

PHYSICS & SOCIETY

A Publication of *The Forum on Physics and Society* • A Forum of *The American Physical Society*

Election Statements

The ballot below will decide the next Vice-Chair, Secretary-Treasurer, Forum Councilor to the APS Executive Board and two members of the Executive Board. The 2004 ballot is earlier than the usual January time-frame because the term of the Forum Councilor begins on January 1, 2004. The primary responsibility of the Vice-Chair coordinates nominations for

Forum APS fellows, then succeeding to Chair-Elect to arrange Forum sessions at APS meetings, and then Chair to coordinate the tasks of the Forum. Please vote before September 1, 2003. This year's nominations committee consisted of Maury Goodman, David Hafemeister and Oriol Valls.

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Physics and Society is the quarterly of the Forum on Physics and Society, a division of the American Physical Society. It presents letters, commentary, book reviews and reviewed articles on the relations of physics and the physics community to government and society. It also carries news of the Forum and provides a medium for Forum members to exchange ideas. Opinions expressed are those of the authors alone and do not necessarily reflect the views of the APS or of the Forum. Contributed articles (up to 2500 words, technicalities are encouraged), letters (500 words), commentary (1000 words), reviews (1000 words) and brief news articles are welcome. Send them to the relevant editor by e-mail (preferred) or regular mail.

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FOR CHAIR ELECT

Mark Goodman

Background: Dr. Goodman is a Physical Scientist in the Office of Multilateral Nuclear Affairs at the Department of State, working on nuclear nonproliferation at State and ACDA since 1995. He manages the State Department-funded program of research and development to support the International Atomic Energy Agency in implementing safeguards to verify that states are not diverting nuclear materials or misusing nuclear facilities to produce fissile material for nuclear weapons. He also supports negotiations and policy formulation on IAEA verification of excess fissile material in the U.S. and Russia under the Plutonium Management and Disposition Agreement, and on a prospective Fissile Material Cutoff Treaty. After receiving his Ph.D. in theoretical particle physics at Princeton University in 1986, Goodman held postdoctoral research positions at the Institute for Theoretical Physics at University of California-Santa Barbara and Rutgers University. His work at Harvard's Center for Science and International Affairs formed part of a 1991 book with recommendations on U.S. nuclear weapon policy after the Cold War. As an AIP Congressional Science Fellow in 1992-93, Goodman worked for Senator Kent Conrad (D-ND) on science, technology, energy, environment, and defense issues. He contributed to reports by the Office of Technology Assessment on civilian satellite remote sensing, and the reports of the Advisory Committee on Human Radiation Experiments.

Statement: The Forum on Physics and Society provides a mechanism for APS members to learn about, exchange views on, and otherwise engage in societal issues where physics plays an important role. I would have two priorities as Vice Chair. The first is to encourage a re-examination of some of the issues the Forum has addressed in the past — such as nuclear arms control, energy and climate, international scientific cooperation, and public mistrust of science — in the light of recent events and changes in U.S. policy. I think it would be healthy to consider which conclusions we might change and which we might reaffirm. My second priority would be to consider how to strengthen the institutional mechanisms for

interaction between scientists and government, which have been under stress in recent years. I had the good fortune to work for two of the finest organizations that brought scientific and technical expertise to bear on public policy issues — the Arms Control and Disarmament Agency (which was merged into the Department of State) and the Office of Technology Assessment (which was eliminated). The unfortunate demise of these institutions has made it harder for decision makers in the Executive and Legislative Branches to obtain balanced technical advice on many important issues.

Joel Primack

Background: Dr. Primack is Professor of Physics, University of California at Santa Cruz. AB Princeton '66, PhD Stanford '70, Junior Fellow Harvard, 1970-73, UCSC 1973-present. After earlier research in particle theory, since about 1980 Primack has been working mainly in cosmology and astrophysics. He is one of the main originators and developers of the theory of cold dark matter, which has now become the standard theory of structure formation in the universe. He has also worked on galaxy formation and structure, and on the extragalactic background light and high energy gamma ray absorption. He has recently served on the DOE-NSF SAGENAP advisory committee and the Executive Committee of the APS Division of Astrophysics. He has been active in outreach activities; for example, he was a scientific advisor on the IMAX movie "Cosmic Voyage", which was made by the Smithsonian National Air and Space Museum, and he was co-organizer of the 1999 public conference "Cosmic Questions" at the Smithsonian National Museum of Natural History. He helped to create the APS Forum on Physics and Society (he was the one who first proposed calling it a "Forum") and served on the editorial committee for the FPS Newsletter. He also played major roles in creating the APS-AAAS Congressional Science and Technology Fellows Program, the APS program of summer studies on technical aspects of public policy issues, the NSF Science for Citizens program, and the AAAS Clearinghouse on Science and Human Rights. He shared with Frank von Hippel the 1977 APS Forum on Physics and Society Award, mainly for their book, *Advice*

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FORUM MATTERS

FPS Executive Committee Meeting, April 6, 2003

Called to order at 2:35 pm by Laurie Fathe, Chair for a few more hours...

Attending: Laurie Fathe, Andy Sessler, Aviva Brecher, Al Saperstein, Marc Sher, Bo Hammer, Mark Sakitt, Tony Nero, Charles Ferguson, Sherri Stephan, Ed Gerjuoy, Brendan Plapp, Andrew Post-Zwicker, Susan Ginsberg, Tom McIlarth, Judy Franz

1) Report on De-mining study funding – Sessler

Funding remains an issue, APS will not provide funding but did approve, for the first time ever, requesting funding directly from Congress.

