

YOUNG SCIENTISTS' NETWORK PROVIDES FORUM FOR ELECTRONIC ACTIVISM

More than three years ago a physics postdoc at the Naval Research Laboratory named Kevin Aylesworth became concerned by the difficulties many of the younger scientists he knew were having in finding work. Around that same time he began hearing accounts, in the news media and elsewhere, of a looming shortage of scientists—something that simply defied what he was seeing.

So in May 1990 Aylesworth sent out a rallying cry to young scientists everywhere “to start a politically active organization to present our case to government, industry and academia.” Among other things, he called for a comprehensive survey of all government, industry and national labs to determine the demand for scientists and engineers. He began putting together an electronic newsletter, in which any and all could voice their concerns. And so the Young Scientists' Network was born.

By the beginning of 1992, amid signs of a worsening job market (see *PHYSICS TODAY*, March 1992, page 55), the network had grown to about 200 subscribers. These days, over 2000

subscribers in 35 countries receive the newsletter six times a week over the Internet. What's more, it has become a sort of electronic meeting ground for those seeking change. (This issue of *PHYSICS TODAY* carries letters from three members of the Young Scientists' Network; see page 9. To subscribe to the YSN newsletter, send an electronic mail message to ysn-adm@zoyd.ee.washington.edu.)

Just how effective the network can be was made clear this winter when four network members successfully petitioned to have their names placed on the upcoming election ballot for the American Physical Society. Usually the slate of candidates for APS office is drawn up by the nominating committee. But the society's constitution does offer an alternate route: According to Article VII.4, an individual can be nominated if at least 1% of the membership endorses the candidacy.

The four candidates are Aylesworth, Zachary Levine, a physics researcher at Ohio State University, and Norman Barth, a senior researcher at CERFACS (the European Center for Research and Advanced Training in Scientific Computing) in Toulouse, France, who are all running for councillors-at-large; and Michael R. Cohen, an unemployed physicist who is a candidate for chair-elect of the nominating committee.

Levine, who initiated the campaign, says the network proved very effective in helping the would-be candidates collect signatures. In January he posted the first of a series of notices describing the signature drive. Network members then circulated petitions at 76 universities, at 19 government labs and in eight different countries. Within three months he had gathered 624 signatures—187 more than APS required.

“You know, this network is very powerful,” Levine says. “I had originally planned to canvass for signatures

during the March APS meeting. But instead I got to attend the meeting like a normal person.” He estimates that a victory will require each candidate to net 6000 votes—slightly more than half of the customary 25% of the members who vote in APS elections.

Aylesworth is not wildly optimistic about winning, but he doesn't rule it out. Getting on the ballot was the most important step, he says. “It sends a message that we're here and we have something to say.”

Activism redux

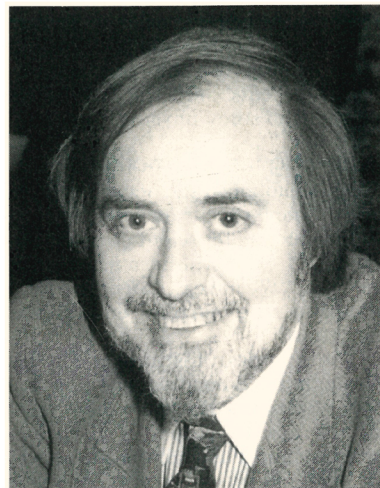
To some, the activism seen on the Young Scientists' Network may recall an earlier time, namely the late 1960s and early 1970s, which also happened to be the time of the last major downturn in scientific employment. That period saw the only other APS candidate to be nominated by petition: Joseph E. Mayer, who in 1970 was elected vice president-elect. That same year the APS membership voted overwhelmingly to establish the Forum on Physics and Society, another effort begun by way of petition.

Brian B. Schwartz, associate execu-

Kevin Aylesworth



Brian Schwartz



tive secretary of APS and a professor of physics at Brooklyn College, was instrumental in the forum's creation. He and Emanuel Maxwell, who were both at MIT at the time, initiated the petition drive at an APS meeting in January 1969.

