

Minutes of FPS Executive Committee: April 30, 2000

The annual FPS Executive Committee (ExCom) meeting took place on Sunday, April 30, 7:45-am to 11 am, in conjunction with the APS Annual Meeting in Long Beach. Members present were: Peter Zimmerman, outgoing Chair; Aviva Brecher, incoming Chair; Bo Hammer, Chair-elect and Program Chair for 2001; Laurie Fathe, Vice-Chair (who will also serve as Fellowship Chair); Ed Gerjuoy, the incoming Forum Councillor, who had just ended 2 days of APS Council Meetings; Carroll Quarles. For brief periods we linked to Al Saperstein via the phone, and were joined by Tom McIlrath, APS treasurer, who shared his insights and experience regarding a transition to web-based publication of P&S. The issues discussed followed Peter's agenda, but they will be listed below in order of decreasing importance:

1. Secretary-Treasurer's Report from Michael Sobel: The budget report had been previously provided by Mike Sobel. It showed that out of an annual revenue total of \$15,760 in FY00, the Newsletter publication cost \$15,221, and misc. conference and award cost another \$1600, so the FPS operated with a deficit of over \$1K. This crisis brought home the issue that FPS has been operating on the margin, with no discretionary funds to sponsor studies, invite speakers, or defray an occasional dinner. The endowments for the 2 FPS Awards are entirely managed by the APS, and even the interest is not controlled by us. Options for decreasing FPS newsletter issues per year (from 4 to 3), the hard copy mailings (from 4 to 2 per year), and marginal mailing costs by reducing the size (\$ of pp) were offered via e-mail by ExCom members in advance.
2. New business: Councillor's report. The good news from Ed Gerjuoy, our new Council representative, were that the APS Council approved an increase of 50 cents per unit member, up to \$4.50. For a FY00 FPS membership total of 4,596, or 10.77% of the APS total of 42,662 members, this amounts to an extra income for the formula allocation of about \$2.5 K for FY01. Other budget cuts were discussed per 3. below.
3. Changes in P&S Publication Policy: savings from web publishing: The ExCom weighed several options for further savings from changes in the number or size of P&S issues published and mailed per year. At \$4K/paper issue mailed, publishing 4 issues on the web (see discussion of pros and cons below) but mailing out only 2/yr would save us another \$8K. One option is to continue to mail hard copy to libraries and institutional subscribers (about 400 cc for libraries as cheap Kinko copies), and to mail out to the membership (4000 strong) only 2 x 20pp paper issues per year (including the Jan ballot and the July issue). In this July issue we announce this new policy as a "Transition to electronic publishing of P&S". We'll send a quarterly e-mail to FPS alerting them to a newly posted P&S issue and include the Table of Contents and the hotlinks, to facilitate browsing. Al Saperstein joined in by telecom for part of this debate and agreed that web publishing makes for more timely issues (all we have to do is tag "NEW" items). We can also routinely request all FPS session invited speakers to submit their overheads as .ppt files and post them sooner, while requesting a text version for P&S. Tom McIlrath stressed the advantages of web publishing for APS journals, and C. Quarles

concurred: no limit on # of pages, more timely posting, hotlinks to references or related URL's, more visual presentations, easier browsing and searching by topic, etc. The APS moved to 3 tiers of subscription cost, proportional to size and means. The FPS obviously can't implement this.

4. Chair's Report: Peter Zimmerman's report welcomed the newly elected members and thanked outgoing ones for their contributions. He stressed the need to renew FPS studies and take on "projects" (like arms control analyses, or pseudoscience debunking case studies by students and physicists), for which we need some discretionary funding. Hence he and Aviva participated in the Units Convocation and pushed for changes in formula allocation. The approved increase (from \$4 to 4.5 per member) should strengthen the FPS budget for the coming year, especially when combined with savings from P&S web publishing. He discussed this year's problems with the timing of nominations for ExCom, which delayed the election. We must complete FPS Fellows nominations in May (Laurie Fathe, the Vice-Chair responsible, is to send packages to Ken Cole by June 15); Forum Awards nominees by July (to Tony Nero, the Chair); and the Nom Com cycle to be done before Nov for the Jan ballots. The timetables and people in charge should be posted on the web. Peter pointed out the problem that other fora have diluted the originally broad scope of FPS; education now in FEd, other issues on secrecy and security are now addressed by FIP; and FIAP took over some technology and policy issues. Peter will act as NomCom ex-officio. The ExCom roster on the web and in the e-mailer, as well as the expanded Friends of FPS e-mailer must be updated (by AI?).

