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History of the Forum on Physics and Society

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Physics is a major component of many of society's difficult issues: nuclear arms and their proliferation, energy shortages and energy impacts, climate change and technical innovation. Because physics principles underlie so many of these societal issues and because physics offers a way to quantify some aspects of them, members of the American Physical Society (APS) should be encouraged to understand, analyze and debate them. That's precisely why APS members formed the Forum on Physics and Society (FPS). To those of us who have been long involved in FPS affairs, it seems but yesterday that we attended the organizing meeting at the 1972 APS San Francisco meeting. As the APS celebrates its centennial by looking back over its first hundred years, it is fitting that FPS also look back at its own accomplishments and look ahead at the direction of its future activities.

The Early Years

The FPS was born in the tumultuous 1960's and 70's. The issues of that era---the Vietnam War, the debate over the Anti-Ballistic Missile system, the energy crisis, the start of the environmental movement, the civil/human rights revolution---impelled that generation of physicists to consider their professional responsibilities. Many felt that the APS should have a division or forum in which appropriate science and society issues would be debated by informed participants before the APS membership. For a review of these early days of the Forum, see the article by Mike Casper in the May 1974 issue of Physics Today.

In its 27 years, FPS had too many excellent leaders to mention each by name. But I would like to describe briefly the four "founding fathers" pictured in Casper's article: Earl Callen (American University), Martin Perl (SLAC) , Mike Casper (Carleton College) and Brian Schwartz (then MIT, now CUNY). Callen was the founding chair of the Forum. Although his particular interest was international human rights of scientists, the major emphases of Callen's term was building membership, developing a reputation within the APS membership for quality and objectivity, and establishing an effective working relationships with the APS Council. Perl can only be described as a phenomenon. While acting as the second chair of the Forum in 1973-74, he discovered the tau meson, establishing the third family of leptons. (For this discovery he was awarded the 1995 Nobel Prize in physics, shared with Frederick Reines for the discovery of the electron's anti-neutrino). And in his spare time Perl established and edited the forum's newsletter, Physics and Society, from 1972-79 and mobilized two Penn State Conferences on graduate physics education (1974, 1977). Casper, the Forum's third chair, established the two Forum Awards. Since then he has actively worked on arms control and as a senior advisor to Senator Paul Wellstone. Schwartz, the ninth chair of the FPS, served brilliantly and creatively in the crucial job of organizing the first Forum panels at APS meetings. While he might have been regarded as a "young Turk" by the APS establishment in the 1970s, he has gone on to be an APS insider, serving as the APS Education Officer and as APS Associate Executive Secretary (1991-94). He is currently one of those charged with planning the centennial activities.

The FPS was the first APS forum. Recognizing that the forum would attract members from across disciplinary lines, the APS waived the additional dues

that are traditionally charge to members for joining a division, such as the division of biophysics or the division of condensed matter. Yet the APS still gives a certain amount based on the forum membership to help defray such costs as the printing and mailing of a newsletter. The success of that idea has induced our Society to create other fora--first the forum on history of physics (in 1980), then those on international physics (1985), on education (1991) and on industrial and applied physics (1995). Under the leadership of FPS Chair Tony Nero, a council of the APS fora was established in order to coordinate and enhance the work of all groups.

Winning respect

In its early days, the Forum was looked upon with suspicion by the APS leadership, which was concerned that the Forum would move issues too far and too fast. Because of this concern the APS council appointed a senior APS member to attend the Forum Executive Committee meetings to make sure that the Forum did not embarrass the APS. Embarrassment never happened.

I recall two examples in which the Forum was very even handed. The first concerns an amendment to the APS Constitution proposed by Robert March, which would have required the APS to "shun activities which contributed harmfully to the welfare of mankind." It was very difficult to obtain a speaker against the March amendment at an April 1972 FPS session. The first Forum Chair Earl Callen stepped forward and filled that role (in which he believed), which helped to defeat the March amendment. The second example concerns the publication of a very political cartoon by the editor of Physics and Society. That editor was warned not to run any more such one-sided cartoons, but he ignored that warning. Although in other respects, that person had been a good and tireless editor, the Forum Executive Committee was forced to adhere to the principle of objectivity and to fire him.