2) Should there be separate committees for Nicholson/Szilard awards due to large overlap?

Can not simply merge the committees without APS approval. This is still an ongoing discussion.

3) Graduate student support for FPS-relevant study

Should we support funding for a graduate student? Not only for studies but invite grad student to Washington Day Congressional Visits. Invite a member of Grad student forum to be a liaison to FPS as a way to foster ties between FPS and graduate students.

4) Treasurer's Report – Post-Zwicker

As of 2/28/03 we have \$35,446.90. Since switching from 4 to 2 printed newsletters we find ourselves in the position of how best to spend our money. (approximately. \$4,000 per printed newsletter savings)

5) POPA report – Brecher

Fuel Cell report will be soon posted on POPA site and a summary will be published in P&S.

Must make sure that we use this new position on POPA to our advantage. On the other hand, we must make sure that we make clear to POPA, other APS groups, why we deserve to have representation.

6) Council Report – Gerjuoy

Issues of obtaining Visas, leaving country, returning. Of particular interest due to next March mtg. is in Montreal. APS alerted departmental Chairs, a statement concerning this was approved.

April APS Executive Board and Council meeting are now available on the APS Governance website. You can find all the APS minutes at: <http://www.aps.org/exec/minutes/>. Please note that this is a password protected site and you need to have a free member web account in order to access the minutes. Also, be reminded that these are only DRAFT minutes and have not been officially approved.

7) Newsletter – Saperstein

We need to increase our submissions to P&S from mtg. sessions. Executive Committee must also submit relevant material to P&S
We again have a News Editor, Jeff Marque.

8) Election - Fathe

We agreed to switch our elections to be the calendar year, to coincide with APS elections. Implication is that Al needs nominations by June 1. Will be in the July issue, then multiple reminders.

8) Extend the reach of invited sessions – Nero

Often discussion after session, or sessions that are mostly discussion, is the most interesting of session. Can we do a real-time electronic follow-up discussion on a list serv? Nero to follow-up.

9) APS Studies - Nero

Can we do something with our available funds? How do we match issues of interest with available resources (people, funding).

10) APS public affairs – Ginsberg for Slake

Climate change

Missile defense

Non-proliferation/nuclear testing

Groups going to Hill have made a big difference...FPS needs to do more

Need to help out with letters

11) Sessions for 2004

Interest from others already for joint sessions

March sessions were well attended. 2 in March, 4 in April is our normal allotment

Non-proliferation

Alternative careers.

Meeting adjourned at 5:25 pm.

Respectfully submitted,

Andrew Post-Zwicker, Secretary/Treasurer

Summary, For FPS Executive Committee, of APS Council Meeting 4/4/03.

This document summarizes, with what I take to be appropriate amplifications, those actions, events, discussions, etc., at the 4/4/03 APS Council meeting that are likely to be of special interest to FPS. I remind you that Council meeting Minutes are posted on the APS web page. Click on "Society Governance", and then on "Current Council and Committees". The Minutes are password protected, so you need to set up an APS web account. I am informed that the Minutes of the 4/4/03 meeting will not be posted for a week or so (as of this writing, 4/25/03); Minutes of past Council meetings are posted now. With this Introduction, here goes:

1. **Visa Issues.** The recent increased restrictions on visas, which were the subject of much discussion at the previous 11/10/02 Council meeting, again occupied considerable Council time. Irving Lerch, the very able APS Director International Affairs who is Judy's liaison to CISA and CIFS, and who is resigning at the end of this year alas, presented many facts about the new visa situation that I had not known. In particular, under recent legislation, including the 1994 Foreign Relations Security Act and the 2001 Patriot Act:

a) Consular officials can be held personally, even criminally, responsible for terrorist acts by persons entering the U.S. under visas granted by those officials if, after review following such acts, the visas are adjudged to have been granted without full compliance with regulations; and

b) The ultimate authority to issue visas now resides in the Department of Homeland Security, not the State Department.

These facts a) and b) sure make it understandable that consular officials often drag their feet on visa issuances..

2. **Visa Issues (continued).** APS is trying to get Congress to implement various measures that could alleviate the problems foreign scientists and science students are encountering in getting visas. APS also is trying to get the Administration to implement measures that will make it easier for foreign scientists with visas to get back into the U.S. after leaving for a short time, e.g., to go to a

meeting abroad or to visit with their families. Lerch stressed that in general the government regards a visa as only a one-time permission to enter the U.S. If the holder of a visa leaves the country he may have to be re-evaluated for entry all over again. Accordingly any visa holder who knows he will be leaving the country and wants to return should attempt to obtain the needed permission to re-enter before actually leaving. Subsequent to the above-described visa problems discussion, Council took the following actions:

a) Council adopted an APS “Statement on Visa Rules and Government Procedures Hampering U.S. Science and Technology”, in which the APS calls on the Administration and Congress “to implement appropriate and effective visa rules and government procedures that sustain science and technology”. After the Council meeting, however, objections were raised to some other language (not quoted above) in the Statement. In fact Myriam Sarachik, APS President this year, has appointed a special subcommittee, which I have been asked to chair, to recommend what the finally approved language of the Statement should be. If the output of this subcommittee is of special interest to FPS, then of course I will appropriately inform the FPS Exec Committee as soon as I know that output.

b) The APS March 2004 meeting will be held in Montreal. It now is far too late to bring the meeting back to the U.S. Thus Judy, Council, anybody who knows anything about how the government presently is handling visas, are and have to be very concerned about the possibility that foreign scientists and students residing here on visas will have difficulties returning if they leave the U.S. to attend the Montreal meeting. Council therefore passed a resolution stating (in part): “we strongly encourage non-U.S. citizens to personally take responsibility for assuring that they will have confirmation of permission for immediate reentry to the U.S. after the 2004 March meeting.” Council also took measures to ensure that this resolution is posted on the APS March meeting website and on the 2004 March meeting registration form.