Schwartz sees certain similarities between that time and now. During the post-Sputnik era there was a heady expansion in the US science enterprise. Research funding jumped, and with it enrollments in science disciplines. Universities expanded their science and engineering faculties to keep up with a burgeoning student population; the annual output of physics PhDs doubled during the 1960s. But by the end of the decade, the good times had ground to a halt. The Vietnam War was draining money from science, and many young PhDs found themselves struggling to find work. Schwartz recalls "tremendous indifference to the plight of the young scientists"—something he has seen in the current situation.

The difficult job market two decades ago caused the number of physics PhDs conferred to plummet by more than 40%—from 1600 in 1971 to around 900 in 1980. Over the last ten years those figures have been steadily creeping up again, to nearly 1300 in the 1990–91 academic year. This time around, however, the increase has been primarily due to an influx of foreign grad students.

One area that needs to be addressed, Schwartz says, is "the role that the producers—the physics departments—play in the problem. There's no negative feedback if you overproduce." He suggests, only half in jest, that every new PhD who cannot find a job within two or three months should move in with his or her adviser. "After a while the professor might start to wonder 'Where'd all these people come from?'" With such a feedback mechanism, the needs of the consumers—the employers—would in effect set the number of people who study physics.

Assessing the job market

When he founded the network, Aylesworth said an accurate determination of the demand for scientists needed to be made. That still hasn't happened, he says. "We have to do a better job of assessing the current employment situation."

The American Institute of Physics, through its Education and Employment Statistics Division, keeps track of the annual output of bachelors, masters and PhDs in physics, as well as the efforts of recent graduates



Gene Nelson

entering the labor market.

"The tight job market has hit the younger scientists the hardest," says Roman Czujko, head of the statistics division. What the most recent AIP surveys have found is that among those who graduated in 1991, 14% of the employment-minded bachelor's degree recipients and 3% of the new PhDs had not found work six months after graduation. In 1980, by contrast, only 4% of the bachelors and 1% of PhDs were unemployed six months after graduating. From 1980 to 1991, there was a doubling—from 10% to 22%—in the proportion of new physics bachelors who had received no job offers when they graduated.

A soon-to-be-released survey on the physics workforce in academia indicates that the near-term job market will remain tight. In 1992 there were 440 openings reported in US physics departments; only about half of those were in PhD-producing institutions. Furthermore, some of the vacancies were intentionally left unfilled, while others were filled by professors from other schools or physicists leaving industrial or government labs.

Also a factor, Czujko points out, is that US physicists are competing for research jobs not just among themselves but rather within an international labor pool. In fact, one out of every six assistant professors hired by PhD-granting departments during the 1980s had been educated abroad, mostly in western Europe. And since 1990, over 50 physicists from the former Soviet Union received faculty positions in PhD-granting departments, amounting to nearly 10% of the total new hires.

"At least among PhDs, the problem is not unemployment but underemployment," Czujko says. His division has now modified survey question-

naires to enable them to collect data on underemployment.

Recently network members have been urging Congressman George E. Brown Jr., a Democrat from California and the chair of the House Space, Science and Technology Committee, to call a hearing on the employment problem among US scientists and engineers.

In the meantime, some scientific societies have taken steps to aid their younger members. In October the American Physical Society held a two-day career workshop at Fermilab, during which participants received counseling on career options and coaching in job search techniques, such as networking, interviewing and writing resumes. A second workshop took place at the University of Texas, Austin, in January. Encouraged by the generally positive response to these workshops, in February the APS executive board authorized support for up to eight more. In addition, APS has been helping individual physics departments, including those at MIT and New York University, to organize their own career development programs.

The AIP Career Planning and Placement Division has also held counseling seminars and job-placement centers at meetings of some of the AIP member societies.