By now, the FPS has long since won the respect of the APS Council. They no longer appoint a representative to the Forum Executive Committee. The Forum is regarded as a source of manpower and ideas for the APS to utilize in preparing its public positions. Of the 24 chairs of the APS Panel on Public Affairs, four of these have been chairs of the FPS.

The membership of the Forum is 4500, about 11% of the APS's 40,000 membership. The vast majority of Forum members are active physics researchers and professors who are already overly committed to their professional careers. These FPS members are not actively publishing on the Forum issues of arms control, energy and environment. However, these members do want the FPS to hold debates, publish a viable Physics and Society newsletter, sponsor occasional studies, offer short courses and give awards. As in any division of the APS, the heavy lifting is carried out by the 1% of the membership who volunteer to be more heavily involved.

FPS Sessions

One of the most important activities of the FPS has been to sponsor sessions at APS meetings on topical science-and-society issues. Some FPS sessions have had more than 1,000 attendees. Over the past 27 years, the FPS has offered 197 sessions for an average of 7.3 +/- 1.7 per year. To provide more in-depth background on certain issues, the FPS has offered short courses on a number of topics. If one adds the 44 sessions from the two Penn State conferences and the five short courses, the total number of sessions rises to 241, for an average of 8.9 per year. The approximate break-out by topic of the 197 APS sessions is as follows: National security (51), science process (36), energy (26), FPS awards (25), education (20), miscellaneous (16), environment (14), contributed papers (9). Physics and Society has published many of these symposia which we briefly list below.

The goal of Forum sessions is to present both sides of an issue in a no-holds-barred debate. This is not always possible since there are occasionally heretical views that don't make sense and confuse the debate. For instance, at the spring 1986 APS meeting in Washington, DC, the Forum held a session on the Strategic Defense Initiative (SDI) and invited the representatives from the Reagan administration and from the Congressional Office of Technology Assessment, and some university professors. It never occurred to us to invite Lyndon LaRouche's Fusion Energy Foundation. However, since this group felt they should have been invited, they attempted to shut down the session. As Forum Chair at the time, it was my task to go head-to-head and threaten them with police action if they wouldn't be quiet and allow the session to continue. They did quiet down, and the details of lasers in space were quantified and debated. It is difficult to define when a position should be categorized as "unscientific;" luckily this issue doesn't come up very often.

AAPT Booklets

The American Association of Physics Teachers has often shown an interest in the FPS sessions and short courses. The AAPT published three of the FPS sessions as informative booklets for its members:

Nuclear Energy, Nuclear Weapons Proliferation and the Arms Race by Bernard Spinrad, John Holdren, Gene Rochlin and Herbert York, January 1982, 48 pages.

Nuclear Weapons and Nuclear War by Philip Morrison, Hans Bethe and Wolfgang Panofsky, April 1982, 35 pages.

Acid Rain: How Serious and What to Do by Myron Uman, George Hidy, Michael Oppenheimer and Leonard Weiss, April 1985, 47 pages.

Physics and Society

This year 1999, P&S is in its 28th year. Martin Perln was founding editor (1972-79, SLAC). He was succeeded in 1980 by the late John Dowling (1980-86, Mansfield State University). Art Hobson (University of Arkansas) was editor from 1987 to 1995. The present editor, Al Saperstein (Wayne State University) took over the job in 1995. P&S fulfills an extremely important function by informing FPS members of current topics. It is much more than a newsletter. Since there are not many journals that cover the physics aspects of these issues, P&S provides a useful outlet for physicists who have some viable data or theory to publish. It has long been a goal of the FPS to convert P&S from a "quasi-journal" to a full-fledged subscription journal. The display at the Atlanta Centenary will show the evolution of the P&S masthead and front-page. With the passage of time the contents of P&S have shifted from more general commentary to the more technical aspects of physics and public policy issues.