5. Webpage report (Aviva for Marc Sher) and Questionnaire (Aviva Brecher) Marc has greatly improved the FPS page timeliness and completeness. We introduced electronic balloting and automated its analysis, and also posted the membership Questionnaire on the web. We need volunteers to analyze the responses! (Reminders to respond will be sent out in all e-mails to members). NB: Since the meeting ended, exchanges by Marc and Aviva with Joan Fincham, the APS webmaster explored how the FPS website could be hosted and serviced by the APS (a separate URL was also considered). The URL will be **aps.org/units/fps** rather than the complicated URL we have now on a Williams & Mary server. An attractive, consistent APS "look and feel" will be selected.

6. Program Chair Report (Aviva): When Priscilla Auchincloss stepped down as Chair elect (and program Chair for 2000) in May, Aviva was bumped up and - with strong cooperation from ExCom session organizers - coordinated a strong FPS showing. The March and April sessions were publicized in advance via APS e-mail to the membership: 2 very successful sessions in March (Ed's well attended Physics and the Law, and Bob Park's Voodoo Science featuring 4 published authors, which packed a ballroom!). Two more sessions in March were co-sponsored: Civics 101 with FEd and the Nicholson Awards with CSWP. The 4 invited sessions in April were well organized, but rather sparsely attended given the small turnout in Long Beach (except the Physicist-writers session which was packed, and I offer to serialize by public demand!) The incoming 2001 Program Chair is Bo Hammer, who has already proposed and solicited ideas for invited sessions: the March meeting in Seattle and the April meeting

in DC will both have better turnouts and should each have 3-4 FPS sessions. (Unless we get volunteer organizers/chairs, we'll have to assign topics...We should also approach FEd and FIAP to co-sponsor sessions.) We got good publicity this year, both as oral plug-ins and Aviva's redesigned FPS fliers placed on grab tables, but we should check how many members joined in March and April to assess "success".(NB: We should continue to have an FPS room set aside for about 150 people, and try to cluster our sessions near the middle of the conference, while avoiding competition.) New business included a look ahead by Peter, who suggested using the discretionary funds for some timely NMD or Energy study (he decried his conflict of interest constraints). A financially stronger FPS in the coming year and an energetic leadership promises further membership growth, visible and relevant sessions and a more active profile in the APS.

New Bills to Improve Science Education

One of the two physicists in Congress, Vern Ehlers (R-MI), introduced three bills that will help improve the recruitment, preparation and retention of good science and math teachers. The bills target three different aspects of federal involvement in science education. The National Science Education Act (NSEA) focuses on improving and expanding the activities of the NSF. It authorizes the NSF to give grants to public and private schools to hire "Master Teachers" to provide support to K-8 teachers, creates a national scholarship to reward teacher participation in research, requires information on NSF-sponsored programs to be posted on the NSF web site, provides access to technology training to middle school teachers, creates a competition for high school and college students to develop educational software and encourages information technology development in poorer schools. The National Science Education Enhancement Act (NSEEA) focuses on Department of Education activities. It gives college students work-study credits for training K-12 teachers in technology, creates after-school science day care programs, authorizes peer-reviewed quality summer professional development institutes and provides additional teacher training. The National Science Education Incentive Act (NSEIA) provides tax credits for college tuition, "Externships" for practical research experience for science teachers, establishes a tax credit for companies to let teachers participate in training workshops and for contributions to K-12 instruction and for equipment donations. More details can be found at fyi: <http://www.aip.org/enews/fyi/2000/fyi00.041.cfm>