College physics departments need to make a special effort to prepare their undergraduate and graduate students for the job market, Schwartz says. "There are signs that very few students and faculty members are aware of the data on the current demand for physicists. These should be openly discussed."

An expensive enterprise

As one of the network's editors, Gene Nelson keeps track of government and news reports and any other information relevant to the employment of scientists, which he then summarizes in regular postings in the YSN newsletter. A PhD biophysicist, Nelson's own experiences in the job market are perhaps not atypical of many of the scientists of his generation.

While finishing up his doctorate at the State University of New York, Buffalo, Nelson went to work in the advanced research department at Technicon, a manufacturer of clinical diagnostics instrumentation, based in Tarrytown, New York. After he had been there close to two years, Nelson says, the company quite suddenly terminated half of the 60 positions in his department. "Unfortunately, I was in the wrong half."

After an intense three-month

search, Nelson landed a job doing similar work for a small company in New Jersey. That lasted all of seven months. He then moved to Oberlin, Ohio, to join Ciba-Corning, where he did product development work. Four years later, his department was restructured and Nelson once again found himself without a job. He tried to start up his own company, developing pen-based computers for biomedical applications, but found financial backing extremely hard to come by.

These days, Nelson and his wife, who is completing a PhD in biochemistry at the University of Akron, are part-time instructors at a local community college. With help from their families and occasional income from consulting work, they somehow manage to support two young daughters on a weekly \$300 paycheck.

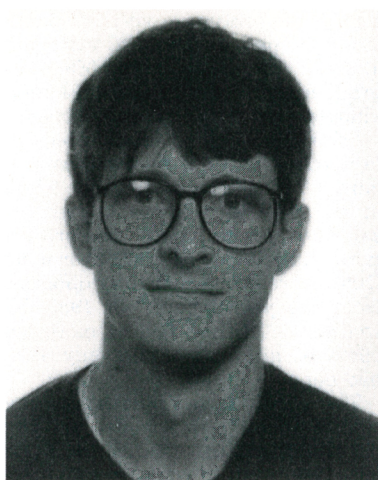
"Science is an expensive enterprise," says Nelson. He believes corporations and universities perpetuate the current system because "they clearly derive substantial benefit from having a low-cost source of labor" to carry out research. What is needed, he says, is for the Federal government to significantly boost R&D funding.

Addressing the 'Myth'

There is little doubt that the young scientists will eventually find work, although maybe not what they had wanted. The question they are asking is, after spending eight or ten years traveling through the proverbial science pipeline, did they have a right to expect a certain kind of job when they emerged? It all goes back to what is referred to on the network as the "Myth": the prediction of a looming shortage of scientists.

In April 1992 a Congressional hearing looked into one of the sources of the myth, namely a 1987 National Science Foundation study prepared by Peter House. The study examined possible changes in the supply of scientists and engineers, but did not consider changes in demand. Given the declining number of college-age students, House concluded that the US would face a cumulative shortfall of some 675 000 scientists and engineers over the next two decades. He arrived at that figure by comparing the likely drop in the number of science and engineering graduates to the number that would have been produced had the record-high production rate of the mid-1980s continued.

Although the final version of the report was never officially released, the hearing found that various drafts had been circulated within NSF and were distributed to members of Con-



John D. Sahr

gress and the press. Data from the study were publicly cited by Erich Bloch, then director of NSF, and others. Somewhere along the way, the study's "shortfall" became amplified into a "looming shortage."

According to Edith Holleman, who was counsel for the House science committee's subcommittee on investigations and oversight, which conducted the hearing, letters and data from YSN members provided useful background, and Aylesworth testified during the one-day hearing. Holleman praises the network's outspokenness. "I think their practice of confronting the older scientific establishment, those who talk about a shortage of scientists, is really valuable," she told PHYSICS TODAY. "We can't keep giving the message to high school students that people are going to be dying to hire them if they study science."