Many of the FPS symposia are published in P&S. Examples include: SDI (September 1986), a forum-sponsored study of land-based intercontinental ballistic missiles (July 1988), energy research (July 1989), safeguards on plutonium and highly enriched uranium (July 1990), pseudoscience (July 1990), a forum-sponsored study of energy (October 1991), powerlines and public health (January 1992), climate change (October 1992), environmental physics (July 1993), physics and law (October 1993), risk and nuclear power (July 1994), theater ballistic missiles (October 1994), legacy of radiation from cold war (July 1995), sustainable technologies (October, 1995) and linear low dose radiation (January 1997). Among the talks in these various symposia, one of my favorites is the one by James Randi (October 1989) on "Fooling Some Scientists Some of the Time." The juxtaposition of Randi's talk and the big APS debate on "cold fusion" at the 1989 Baltimore APS meeting was indeed timely. The April 1991 issue of P&S contains a nice debate between Peter Zimmerman and Art Hobson on the use of high technology conventional weapons in the Gulf War. P&S also reviews recent books and describes recent events in physics and public

policy. Over the years P&S has published a wide variety of letters on both popular and unpopular topics. Many times an editor (and the editorial board) has disagreed sharply with the contents of some of the letters to the editor, but openness has often dictated their publication as long as the view makes some logical points.

Forum Studies

Over the years the FPS has sponsored three studies which have been published by the AIP:

(1) Civil Defense: A Choice of Disasters, edited by John Dowling and Evans Harrell, 1986, 248 pages

(2) The Future of Land-Based Strategic Missiles, edited by Barbara Levi, Mark Sakitt and Art Hobson, 1989, 310 pages.

(3) The Energy Sourcebook: A Guide to Technology, Resources and Policy, edited by Ruth Howes and Anthony Fainberg, 1991, 550 pages.

Each of these studies contains the caveat: "This volume was prepared by a study group of the Forum on Physics and Society of the American Physical Society. The American Physical Society has neither reviewed nor approved this study." This disclaimer is only fair since the APS Council did not take an active role in the development of these studies. Time has eclipsed the large scale plans for civil defense structures and the evacuation of cities. If Russia ever ratifies START II, land-based missile will be confined to single warhead systems. The energy issue may have been forgotten in the press, but most FPS members think it will return in the next century. At that time, hopefully, many physicists will blow the dust from the Howes-Fainberg volume and use the timeless principles within to help solve the problem. These excellent studies have held up over the years and remain good references today.

Physics Jobs

The first "job crisis" for young PhD's took place in the early 1970s. The Forum responded by organizing two conferences at Penn State University (August 19-23, 1974 and August 1-3, 1977). Perl and Roland Good were the driving forces behind these conferences, which examined the data and possible responses by the physics academic community. Of course, there was no easy solution then, or now, to the vulnerability of young PhD's and postdocs to a tight job market, but the conference developed a number of partial solutions. The results of the first conference on "Technology Change in Physics Graduate Education" were published in the 64-page, February-1975 issue of Physics and Society. The results of the second conference on "Changing Career Opportunities for Physicists" was edited by Martin Perl and published in the AIP Conference Series (Physics Careers, Employment and Education, AIP 39, 1978, 340 pages). These studies were a precursor to the later studies by the APS Committee on Professional Concerns and the Young Scientists Network.