Congressional Interest in Nanotechnology

Nanotechnology has been getting a lot of attention in Congress and the Administration recently. One of President Clinton's major priorities in his FY2001 budget is the "National Nanotechnology Initiative", with a \$227 million increase for such research. According to the Clinton budget request, "The essence of nanotechnology is the ability to work at the molecular level, atom by atom, to create large structures with fundamentally new molecular organization....control of matter at molecular levels means tailoring the fundamental properties, phenomena and processes exactly at the scale where the basic properties are determined. Therefore, by determining the novel

properties of materials and systems at this scale, nanotechnology could impact the production of virtually every human-made object and lead to the invention of objects yet to be imagined. Nanotechnology's impact...is expected to be at least as significant as the combined influences in this century of antibiotics, the integrated circuit and human-made polymers". The additional funds would be spread across many R&D agencies, including the NSF, DOE, NASA, Commerce and NIH, with most of the increase going to the NSF. 70% of the money will go towards university-based research. Congressional response so far has been supportive of this investment. Senator Evan Bayh (D-IN) noted that "innovation is the key to our comparative advantage in the global economy, yet federal investment in the physical sciences...are all declining, as are the number of college and advanced degrees in these areas...It is vitally important that we increase our investment in the physical sciences, including nanotechnology...". Whether congressional appropriators have sufficient funds to support this request, of course, remains to be seen. The Administration's nanotechnology initiative can be found at <http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/html/iwgn/iwgn.fy01bud.suppl.toc.cfm>

National Missile Defense

A critical decision is nearing on the deployment of a National Missile Defense. This fall, President Clinton is to make a decision on whether to deploy the initial phase of the NMD system. This would involve deploying 100 ground-based interceptors in Alaska, with the intent of defending all 50 states from a few warheads launched by a "rogue" state, such as North Korea, Iran, Iraq, or Libya. It would directly violate the Anti-Ballistic Missile Treaty. Negotiations are currently underway with the Russians to amend the treaty, but many in Congress and the Administration have argued for going ahead with deployment even if such negotiations fail. The Russians have said that such a deployment would not only abrogate the ABM treaty, but made their recent ratification of START-2 dependent on US adherence to the ABM treaty. The decision is scheduled for October, although many senators (including both supporter

In the mid-80's, after President Reagan proposed the Strategic Defense Initiative, the nation's physicists, and the American Physical Society in particular, played a major role in evaluating the technical feasibility of the SDI. The vast majority of American physicists believed that the "umbrella" envisioned by President Reagan was technologically impossible, and the APS's Directed Energy Weapons Study played a major role in the Pentagon's 1988 decision to scale the program back substantially. However, many physicists have also believed that a defense against a few ballistic missiles, although it may not be wise, is technologically feasible.

Several recent reports, however, have cast doubt on the feasibility. Should the rogue states take no action to improve their missiles, then the currently designed NMD system could be effective against a small scale launch. However, there is grave concern that very simple countermeasures, which would be readily available to any state sophisticated enough to possess ICBMs, could overcome the NMD system. For example, if, just after reaching a ballistic trajectory, the missile deploys a large number of mylar balloons, and also surrounds itself with a large balloon, then the NMD will be

unable to distinguish them until reentry. Other countermeasures may also be available (see the next news item).

At its April meeting, the APS Council passed the following statement:

STATEMENT ON NATIONAL MISSILE DEFENSE SYSTEM TECHNICAL FEASIBILITY AND DEPLOYMENT (Adopted by the Council, 29 April 2000) The United States should not make a deployment decision relative to the planned National Missile Defense (NMD) system unless that system is shown -- through analysis and through intercept tests -- to be effective against the types of offensive countermeasures that an attacker could reasonably be expected to deploy with its long-range missiles. The planned NMD system is intended to defend US territory against tens of long-range ballistic missiles carrying biological, chemical or nuclear weapons. The ability of the NMD system to deal with countermeasures is a key factor in determining whether the system will be able to defend against the threats it is intended to meet. A decision on whether or not to deploy the NMD is scheduled for the next few months. The tests that have been conducted or are planned for the period fall far short of those required to provide confidence in the "technical feasibility" called for in last year's NMD deployment legislation. This statement implies no APS position with respect to the wisdom of national missile defense deployment and concerns itself solely with its technical viability.