Life on the network—and off

In January 1992 Aylesworth handed over day-to-day administration of the network to John D. Sahr, an assistant professor of electrical engineering at the University of Washington.

When Sahr first joined the network in 1990, he was a postdoc at Cornell University. One of the lucky ones, he did manage to land a tenure-track position, beating out a field of 480 other applicants. "Some of my friends and family are under the impression that I must have been more talented than the others," Sahr says. "But the way I see it, there were any number of qualified people for the job. The very circumstances of my getting this position are indicative of the problem."

Although the network was begun by a physicist and drew most of its early members from the physics community, it has since grown to em-

brace scientists from other disciplines, as well as engineers. And while most members are either recent graduates or students, not everyone is young. In a recent posting, the director of a research facility in Illinois described himself as "not as young and fairly comfortably situated." Even so, he said, keeping his job "may soon depend on the restoration of Federal funding for scientific instrumentation."

Like many other electronic discussion groups available on the Internet, the Young Scientists' Network carries an ongoing discourse on matters relating to the scientific enterprise. An opinion may be voiced on, say, affirmative action; rebuttals then follow, points are clarified and the discussion moves on.

There are also the more mundane inquiries about jobs, where they are and how to get them. Occasional messages will list openings that members have heard of either directly or secondhand.

One day in late March Gabriella Turek, a PhD candidate studying acoustics at Georgia Tech, posted a message asking for leads on jobs at the national labs. When she checked the network a week later, she was "pleasantly surprised" to find a handful of detailed replies, offering names, phone numbers and tips on job hunting. "Good luck!" was the typical closing.

In a phone interview with PHYSICS TODAY, Turek said she took her first stab at job hunting last year, sending out letters to any labs that she thought would be likely to hire an acoustics researcher. "I didn't even get a response from most of the places." The most promising lead was with a small company in the San Francisco Bay area, which she visited at her own expense. "They're not even looking for people," Turek says, "but they think they may have an opening in the future."

Now that she expects to complete her PhD in August, Turek says she is "going all out." In addition to joining the Young Scientists' Network, she also monitors several electronic news groups, and she attends meetings of the Acoustical Society of America, the Society of Industrial and Applied Mathematicians and other professional organizations.

"People are always telling me 'Oh, you're a woman so you'll have no trouble finding a job,'" Turek observes. "But I'm not seeing that. When things are bad, they're bad for everyone."

As for Aylesworth, since starting the network he has met with Walter

Massey, the former head of NSF, and D. Allan Bromley, the Presidential science adviser under George Bush; he has organized sessions at physics meetings and has been interviewed by newspapers, magazines and radio programs. But Aylesworth is no longer active in physics research. Last year he began working as a technical assistant and paralegal for Kenneth Chesebro, a lawyer based in Cambridge, Massachusetts, who is also a childhood acquaintance.

"I feel pretty happy about my current situation," Aylesworth says, adding that eventually he'd like to get into science policy. Neither a militant nor a radical, he readily admits that the network would never have come to be had the job market been kinder. "In a perfect world," he says, "there would be enough funding to do what we [scientists] want to do. And I would still be in research."

—JEAN KUMAGAI

RECESSION EFFECTS SEEN IN AIP SURVEY OF COLLEGE GRADS

The latest survey of recipients of bachelor's degrees in physics registered little change from the immediately previous years, evidence apparently of the stubborn recession affecting the whole economy. The survey covered individuals who graduated from college in 1991–92 and was carried out by the Education and Employment Statistics Division of the American Institute of Physics.

The survey report identifies stagnant salary levels and diminished job opportunities as characteristic symptoms of the overall situation. For the third year in a row, the median monthly salary obtained by those bachelors who chose to take full-time jobs was exactly \$2085. Women working in the manufacture of technical products earned the highest monthly median salary, \$2890, but the median salary for all women was about \$50 lower than that for men.