3. Nuclear testing. The Council unanimously passed a Statement prepared by POPA (which presently is chaired by John Ahearne, a former FPS Chair), reaffirming the APS April 1997 Statement that “fully informed technical studies have concluded continued testing is not required to retain confidence in the safety and reliability of the remaining nuclear weapons in the United States stockpile.” This new Statement also urged the Congress and the Administration “to provide sufficient notification and justification for any proposed nuclear test to allow adequate time for informed and thorough analysis and public discussion.” I can’t see how we the FPS Executive Committee could have produced a better Statement on this subject than Council approved.

4. Perpetual Motion Machines. I can’t help mentioning in this Summary that Council rejected the text of a proposed APS Statement, prepared by POPA at Bob Park’s urging, and approved by the Executive Board for presentation to Council. This proposed Statement read, in its entirety: “The laws of nature forbid categorically the construction of perpetual motion machines or sources of unlimited useful energy. The American Physical Society deplores attempts to mislead and defraud the public based on systems that claim to violate these laws.” Apparently Council felt it is presumptuous for us to be certain we now know enough about nature to guarantee that perpetual motion machines cannot be constructed. To Council’s credit, however, and for Park’s peace of mind, Council finally agreed to an alternative Statement reading: “The American Physical Society deplores attempts to mislead and

defraud the public based on claims of perpetual motion machines or sources of unlimited useful energy, unsubstantiated by experimentally tested established physical principles.”

5. Report by Marty Blume, Phys Rev Editor-in-chief. In his long report on the state of APS publications, which will be summarized in the posted Council Minutes, and which I will not discuss in its entirety, Blume brought up the following subjects of special interest to FPS (in my view):

a) Guidelines for the editors and staff, for use in investigations of research misconduct, are being prepared. The most common misconduct is plagiarism.

b) Three foreign referees have notified Blume that, because of US policies, notably the war against Iraq, those referees would refuse to do any refereeing for Phys Rev. As Blume noted, three referees are a very small fraction of the number of foreign referees the Phys Rev uses; nevertheless, as Blume also noted, these notifications are evidence of the deep unease with U.S. foreign policy that many of us have discerned in our own conversations with foreign scientists. Blume then discussed the canonical letter he has constructed to respond to such referee refusals. I think this letter is so apt that I have decided to include it in this Summary despite its nontrivial length (Blume’s letter doesn’t appear in the Minutes):

“We have received your email with your decision not to review a paper for us in light of the American invasion of Iraq. We recognize that reviewing manuscripts is a voluntary activity, one that you perform as a service to the physics community, and thank you for your efforts. Given the voluntary nature of your participation we of course respect your decision to cease, and have made an indication in our data base so that no further papers will be sent to you for review until you inform us otherwise.

“We ask, however, that you consider the following, in hopes that in the not too distant future you will decide to review for us again. We regard science as an international enterprise, and we do our best to put aside political disagreements in the interest of furthering the pursuit of scientific matters. We have never used other than scientific criteria in judging the acceptability of a paper for publication, without regard to the country of origin of the author. We have done this even in cases where some of us have disagreed strongly with the policies of that country, and we will continue this practice. We believe it is essential that all parties involved make every effort to separate social and political differences from their participation in scientific research and publication. The pursuit of scientific knowledge needs to transcend such issues.”

6. Lobbying Guidelines. Council unanimously adopted a document that, as Mike Lubell made plain, in essence establishes Guidelines and Procedures for APS lobbying of Congress in support of an APS project. The Guidelines make explicit that the proposed project “should be beneficial to society at large”, and that “neither the APS nor any of its members shall be the primary beneficiary of the project.” During the discussion leading up to the adoption of these Guidelines it was remarked that the APS difficulty in finding funding for the APS de-mining study might be eased if the APS were to establish such Guidelines and Procedures, to which it could point. To my best recollection, this was the only mention of the de-mining study during this Council meeting.

7. World Year of Physics 2005. In my report to FPS summarizing the 11/10/02 Council meeting I mentioned that there is going to be an international celebration of physics in 2005. Alan Chodos, APS Associate Executive Officer, reported to Council on the developing plans for this World Year. The APS, which is the official organizing

body for the U.S., is calling its program “Einstein in the 21st century”, recollecting that 2005 is the 100th anniversary of Einstein’s marvelous 1905 year. Obviously, as I suggested in my aforementioned report, we FPS should be thinking about how we can participate in the World Year activities. In particular, the planning of FPS sessions in 2004–2005 should take this World Year of Physics 2005 project into account. In this connection I remind you that Bo Hammer, who only in April 2003 gave up his position as FPS Past Chair, is on the advisory committee for the World Year.