References: National Intelligence Council, "National Intelligence Estimate (NIE): Foreign Missile Development and the Ballistic Missile Threat to the United States Through 2015," unclassified summary, September 1999, p. 16. Available at: <http://www.cia.gov/cia/publications/nie/nie99msl.html>

"Director of Operational Test and Evaluation, FY 1999 Annual Report," submitted to Congress February 2000, p. VI-13. Available at: <http://www.dote.osd.mil/reports/FY99/index.html>

Countermeasures

In April, a study group of eleven physicists, chaired by former APS President Andrew Sessler, released its report entitled *Countermeasures: A Technical Evaluation of the Operational Effectiveness of the Planned US National Missile Defense System*. The report is available at <http://www.ucsusa.org>. Among their overall findings and recommendations: Any country capable of deploying a long-range missile would also be able to deploy countermeasures that would defeat the planned NMD system. Biological or chemical weapons can be divided into many small warheads called "submunitions". Such submunitions, released shortly after boost phase, would overwhelm the planned defense. Moreover, there are no technical barriers to their deployment or use.....An attacker using nuclear weapons could also defeat the planned system. An attacker could overwhelm the system using "anti-simulation balloon decoys", that is, by deploying its nuclear weapons inside balloons and releasing numerous empty balloons along with them. Or an attacker could cover its nuclear warheads with cooled shrouds, which would prevent the kill vehicles from detecting

and therefor from homing on the warhead. Thus, we find that the planned NMD system would not be effective against the limited long-range missile threats it is intended to defend against, whether from Russia, China or emerging missile states. The upcoming deployment decision will be made on the wrong technical criteria. The Pentagon will asses the technical readiness of the system prior to the presidential deployment decision. However, this assessment will consider only whether the first phase of the system would be effective against a threat with no credible countermeasures; it will not consider whether the full system would be effective against a threat with realistic countermeasures. The US cannot reasonably exclude the issue of countermeasures from a decision to deploy the first phase of the system. A deployment decision should be postponed until the system has been tested success fully against realistic countermeasures such as those described in this report. The US should demonstrate, first by analysis and then in intercept tests, that the planned defense would be effective against realistic countermeasures such as those we examine in this study. This should be done before the commitment to deploy even the first phase of a planned NMD system. The report is clearly in accord with the above APS statement (although the statement was made without reference to the report). It should be pointed out that the countermeasures discussed in the report are just examples. There is concern about the feasibility of the "liquid shroud" countermeasure, for example. In addition, the "submunitions" countermeasure on missiles with biological and chemical weapons is very well known in the arms control community. However, the question of why any rogue state that wished to deliver biological weapons to American soil would use ballistic missiles is unclear. Such a state could much more easily deliver the weapons via Federal Express or a commercial airline (biological weapons are easily transportable and not made of metal). A test of the NMD system (on a projectile without countermeasures) was scheduled for June but in mid-May it was announced that the test has been postponed due to wiring problems in the interceptors.

Rep. Rush Holt on Science Policy

The second physicist in Congress, Rep. Rush Holt was a guest on National Public Radio's "Talk of the Nation: Science Friday" (<http://www.sciencefriday.com>) late last year. Selections (made by AIP, fyi@aip.org) from his interview with Ira Flatow follow. The entire interview can be heard at the Science Friday web site.