Of the 1991–92 graduates, less than one-fifth took full-time employment, while 38% chose to pursue graduate studies in physics or astronomy and 21% opted for graduate study in other fields. The high proportion continuing with graduate study—59% in 1991–92 versus 50% in 1984–85—is in itself symptomatic of poor economic prospects in the view of Susanne D. Ellis, the AIP staffer principally responsible for the survey and survey report.

Women were disproportionately

likely to continue with graduate study in physics and astronomy in 1991–92. They constituted 18% of the graduating class, and 44% (194 individuals) planned on graduate study.

Of all the employment-oriented college graduates in physics and astronomy, 11% had two or more job offers at the time of graduation, just the same as the year before. The proportions with one job offer (69%) or none (20%) were not significantly different from the year before. In 1980, by contrast, 40% had two or more job offers at graduation and only 10% had none.

The survey report highlights some striking long-term trends. Of the physics bachelors taking full-time jobs, 20% went to work for manufacturing companies in 1991–92, compared to 40% in 1980–81. The proportion going into the military increased during the same period from 21% to 29%, and the share going into high school teaching went from 2% to 11%—good news in terms of the outlook for improved precollege science instruction. (Better to have a physics bachelor teaching physics than a football coach!)

Of the 1991–92 bachelors, 62% had taken general physics in high school, 23% advanced placement physics. The proportion with no physics upon entering college dropped to 9% from a record-high 13% in 1989.

Compared to the physics college graduates, astronomy bachelors were more likely to be women and less likely to be members of ethnic minorities.

The report on the 1991–92 survey of physics and astronomy bachelor's degree recipients is available from the Education and Employment Statistics Division, AIP, 335 East 45th Street, New York NY 10017.

AIP HISTORY CENTER RECEIVES GIFTS FROM SEGRE, FORD FAMILIES

The Center for History of Physics of the American Institute of Physics recently received two substantial gifts: a donation from Rosa Segrè, the widow of Emilio Segrè, for upgrading the center's photograph collection; and an unrestricted bequest from the late Clinton B. Ford. The gifts will significantly enhance the center's efforts to preserve and make known the history of modern physics and allied sciences.

The history center's collection of photographs and other audiovisual materials has been renamed the Emilio Segrè Visual Archives. In addition

to doing experimental research in nuclear and high-energy physics and writing books on physics history (see Segrè's obituary, *PHYSICS TODAY*, October 1990, page 122), Segrè was an avid photographer and often illustrated his books with his own pictures of colleagues.

The Segrè gift of about \$70 000 will help assure the long-term preservation of photographs and other materials, which frequently are used by historians, textbook publishers, and makers of film and television educational productions. The center is separating negatives from associated prints and duplicating about 2000 of the most valuable photographs—roughly one-tenth of the entire collection—so that the originals can be placed in cold storage at a separate location.

Later the center will put endangered films on videotape, publish a brochure describing the collection and seek out additional images of scientists. AIP has segregated \$13 000 as an endowment for the collection.

The Ford bequest of \$200 000 has been deposited in a new fund, the Clinton B. Ford Endowment. Ford, an amateur astronomer widely known for his work on variable stars, was a lifelong member of the American Association of Variable Star Observers and a fellow of the American Astronomical Society.

The first project funded from the Ford bequest involves locating correspondence and unpublished papers related to the history of astronomy in archives around the world. The information is being indexed and entered on the center's computer-based International Catalog of Sources for the History of Physics and Allied Sciences.

In addition to the Segrè and Ford gifts, the history center has seen a substantial increase in its endowment thanks to donations from hundreds of individuals. During the past five years these "Friends of the Center" have donated about \$170 000 more than in the previous five-year period; a challenge grant from the National Endowment for the Humanities matched these funds with an additional dollar for every three dollars given by friends. As a result, the center's endowment funds now total nearly a million dollars. The income is currently being used to make grants-in-aid to scholars who visit the center's Niels Bohr Library or who conduct oral history interviews that will be deposited there, and to support preparation of a guide to the library's collections. ■