Congressional Science Fellows

In 1973, APS chose its first two APS Science Congressional Fellows in an AAAS program with different societies (IEEE, OSA, etc.) In 1973 Ben Cooper and Richard Werthamer were chosen as the first APS Congressional Science Fellows. Cooper served a long and distinguished career on the Senate Energy Committee, rising to the position of the majority staff director under Democratic Senator Bennett Johnston (and as a chair of FPS). Dick Werthamer served his congressional year with Republican Congressman Charles Mosher of Ohio and later served as Executive Secretary of the APS. Since then, over 95 physicists have served as Science Congressional Fellows, either as APS Fellows or as fellows from other scientific organizations. Forum members Mike Casper, Richard Scribner and Joel Primack played distinct and significant roles in the creation of the APS Congressional fellowship program which former FPS chair Scribner

directed for many years at the AAAS.

Physics Education

Over the years, the Forum has organized 20 sessions on education issues. Former FPS chairs Ruth Howes an dKen Ford took an active role in organizing the Forum on Education in 1991. The Forum on Physics Society still maintains an active interest in physics education issues, but is now in a supportive role with the Forum on Education and the APS Committee on Education.

Short Courses

In order to study physics and society issues more deeply, the Forum has organized a series of short courses, which last for 2 to 3 days. For fees that have been around $100, the participants hear some 20 hours of lectures from 15 assorted experts; later they receive copies of the proceedings. The short courses are usually timed to precede or follow APS meetings so as to attract APS members who are already in attendance at those meetings. The Forum has offered 3 short courses on arms race matters (1982 at APS San Francisco, 1983 at APS Baltimore, 1988 at George Washington University), one short course on energy (1985 at the Office of Technology Assessment), and one on climate change (1991 at Georgetown University). The results have been published in the AIP Conference Series:

Physics Technology and the Nuclear Arms Race, edited by D. Hafemeister and D. Schroeer, AIP 104, 1983, 380 pages.

Energy Sources: Conservation and Renewables, edited by D. Hafemeister, H. Kelly and B. Levi, AIP 135, 1985, 676 pages.

Nuclear Arms Technologies in the 1990s, edited by D. Schroeer and D. Hafemeister, AIP 178,1988, 480 pages.

Global Warming: Physics and Facts, edited by B. Levi, D. Hafemeister and R. Scribner, AIP 247, 1992, 326 pages.

APS (Forum) Awards

The FPS presents nominees to the APS Council for two APS awards, the Joseph A. Burton Forum Award and the Leo Szilard Award, for significant work on physics and society issues. The Burton-Forum Award "recognizes outstanding contributions to the public understanding or resolution of issues involving the interface of physics and society." The Szilard Lectureship Award "recognizes outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in such areas as environment, arms control and science policy."

The Awards were first offered by the FPS (and not the entire APS) in 1974; David Inglis received the Szilard Award and Ralph Lapp earned the Forum Award. Initially a modest honorarium of $250 was given along with a handsomely scripted scroll. The honorarium became even more modest in 1985 when the Szilard Award had to be shared among the seven (!) dominant authors of the papers on the "Nuclear Winter" calculations. The embarrassingly small stipend led the FPS Executive Board to conclude that it was better to offer no honorarium rather than an amount that would (in this case) only buy one good dinner. In desperation, the FPS then moved from monetary awards to symbolic art. Two California artists created statues whose bases are engraved with the names of the awardees. The current winners keep the statues for one year after which they pass them to the next year's winners. The statue accompanying the Szilard Award, which was created by David Smith, is a dolphin, the symbol of Szilard's novella, The Voice of the Dolphins. The Forum Award statue is an abstract spherical model of the Earth created by Crissa Hewitt.

In 1986, the two FPS Awards were promoted to awards of the entire APS, but this promotion in status came with some pressure to create a permanent

endowment for the awards. In 1997, the Forum Award was endowed with $70,000 from the Apker Award Endowment, creating an annual honorarium of $3000, plus travel expenses to the April meeting. The Forum Award was renamed the Joseph A. Burton Forum Award in honor of Joe Burton, beloved former APS Treasurer and long-time FPS supporter. In 1998, the Szilard Award received an endowment of $70,000 from the MacArthur Foundation, the Energy Foundation, the Packard Foundation, the FPS and a number of individual donors. In order to create a climate for graduate students to consider careers in physics and society, the award was changed to a lectureship, and its name was changed accordingly to the Leo Szilard Lectureship Award. Starting in 1999, the recipient will receive $1000 honorarium and travel money to present talks at an APS meeting and at universities or research laboratories.