8. Boost Phase Missile Defense Study. Finally I inform you that in her introductory remarks to Council Judy Franz said that the already long delayed Boost Phase Missile Defense Study report still is not completed (Council originally expected to receive the report before its April 2002 meeting), but that she hoped the report would be sent to the Review Committee by the end of April 2003, in which event Council would see the report shortly thereafter. The report will become available for public release just as soon as Council accepts it, presumably by email ballot unless Council wants to delay the report’s acceptance and public release until its November meeting. I am alerting FPS to these plans because, especially in view of North Korea’s very recent (though possibly untrue) assertion that it already possesses nuclear weapons, it seems

clear FPS should plan on a session relevant to this Boost Phase report at the 2004 March and/or April meetings, even though missile defense already has been the subject of FPS sessions in 2003 (in large part on the expectation that the Boost Phase Study would have been released well before the 2003 March and April meetings).

Before closing this report I want to remind the FPS Executive Committee, as I reminded it in my last report, that the Council Committee on Committees (of which I am a member) will convene some time before the next Council meeting in order to prepare its list of recommended APS members for filling the many forthcoming vacancies on the various APS Committees. These Committees, which carry out and determine many of the Society’s policies, are listed and described in the APS Bylaws. The Committee on Committees welcomes suggested names for its recommendations. I reiterate my previous report’s urging that the FPS Executive Committee try to “propose, for the various APS Committees, possible members for these APS Committees who are aware of and sympathetic to FPS goals, and of course whose qualifications are good enough to give them a chance of being appointed or elected, as the case may be.”

Edward Gerjuoy
Forum Councillor

ARTICLES

U.S. Nuclear Posture: One Step Forward, Two Steps Back

Steve Fetter¹

I would like to comment on the direction of U.S. nuclear weapons policy. Although the Bush administration typically is secretive about such matters, quite a bit is known as a result of the leak of the Nuclear Posture Review (NPR) about a year ago.² The NPR’s recommendations mirror those found in a report published by National Institute for Public Policy just before the administration took office,³ which should not be surprising as several senior administration officials participated in the NIPP report, including Stephen Hadley (deputy national security advisor), Robert Joseph (special assistant to the president for counterproliferation), Linton Brooks (administrator of the National Nuclear Security Administration), and William Schneider (chairman of the Defense Science Board).

On the positive side, the administration stated early on that Russia should be viewed as an ally rather than as an adversary or a potential adversary, and that the U.S.–Russian nuclear relationship should be restructured accordingly. The administration supported significant reductions in nuclear forces and signed the Strategic Offensive Reductions Treaty (SORT) last May, which will reduce the number of deployed strategic warheads to 2,200 by 2012.

This treaty has some curious features, however. The limit of 2,200 warheads takes effect on December 31, 2012, which is the same day that the treaty expires. In addition, the Treaty contains no verification or transparency measures. If the two sides agree they presumably could use the procedures in the START Treaty (which is set to expire in 2009) to verify compliance with the new limits, but these procedures would have to be extended significantly. The administration has also stated that, in contrast with START, submarines in overhaul will not be counted under the limits; if we include these, the limit would be closer to 2500 strategic warheads.

A major disappointment was the refusal of the Bush administration to agree to dismantle some or all of the thousands of nuclear warheads that will be removed from deployment as a result of SORT. The United States and Russia had agreed during the Clinton administration to do this as part of START III, and the nuclear weapons laboratories had done much technical work on verifying warhead dismantling. Although the number of deployed strategic weapons will decline from about 6,000 today to 2,200 under SORT, the total number of U.S. warheads, including nonstrategic and reserve warheads, could remain as high as 10,000. The total number of Russian warheads could be as high as 20,000. Many of the reserve strategic warheads could be rapidly redeployed on ballistic missiles and bombers. Indeed, the NPR refers to this breakout potential as a “responsive force,” which could be used to more than double the size of the U.S. strategic force.

The administration has claimed that the size of the U.S. nuclear arsenal is no longer linked to the size of the Russian force; that this is a “capability-based” rather than a “threat-based” force. I confess that I have no idea what this means, but I do know that it is impossible to justify the size and posture of U.S. deployed and responsive forces except by reference to Russia, inasmuch as no other country possesses more than a few percent of U.S. holdings of nuclear warheads.

The administration also claims that it has moved beyond the SIOP—the single, integrated operational plan—and its focus on large attacks against Russia, but the NPR describes targeting policy with language that has been used for over 30 years:

“to hold at risk what opponents value, including their instruments of political control and military power, and to deny opponents their war aims. The types of targets to be held at risk for

deterrence purposes include leadership and military capabilities, particularly WMD, military command facilities and other centers of control and infrastructure that support military forces.”

In addition, the U.S. continues to maintain two-thirds of its submarines at sea and all of its intercontinental ballistic missiles (ICBMs) on alert. A fraction of the submarine-launched ballistic missiles and virtually all of the ICBMs can be launched within a few minutes of a decision to do so. The NPR makes clear that these operational practices will continue. The administration’s nuclear war plans are likely little more than a scaled-down version of the SIOP under the last Bush administration, with options for prompt counterforce attacks against Russian nuclear forces, command and control, and leadership targets.

A key feature of the Bush NPR is that it implicitly assumes that the U.S. nuclear posture is largely, if not entirely, decoupled from the nuclear policies of other states—that there is no feedback loop in which other countries react to U.S. nuclear policies. Administration officials sometimes say that they simply are doing what is in the best interests of the United States, regardless of what the leaders or citizens of other countries prefer. This sounds good, but the failure to take into account the reactions of other states is the classic “fallacy of the last move.” This has caused the Bush administration to miss key opportunities and, in some cases, to take actions that are likely to increase threats to the security of the United States over the long run.

