's up to him, he says, "I intend to stay here,

slug it out, achieve the kind of advance we've talked about."

But behind the bravado is another note. Shakhshiri is quick to remind journalists that he is a tenured professor at the University of Wisconsin at Madison on leave of absence. Like many NSF officials before him, he has an academic career on hold while he serves in Washington; he also feels, not unreasonably, he has other job options.

Shakhshiri is going into his sixth year at NSF, he notes. He has tried to keep up in his academic field and his third book on classroom demonstrations in chemistry was published this year. And 6 years is an unusually long time for an academic to be away from his home campus. This year Shakhshiri's department voted not to extend his leave further. "That came as a big shock and a big surprise to me, so I went out to Madison and met with the department and they reversed themselves." But threat of such action in the future hangs over his head.

It's worth the worry, Shakhshiri says, if he can keep making progress toward that \$600-million goal. What he says he is counting on to get there is that Americans are realizing what the deficiencies in science and math education "mean for their children's prospects and the future of the country and are finally going to demand effective action." He is also counting on the new Bassam Shakhshiri. ■ JOHN WALSH

John Walsh, a former staff writer for Science, is now a free-lance journalist living in Bethesda, MD.

Research Chief to Leave DOE

Robert O. Hunter, Jr., the controversial director of the Office of Energy Research, will be leaving the Department of Energy (DOE) within the next several months, according to Bush Administration officials. Hunter reportedly agreed in early October to give up his post following a meeting with Energy Secretary James Watkins. It is expected that he will continue to run DOE's research division until Watkins can find a suitable replacement.

DOE officials could not confirm at *Science's* press time that Hunter would resign from his job of overseeing the \$1.7-billion general science and basic research program. But insiders told *Science* that the White House already is supplying Watkins' office with the names of potential candidates who might succeed Hunter. Hunter could not be reached for comment.

Hunter's departure is not totally unexpected. Since taking the energy research job



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in August 1988, he has come under increasing fire (*Science*, 15 September, p. 1182) from some researchers and members of Congress over his attempts to change the direction of various research efforts, including magnetic confinement fusion energy and geoscience. ■ MARK CRAWFORD