THE RELATIONSHIP BETWEEN CONGRESS, SCIENTISTS, AND FACTS:

"The way facts are treated is indeed different. Scientists would help themselves and help society, actually, if they explained to the public that facts are not cut-and-dry and immutable. Even scientists are dealing with provisional understandings of how things work..... I think, obviously, you don't want the arrogance of science saying that we have all the answers. But, by the same token, we do need to educate the public that there are some things that are well-understood, and if they are going to be challenged, than the standard of the challenge is pretty high."

HOW CONGRESS VIEWS SCIENTISTS:

"I think that most Members of Congress think of scientists as another interest group. Perhaps smarter lobbyists...the science lobby. They are coming in asking for more research and development money...more instruments, better telescopes..... I think there is a general sense, as there is in society at large, that scientists are pretty smart people. And so maybe this interest group gets a little more hearing than some other interest group. But I think that is partly how Members of Congress look at scientists. So we have the challenge, scientists have the challenge, and I as both a scientist and a legislator, have the challenge to help everyone understand...what is so special about science."

BALANCING FEDERAL SUPPORT BETWEEN NIH AND OTHER BUDGETS:

"We could hope that there would be a little more balance in the portfolio so that physical sciences and others would have more of an increase. [Holt was then asked about lobbying.] NIH and the health industry in general are very effective at lobbying because for one thing, you can bring it home. You can relate this to the legislator's husband or wife or kids or grandparents or aunts or uncles. And it's hard to vote against health."

CONGRESSIONAL ACTION ON SCIENCE AND MATH EDUCATION:

"I am particularly pleased that we able to include some money, a small increase, for training of teachers who will be teaching science and math. This would include elementary school teachers; we make enormous demands of elementary school teachers and we need to help them in the teaching of science and math. I think that is particularly important." [Holt then discussed the reauthorization of the Elementary and Secondary Education Act.] "We have been able to emphasize science in several parts of it. In seeing that states not only have standards for science, but they actually test in the area of science as they do in reading and math, to find out if students are meeting those standards. Let me come back to the training. I think that it is particularly important that we provide funding for that. Because in education we devote a small fraction of a percent to training of teachers. Whereas in most industries, companies will spend five, ten, even twenty percent, training their workers in their areas, ongoing training. So we should be doing that in our education as well."

RELATIONSHIP OF SCIENCE TO THE PUBLIC AND CONGRESS:

"Science seems somewhat remote to most people.... Remember the House of Representatives is nothing if not representative. And generally speaking, the representatives are very smart, very good at what they do. But they represent the hopes and fears and general understanding of the public in general. So I think, again, that science is seen as something of an interest group. And what we would like to do is help people understand that science not only can improve the thinking of individuals, the citizenship of individuals...but will contribute to our economic growth. That investment in science really makes this a better country. One of the things that I am pleased to be working on is a bill calling for the doubling of the federal investment in research and

development. One of the reasons is that it is through federally funded research and development that we train our future scientists."

PROBLEMS REQUIRING A LONG-TERM APPROACH:

"Our political system generally struggles to deal with things that require a long-term perspective."

ALLOCATING FEDERAL RESOURCES TO DEAL WITH SOCIETAL PROBLEMS:

"Scientists do not have the ultimate answers. Science can put a limit on what is possible. Science can't balance school lunches v. transportation projects v. defense projects. That depends on the values of societies. We certainly need to enhance the values of society that are based on human welfare. ...let me go back to research and development. This is not some esoteric concern. It really makes a difference for people.... It is research and development that gives us the new ideas to allow for the productivity growth that will allow us to meet the material human needs.... Research is critically important for that."

Long-Awaited Commission Report on Women in Science and Engineering

Two years ago, Rep. Constance Morella (R-MD) introduced legislation called the "Advancement of Women in Science, Engineering and Technology Development Act" to establish a commission to study the factors which have contributed to the relative lack of women in science and engineering, and to issue findings and recommendations to improve practices related to recruiting, retaining and advancing women scientists and engineers. The legislation was passed and signed into law in the fall of 1998. After over a year of hearings, the Commission is preparing its final report. It should be available by the end of July at <http://www.nsf.gov/od/cawmset>