At present, the only major threat to the security of the United States—certainly the only thing that threatens the very survival of our society—is the Russian nuclear arsenal. Yet we continue to deploy U.S. nuclear forces in ways that magnify this threat. We keep a large fraction of our forces on high alert and target them against Russia’s nuclear forces. The ability of the United States to preemptively destroy Russia’s forces is higher than it has been since the 1960s. Russia knows this. Although Russian military planners think a U.S. attack is highly unlikely, they do not ignore the possibility. Indeed, they continuously guard against the possibility of preemptive attack by maintaining a large number of ICBMs, and reportedly even submarines in port, on alert, ready to launch on warning of an attack. Thus, our daily survival relies on the integrity of Russian attack warning systems, command and control systems, and the integrity of the chain of command. The danger of this posture was revealed in 1994 when the launch of a harmless Norwegian sounding rocket triggered a Russian nuclear alert.

This is a crazy situation. Russia maintains a huge, alert, and lethal force because the United States maintains a huge, alert, and lethal force. No other potential threat could justify such a posture by either country, now or for the foreseeable future. Neither country believes that an attack by the other is plausible, aside from the fact that the other maintains a huge, alert, and lethal force. The security of both countries would be improved through reductions in alert status and other steps to reduce the counterforce capability of remaining deployed forces. Unfortunately, the discussion of dealerting in the leaked portions of the Bush NPR refers only to safeguards on U.S. nuclear forces and does not even acknowledge the coupling between U.S. and Russian postures.

The fallacy of the last move is also evident in the administration’s push for a national missile defense (NMD) system. If other countries do not react to the deployment of U.S. NMD, then the system might improve U.S. security. But other countries *will* react, likely in ways that will result in a net decrease in our security.

Deployment of a U.S. NMD system will increase pressure on Russia to be able to launch its nuclear forces on warning of an attack, to ensure that a retaliatory strike could penetrate the defense. Today, in the absence of NMD, Russia might rely in peacetime on the one or two subs it has at sea, or the dozen or so mobile missiles on patrol. But if the U.S. deploys an NMD system with a hundred or more interceptors, that would not suffice.

Deployment of a U.S. NMD system would almost certainly cause China to field a larger ICBM force than it otherwise would—perhaps much larger. Today, China relies on a dozen or so ICBMs, which are reportedly unarmed and unfueled. The force is being modernized, but at a very slow pace. Based on statements by Bush administration officials, China has good reason to believe that a US NMD will be oriented against China. For example, shortly before becoming deputy national security adviser, Stephen Hadley argued that “the United States should have no need to deploy an NMD system against China. But if China continues to insist that it is free to use force against Taiwan, continues to deploy more ballistic missiles aimed at Taiwan and the United States, and continues to threaten to use those missiles against both, then the United States may simply have no choice.”⁴

The demonstrated readiness of the Bush administration to use force and reluctance of the US to accept any limits on unilateral action will also influence Russian and Chinese nuclear planning, in ways that are unlikely to benefit the United States. But the greatest deficiency in the Bush nuclear posture, and the most glaring example of the “fallacy of last move,” is the broadening of U.S. nuclear threats to other potential adversaries, who are not armed with nuclear weapons, in situations ranging from deterring or responding to chemical and biological attacks to destroying deep underground bunkers and other tactical uses.

The Bush NPR cites the need “to develop concepts for follow-on nuclear weapons better suited to the nation’s needs,” and mentions new initiatives to attack mobile and relocatable targets; earth-penetrating warheads to destroy hard and deeply-buried targets; warheads to defeat stocks of chemical and biological agents; modifications to existing weapons to “provide additional yield flexibility,” and new warheads that reduce “collateral damage.” It calls for a “revitalized nuclear weapons complex able to design, develop, manufacture, and certify new warheads in response to new national requirements.”

The Bush administration’s analysis focuses exclusively on the potential benefits of these initiatives for US action: enhancing our nuclear capabilities will bolster our ability to deter other countries from threatening our interests; and if deterrence fails, new nuclear weapons will give the US new military options. But the deterrent value of an expanded nuclear threat is marginal. Adversaries already know that the United States is armed with nuclear weapons; they must consider the possibility that, if they hurt us badly enough, the United States would respond with nuclear weapons. At the same time, adversaries also know that the use of nuclear weapons by the United States would be widely viewed as disproportionate, and so attempts to enhance the credibility of U.S. nuclear threats are inherently limited by the stakes. In many cases the stakes simply would not be high enough to make U.S. nuclear threats credible, no matter what types of warheads are in its nuclear arsenal.

And what if deterrence fails and a country used chemical or biological weapons against U.S. troops or U.S. cities despite threats of nuclear retaliation. Would the United States respond with nuclear

weapons? I hope not, because most likely a nuclear response would not make military or political sense. Nuclear attacks against cities would almost certainly be regarded as immoral and illegal unless it could be shown that this was a proportional response and the only way to prevent additional catastrophic attacks against civilians.

The tactical military value of nuclear weapons is very limited, also. Deep underground bunkers are very difficult to destroy, even with nuclear weapons. The radioactive fallout from earth-penetrating nuclear weapons would create enormous military-operational and political problems for the United States, even if it did not create a humanitarian disaster. It is much simpler to attack the entrances and communications and power lines into these bunkers with conventional weapons. Nuclear weapons can be used to advantage on the battlefield only against large targets such as ports, or against large concentrations of military forces, such as carrier battle groups or large numbers of tanks. Every time in the last 50 years that the tactical use of nuclear weapons has been considered seriously—in Korea, in Vietnam, in Iraq—the United States has concluded it would be disadvantageous, and that our military objectives were better achieved with conventional forces. The use of nuclear weapons in any but the most dire circumstances would turn world opinion against the United States and destroy U.S. leadership and alliances.

