

to be."

The great funding available to physics during the cold war reflected how a society spends willingly on its military functions when it perceives a strong adversary. Brodsky points out that this relationship of physics to society has been true throughout the history of physics. (Archimedes and Count Rumford lived long before the nuclear age.)

Now AIP has to help physicists explain to the public that physics is in everyday life, too. As an example, Brodsky mentioned medical instrumentation and diagnostic tools, adding that the American Association of Physicists in Medicine is the fastest-growing member society of AIP. Brodsky wants AIP to help physicists remind the public that "physics underlies all the conveniences of the modern age, from electricity to electronics, from automobiles to airplanes." AIP attempts to convey the fundamental science and the technological significance of physics by producing radio and video spots, publishing books and magazines, distributing announcements on e-mail and sending out press releases. AIP also has educational programs, including one that assists physicists who want to make presentations in elementary schools.

Information should flow the other way, too. AIP must fulfill its responsibility of conveying the public's impression of physicists back to physicists, Brodsky says, "to help them relate better to the public."

Government is a particular part of the public that physicists must relate to. In 1991-92, as an Executive Branch Fellow at the Department of Commerce, Brodsky advised on issues of US competitiveness in regard to high-technology industries. When asked if he would try to improve AIP's interaction with government, Brodsky explains, "AIP has to have better connections with government in order to communicate with government." He tells of meeting recently with a congressman and discussing the debate about the Superconducting Super Collider. The congressman told Brodsky that scientists had sent him letters that he read and reread carefully. In the end, he couldn't decide whether some were for or against the SSC! Why had they written? asked this slightly frustrated congressman. To tell him he had a tough choice?

Future physics funding

Along with many other observers, Brodsky sees a fixed ratio of about two orders of magnitude between the amount of money spent on military

and industrial "deployment" and the amount spent on fundamental scientific research. That is, about 10% of the total spent on deployment goes for development and about 1% is spent on the underlying science. As the defense industry shrinks, the money it spends on science shrinks.

Brodsky feels strongly that the "golden age" of physics has not passed, but the era where physics depended mostly on national security has ended "and hopefully won't come back again." Further, Brodsky believes physics not only will survive but is likely to flourish, "embedded in other technological needs of society besides military ones."

In Brodsky's way of thinking, the targets of "strategic research" are more easily hit if they surround you. As he wrote earlier this year in a briefing paper prepared for a meeting on US leadership in science, sponsored by the White House Office of Science and Technology Policy (see PHYSICS TODAY, March, page 41), "fundamental research is valuable and affordable only if it is done in a larger context of economic activity that has significant technological content." As examples of that activity, Brodsky mentioned not just manufacturing, but also health care, urban planning, transportation and the environment. AIP has a role here, too.

AIP will work more aggressively with companies through its Corporate Associates program, says Brodsky. Originally, the program was designed so the associates could help AIP. Now Brodsky and AIP's advisory committee will reverse the emphasis, "to try to figure out better ways to serve companies and to help physics and physicists serve companies." Through their connection to AIP, the companies will also learn about physics-related activity in other companies.

How will Brodsky measure the success of his three goals for AIP? About the umbrella role, he hopes to hear people saying, "That's what AIP should be doing." The pricing goal is easily measured, if not easily attained: Journal subscription prices eventually should not rise faster than library budgets. As for image, "If AIP finds itself with enough good ideas that result in programs," and if, with its finite resources, AIP then finds money to effect those programs, Brodsky will know that physicists are working to tell people who they are and the value of what they do.

AIP has a \$42 million annual budget and bills an additional \$18 million in at-cost services to member societies. Brodsky believes strongly in a service orientation for AIP, but

he recognizes the complexity of interactions between those one might characterize in modern business lingo as customers, vendors, partners and competitors. Roles change; the person AIP deals with one day as customer may come back another day wearing the hat of competitor.

Brodsky has few competitors when it comes to defending AIP. "I respond," he says, when anyone complains about problems with AIP's services. "We think we're good and we're determined to improve," he continues. "I tell people: Keep me informed. Write to me anytime you have a complaint." His e-mail address is brodsky@aip.org.

—DENIS F. CIOFFI

TWO PHYSICS JOURNALS TO GO ONLINE IN 1995

If all goes according to plan, 1995 will see the online debut of the American Institute of Physics's *Applied Physics Letters* and the American Physical Society's *Physical Review Letters*.

Unlike some texts where communication occurs almost exclusively through words (for example, law reviews), physics journals present unique challenges to any online system: Text is interspersed with equations, graphs and halftone figures on virtually every page. Tim Ingoldsby, AIP's director of new product development, promises accurate reproduction of the equations on most display screens. AIP has contracted with the Online Computer Library Center of Dublin, Ohio, to put online the electronic version of *APL*, which is called *APL Online*. It is scheduled to begin in January.

Robert A. Kelly, APS's director of journal systems, told PHYSICS TODAY that APS hopes to select a vendor for *PRL* by the end of June, with *PRL*'s online appearance targeted for mid-1995. The vendor chosen may be different from the one selected by AIP. If this is the case, there will be an opportunity to compare two approaches and systems during this pilot phase. In any case, APS and AIP are planning to exchange information and evaluations on a continuing basis, Kelly says.