POPA/Forum Differences

There is often confusion on the roles of the two APS entities that deal with physics and society issues. The Panel on Public Affairs (POPA) was established in 1974, two years after the Forum was established. The major distinction is that POPA is an APS committee whose members are elected by the APS Council and whose role is to advise the APS council, whereas the FPS (and other forums) is a membership organization, whose executive board is elected by the members and whose roles include publishing a newsletter and sponsoring invited sessions at APS meetings. As a membership unit, the FPS is a responsible to the FPS membership and not the Council, much as the Division of Condensed Matter Physics is responsible to the condensed matter physicists. These distinctions become blurred in the sense that all divisions and fora are responsible to the Council if the actions of the APS units run counter to the goals of the APS. POPA has sponsored studies of certain issues, after receiving outside grants to pay the expenses of experts. POPA also prepares reports by POPA members, and gives advice to the Council on a wide variety of issues. The advice from POPA generates about 3 APS resolutions and 5-10 letters for the APS leadership per year.

On the other hand, the Forum organizes sessions to raise technical issues in a public arena, publishes a quasi-journal Physics and Society, carries out Forum studies, offers short courses, and organizes the presentation of two APS Prizes Awards each year. POPA's budget is about $25,000 per year, spent mostly on travel for three meetings each year. The Forum's budget is about $20,000 per year, spent mostly on the publication of Physics and Society and travel expenses for speakers who are non-APS-members.

POPA submits proposals for APS studies to the Council for its consideration. If the Council supports the proposal, POPA assists the APS Executive Director and the Council in selecting the study participants and obtaining funds. The most famous POPA study was the 1987 Directed Energy Weapons Study. The Forum also carries out studies, with modest budgets of about $5,000, as compared to POPA studies with budgets of about $600,000. POPA has helped organize some 9 APS studies and the Forum has produced 3 studies. In recent years, POPA has found it more difficult to obtain funding for the more lengthy studies, with the result that POPA has undertaken 3 POPA "reports" written by POPA members on electromagnetic fields of powerlines, helium conservation, and energy policy.

Forum Problems and Future

There has been an interesting trend in the make-up of the Forum leadership over the years. The early Forum leaders were essentially all from academia, but this is not true today. This year, the past chair, the chair, and the chair-elect all hail from outside a university setting (Sigma Xi, the National Academy of Sciences, ACDA). However, on average about one-half of the recent Forum leadership comes from universities and the other half from non-academic institutions. This mixture is very good since the non-university scholars add significant knowledge that

professors do not have. At any rate, it is very important for the Forum to continue to present the issues and show young PhD students that there are career paths other than the academic route. Our task has been complicated by the shift of the April APS meeting from Washington, DC to other cities around the country. It is far, far easier and cheaper to organize a critical physics and society session in Washington than it is in the cities beyond the beltway. It is imperative that the Forum keep the candle of professional responsibility well lit. We cannot slip backwards to the old days when APS meetings had no sessions on physics and society issues. The FPS continues to be a way for physicists in all fields of endeavor to keep easily abreast of the technical aspects of problems facing society. At the personal level, the Forum's members have been a great source of friendship, knowledge and inspiration to me and the other members. A number of our members have moved on from forum activities to larger roles. Examples include former Executive Board members Vern Ehlers, who serves as a Republican Congressman from Michigan, and Rush Holt, who just won that position as a Democrat from New Jersey. I like to think that the Forum's examination of the critical aspects of science and society issues not only helped send them on their way, but also shaped their approach to some of the issues that they deal with today. [The Cal Poly Physics Department library maintains a repository of FPS-BAPS abstracts, P&S, FPS books, and Physics Today articles.]