The benefits of these initiatives to increase the usability of nuclear weapons are marginal, and are based on the premise that the United States will be the only country to threaten the use of nuclear weapons. But moves by the United States to enhance the usefulness and usability of nuclear weapons and to thereby expand U.S. nuclear threats are likely to increase pressures on other countries to acquire nuclear weapons—particularly countries that find themselves on the expanding U.S. target list. The public explanation by Secretary of Defense Rumsfeld for the difference in U.S. policy toward Iraq and North Korea—that we will attack Iraq because it might acquire nuclear weapons but we will not attack North Korea because it already has a nuclear weapon—sets a very unfortunate example for other countries that contemplate coming into conflict with the United States.

This message applies beyond U.S. adversaries. After all, if the United States, by far and away the strongest military power, needs nuclear weapons to counter non-nuclear threats, then why does not every other country have even more need for nuclear weapons, particularly countries facing far more dire security threats or those that are not covered by U.S. security guarantees?

Nuclear weapons are, fundamentally, the great equalizer. As former Secretary of Defense Les Aspin said more than ten years ago, we are now the “equalizee.”⁵ U.S. conventional military power is completely unchallenged, and is likely to remain so for the foreseeable future—except for nuclear weapons. No potential adversary or combination of adversaries will master anytime soon the combination of technologies required for modern warfare as it is now being practiced in Iraq and Afghanistan: real-time intelligence information being fed directly into systems for targeting and destroying a vast range of targets; pilotless aircraft loitering over areas waiting to attack particular individuals. But a large number of countries could, at least in principle, destroy one or several large U.S. cities with nuclear weapons.

The most significant security threat to our society and to most of our allies is nuclear weapons. The taboo on the use of nuclear

weapon which has held since 1945 benefits the United States as much or more than any other country. Our nuclear posture should be based first and foremost on protecting and enhancing that taboo on the spread of nuclear weapons to additional states. Developing new nuclear weapons designed for tactical use moves in the opposite direction.

As Pakistan and North Korea demonstrated, nuclear weapons are not that difficult to acquire. Iraq may have been thwarted, but what about Iran? Many countries could build nuclear weapons in a few years or less if they decided to do so, despite our best efforts to prevent it. Nonproliferation is largely a voluntary and cooperative game; for the most part, we are able to act effectively against proliferators only to the extent that we can marshal widespread international support.

We must recognize that a nonproliferation regime is a vast web of formal international agreements and informal cooperation. Despite a few notable failures, it has been highly successful and has greatly benefited the security of the United States. Cooperation among states with nuclear capability is vital to control the flow of nuclear materials and combat nuclear terrorism. This web of agreements and this level of cooperation cannot remain intact for long if the United States claims for itself alone the right to use nuclear weapons first, even against non-nuclear weapon states, and to develop and test a new generation of weapons for this purpose.

We are the most powerful nation on earth, but we are not invulnerable. Our security relies on assistance of allies and the protection of international restraints. In the long run, our interests are best served by an international system that is as law-like as possible, one in which the use of nuclear weapons by anyone or any country is beyond the pale.

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²Excerpts of the Nuclear Posture Review, dated 8 January 2002, are available at <http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm>.

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⁴Stephen J. Hadley, “A Call to Deploy,” *Washington Quarterly*, Vol. 23, No. 3 (Summer 2000), p. 106.

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Seattle Won a Park in a Battle With a Missile System

Greg Dash

Discovery Park has approximately 644 acres of meadow, walks and trees on a high bluff overlooking Puget Sound and the Olympic Mountains. It is Seattle's largest and newest park, established on June 1, 1972.

But a few years earlier, it seemed destined to become a missile base, where radars and intercept missiles would be prepared to detect and destroy intercontinental ballistic missiles. The struggle to change that destiny took the dedicated efforts of citizens organizations, political leaders and scientists.

On Sept. 18, 1967 Defense Secretary Robert McNamara announced that the U.S. would build a "light" anti ballistic missile (ABM) system as a deterrent against an expected Chinese missile attack in mid-1970's. The "Sentinel" ABM system would consist initially of ten radar and missile sites along the northern tier of states. It would be adequate to defend against a light attack by a small number of simple missiles, but it could not defend the country against a massive attack such as USSR could launch. An ABM defense against the USSR was impractical, and perhaps unnecessary, in view of the effectiveness of the policy of Mutual Assured Destruction, whereby each country held the other's cities in hostage. Skeptics thought that Sentinel might actually be the thin end of a wedge, a start for a much larger, eventually anti-Soviet system. Indeed, John Foster, Director of Defense Research and Engineering, testified that while politically the system was designed to protect against a Chinese attack, it would actually have some degree of effectiveness against Soviet missiles. And on the day after the announcement Senator Henry Jackson hailed the decision as a step toward a massive ABM system.

When more details of the ABM system were described, Fort Lawton in Seattle was mentioned as a possible choice for its westernmost base.