Prior to the start of the subscription term, *APL Online* subscribers will be sent a user's manual, a copy of the software that will enable them to access the journal, and full instructions on its use. Ingoldsby hopes that in the first year AIP will capture "at least 25%" of current print subscrib-

ers and will continue to attract others, including those new to *APL*. *APL Online* will be available via the Internet or direct dial-in connections.

One immediate advantage of the new system for *APL* will be its ability to provide a so-called hyperlink jump to references in AIP's SPIN bibliographic database, where in addition to basic information—journal, article and author—an article abstract is available for immediate reading.

What is planned as a user-friendly system has not proved friendly to produce. As they anticipated, Ingoldsbey and colleagues have encountered many unexpected problems, but their enthusiasm has not dampened. "The reason we started with this journal," says Ingoldsbey, "was to learn what changes would be required in our overall publishing process to publish electronically." Once the journal has been prepared in electronic form, manipulation is easy. For example, since individuals as well as libraries often buy a journal for archival use, *APL Online* will offer a year's issues on CD-ROM for an additional fee.

An equally enthusiastic Kelly echoes the notion that these early attempts should be described as "experiments." Kelly spoke of the choice between designing a system of the lowest common denominator versus a more sophisticated technology, which would be more powerful but inaccessible to some. Many *PRL* subscriptions come from overseas, where online technology is not as robust. "We have to be concerned with that," says Kelly.

Both Kelly and Ingoldsbey stress that APS and AIP want to give people choices and not lock anyone out. A wide range of platforms and technologies exists. The strategy, Kelly says, is to "position APS in such a way that we'll be able to take advantage of technology as it unfolds and matures."

Kelly sees increased cooperation among publishers because they realize that physicists, although certainly happy about possible new search capabilities, are more concerned with the ease (or lack thereof) of a single user interface. Publishers must avoid presenting a Tower of Babel, Kelly says.

AIP REPORTS ON US HIGH SCHOOL PHYSICS TEACHERS

The American Institute of Physics has recently published a report of its second survey of high school physics teachers, undertaken in 1989–90. From the responses of a representative sample of more than 2300

How to improve and expand high school physics programs*

%	Suggested change
47	Improve lab, lab equipment
20	Make course easier, accessible to more students
12	Improve student background and/or skills
11	Revamp science curriculum and physics's place within it
8	Pay teachers more; reduce their load
7	Raise requirements; encourage more students to take physics
6	Change administration attitudes, support for teachers
5	Improve teacher backgrounds
3	Improve textbooks
2	More extracurricular activities
2	More parent and community involvement
14	Other suggestions

*Of the 80% of respondents who offered suggestions, proportion that suggested various methods. Adapted from "Physics in the High Schools II."

teachers, "Physics in the High Schools II" presents a mixed picture of high school physics education in the US. On the positive side, the report maintains that "the image often evoked of deep systemwide crisis and widespread failure seems overdrawn." Nevertheless, it found that many of the problems highlighted in AIP's first high school survey, conducted in 1986, continue unabated. (See *PHYSICS TODAY*, November 1988, page 93 and August 1989, page 30.)

Michael Neuschatz, who coauthored the report with Lori Alpert, says that one persistent problem is the degree to which high school physics teachers feel a sense of isolation. A major cause may be that in 90% of the schools that offer physics, only one person teaches it. Remoteness from the discipline itself is reinforced because most physics teachers spend the bulk of their time teaching other subjects, even if their training centered on physics.

The survey underlined the need for better equipped physics labs. As the table above shows, when asked how to expand enrollment and improve their programs, far more teachers mentioned increased funding for lab facilities and equipment over any other factor.

Even a casual acquaintance with newspapers or TV news would lead one to think that education in the US, and science education in particular, is finally receiving adequate attention and support. This report finds, how-

ever, that "political pronouncements and catchy acronyms notwithstanding, real change [for physics] has thus far been slow in coming."

The good news, Neuschatz told *PHYSICS TODAY*, is that teachers "seem better qualified than we thought and that despite problems such as isolation, morale seems better, too." The overwhelming majority of respondents reported that they enjoy teaching physics and want to teach it as often as possible.

The report is distributed by the Education and Employment Statistics Division of AIP, at One Physics Ellipse, College Park MD 20740. Single copies are free, and multiple copies may be provided on request.

SOCIETIES ADVISE DEPARTMENTS ON ADVISING AND HIRING

The council of the American Physical Society and the council of the American Mathematical Society have each issued statements that show an awareness of the "realities of the job market"—the phrase is common to both—faced by graduating PhDs.

APS's 72-word missive, adopted in late April and entitled "On Current Employment Opportunities for Physicists," focuses on advising physics students. APS wants "physics departments and their individual faculty members to make all their undergraduate and graduate students aware of the realities of the job market and to encourage them to prepare for a broad range of careers." Further, departments are urged to take another look at their programs "in the light of changing opportunities."

The longer and more specific statement by AMS, "Supportive Practices and Ethics in the Employment of Young Mathematicians," was passed unanimously by the council in January. With language similar to APS, it too touches on the importance of preparing students for a "broad range of jobs" and of being forthright with them about job prospects. The resolution notes the gulf between the supply and demand of recent math PhDs and sees "no indication that the situation will ease significantly in the future."

The main focus of the AMS statement, however, is on how the professional development of young PhDs can be adversely affected by short-term hires: departments making one-year appointments to fill regular teaching positions or, worse, hiring unemployed PhDs "by the course, without integrating them into the