The fort was an army base originally intended for a coastal gun battery, but never activated. This came as a shock, for Seattle had been looking forward to acquiring all or a substantial part of Fort Lawton for a city park. Mayor Dorm Braman said that it was disappointing news, but if the system needed Fort Lawton to make Seattle safer, it would be worth the loss.

However, a Pentagon spokesman replied that "The missile hardware has to go in at Fort Lawton if it is to defend Seattle properly".

To a few scientists at the University of Washington, the case was not so obvious. Their opposition rested on two principles. The first was a conviction that missile defense was unwise. The second was that, if an ABM base was to be built in the Northwest, Fort Lawton would not be a necessary or desirable location.

The issue of missile defense had been debated within high level Defense Department advisory committees and in public for several years. The considered judgment of non governmental defense experts was that there was no foreseeable technology for an effective antimissile system. Therefore, an ABM system built with currently available technology would be ineffective and wasteful. Furthermore it could actually increase the risk of war. At that time, we and the USSR opposed each other with thousands of intercontinental missiles. The sure knowledge that an exchange would destroy both countries led to a state of mutual deterrence. But if one country could ward off an attack, or even if it prepared to defend against it, that would threaten the other's security. So if the Sentinel system

were built, although it might be only a thin defense against a Chinese attack, it could give rise to Soviet fears that it would lead to a larger and more advanced anti Soviet ABM, and that would compromise the Soviet defense. In response to the threat, the Soviets were likely to increase the number of its missiles targeting the U.S., to be sure that an adequate number would get through.

Along with the national debate, these arguments were discussed in University of Washington seminars. Newell Mack, a Physiology graduate student, had been so concerned by signs that national policy seemed to be leading toward missile defense, that he had convinced members of a graduate seminar on Conflict Studies in the University of Washington to study the issue. He was joined in leading the discussions by Philip Ekstrom, a Physics graduate student.

The meetings had begun with one or two sessions on the technical aspects of missile defense, when the Sentinel ABM was announced, and Fort Lawton was mentioned as a possible choice for the key site for the West Coast. As a bonus, it was said to protect Seattle.

The seminar members were disappointed in the national decision, but they felt that perhaps not all was lost; Fort Lawton might be saved for a park if the Pentagon spokesman was wrong, and that Seattle's defense could be based somewhat outside of the city. To determine that, one would have to know the technical characteristics of the Sentinel system. Fortunately, the details had been published, in an issue of *Aviation Week*.

Each installation would have a large Perimeter Acquisition Radar, to detect an ICBM attack at long range, while the missiles were on their inertial trajectories well above the Earth's atmosphere. The PAR would alert the system to fire Spartan interceptor missiles, which would target the incoming ICBMs while they were still in space. The Spartans, guided to their targets by the PAR, would be able to destroy them with their 1 megaton nuclear warheads even if they didn't make contact. The PAR radars would be protected by a "last ditch defense", a battery of short range high acceleration Sprint missiles, which could intercept and destroy ICBMs penetrating the Spartan shield. In fact, it might be necessary to hold fire until the ICBMs entered the atmosphere, so that air resistance could discriminate between actual missiles and decoys. The Sprints carried 'small' nuclear warheads, about a kiloton.

Philip Ekstrom, with help from Physics Prof. Edward Stern, calculated the "footprint" of the protected zone. Ekstrom's calculation had as input data the speed and range of the Sprints, and the probable trajectories of the attacking ICBMs. The physics problem was a bit like finding the area that can be kept dry by an umbrella in a driving rain. The footprint turned out to be so large that the ABM base could be placed well outside of Seattle, and yet include the city in its protected area. His colleague, Physics Prof. Greg Dash described the good news in a March 31 *Seattle Times* story; Fort Lawton could be saved for a park, and Seattle could have both missiles and picnics. Dash pointed out that the PAR site for the Northwest would be the key detection unit for the entire West Coast. If it were placed at Fort Lawton, Seattle would become a prime target. An enemy intending to attack San Francisco or Los Angeles would have to take out Seattle's radar unit in order to assure that its missiles could get through. Furthermore, having 1

kiloton warheads explode at close range could be suicidal, with fallout from airbursts.

The news gave a great boost to the public campaign, which became known as The Battle of Fort Lawton. The campaign had remarkably wide support, with twenty-five citizen and professional organizations, such as the Seattle chapters of the American Institute of Architects, the Federation of American Scientists, the Magnolia Community Club, the League of Women Voters, and The Mountaineers. They were joined into one group, Citizens for Fort Lawton Park, headed by Donald Voorhees, a prominent Seattle lawyer, who was a leader in Seattle's improvement activities. Strong support came from Senators Henry Jackson and Warren Magnuson, and Congressmen Thomas Pelly and Brock Adams, Mayor Braman and other city officials, *The Seattle Times* editor Herb Robinson and reporter Svein Gilje. The campaign was carried out in letters to newspapers, editorials, radio interviews, and personal contacts between the senators and General Starbird, for over a year. Yet the Army Defense Command and Sentinel's General Starbird continued to claim that Seattle's defense required the in-city location.

As the criticism increased, Defense Department officials tried to explain that the dangers were overdrawn, but their arguments were unconvincing. In an October interview John Foster scoffed at the scientists' concern at having nuclear weapons based in the city. Foster claimed that the explosion of a Spartan warhead outside the atmosphere would be hardly noticeable, and its fallout would be filtered by the atmosphere over a long period. The Sprint's one kiloton warhead would be too low to cause damage. The group found his claims incredible and his breezy dismissal infuriating.

The public campaign now was intensified by the realization that an ABM at Fort Lawton would increase the city's vulnerability. Senator Jackson then asked the FAS group for detailed data showing alternative sites that could satisfy Sentinel's strategic plan. Ekstrom and Stern supplied it in late August. A few days later Jackson met with Gen. Starbird, and extracted a promise that the general would meet with Stern and listen to arguments for alternate sites. Stern flew to Washington in mid September and offered three alternate sites.

A week later a Pentagon source informed *Seattle Times* reporter Svein Gilje that the alternate sites would not be feasible. Besides, he added, why look for others when the Army already owns a perfect site, Fort Lawton?

Senator Jackson suggested that perhaps the Army had not done all its homework. Senator Magnuson complained that Fort Lawton "would be the worst possible site that anyone could imagine."

On Dec. 12 a crucial meeting was held in the Mayor's Office on the fate of "Ft. Lawton: Anti-Ballistic Missile Site or City Park?" Attending were 16 representatives of civic and environmental groups, Donald Voorhees, chairman of Citizens for Ft. Lawton Park, Senator Jackson, General Starbird, and Mayor Braman.

On the next morning, Sen. Jackson had breakfast with Defense Secretary Clark Clifford in the Secretary's office. Jackson had flown in minutes before from Seattle in a military plane. He was there to transmit the strong feelings that had been expressed in Mayor Braman's meeting. Clifford told him that he was aware of Seattle's desire to preserve the open space, but he had not yet heard from Gen. Starbird; he promised that he would ask for a report from the general over the weekend and have a decision a few days later. Starbird, in turn, was reported to have been convinced that Seattle's arguments for open space were valid, and official policies for retaining Ft. Lawton for missiles were contradicted with technical

arguments showing the feasibility of alternate sites.

On Dec. 22nd, the day promised for the decision, Sen. Jackson telephoned Secretary Clifford, who told him the good news: the ABM would go to an alternate site.

Epilogue

This account has focused on Seattle's campaign, but there were other local groups that waged campaigns against Sentinel. In Berkeley and the Bay Area, Minneapolis, Chicago, Detroit, New York, Pittsburgh and Boston, groups opposed the establishment of nearby sites, or fought against the system as a whole. The opponents were partially successful. In March 1969 President Nixon announced that Sentinel's city defense would be abandoned in favor of a "Safeguard" system, a defense of Minuteman ICBM sites. The change, in an influential paper by Harold Agnew, the Leader of Los Alamos' Weapons Division, was advisable because "...defense installations are primarily located in areas of existing military bases thus minimizing problems presently being posed by citizens worried over safety matters or angered over dislocation problems." However, Safeguard failed to get strong political support and adequate financing, and in the end, only two sites were constructed.

In 1971 Anne Cahn earned her Political Science Ph.D. from M.I.T. with a study of the scientists' influence in the struggle. She concluded, in part, "Across the country scientists, mostly Outer (i.e. non Defense Department), younger, not scientifically prominent men took it upon themselves to alert, inform and educate the public about ballistic missile defense."

"The important event, in our opinion, was that scientists took their case to the people."

Missile defense was proposed again by President Reagan. on March 23, 1983. The initial design of the Strategic Defense Initiative (SDI) was to provide a nearly perfect "astrodome" defense. It would rely on space based laser or electron beams to disable attacking ICBMs. The system would be powered by orbiting nuclear power reactors. Vigorous opposition came from scientists. Particularly cogent criticism came from a committee of the American Physical Society, in a paper analyzing beam weapons. In an effort to answer the criticism, the design was changed to "kinetic energy weapons", which would rely on direct impact. A furious national debate over the technical feasibility and the political effects of SDI eventually led to its failure to get congressional support.

In 1996, the Secretary of Defense announced a new program, National Missile Defense. NMD was begun as a technology development effort leading to deployment of system that would protect all 50 states from a limited strategic missile attack by a rogue nation. The system would detect the launch of enemy missiles and track them by surveillance satellites and ground based radars, and then guide defending ABM's to intercept the incoming missiles. In response to the opposition to the previous two ABM system designs, nuclear warheads and nuclear reactors in orbit would be replaced by ground based defending missiles, and they would be kinetic energy, "hit-to-kill" weapons. However, a succession of tests has shown the difficulty of achieving direct impacts. Many attempts to hit the incoming missile have largely failed, in spite of advance knowledge of the launch time and trajectory of an incoming missile, even when carrying a beacon. Nevertheless, the administration of Pres. George W. Bush has decided to begin preparing the first site. But the system is already aiming at its first target: the Antiballistic Missile Treaty. In 1972 the United States and the Soviet Union agreed to forego missile defense, in order to avoid threatening each

other's deterrence forces. But defense policy makers are now preparing to discard that policy for an unproven NMD system. Although the current system is far from ready, in the words of a Defense Department official. "We do not have the luxury of waiting" until the system is proven to be effective."

In a crowning bit of irony, William Scheider, Chairman of the Defense Science Board, reported last year that the continual test failures with the 'hit-to-kill' method has caused the Bush administration to consider putting nuclear warheads on the interceptor missiles.

But meanwhile, Seattle can look back at its fight against an ABM system more than 30 years ago, and take pleasure in its victory, that won it a beautiful city park.

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COMMENTARY

I think that most of our readers are concerned, both professionally and personally, with how their overseas colleagues view the state of American science. American physicists, though presumably better educated and well informed than the general public, still get their information on world affairs from the "media". But during, and preceding, the "Iraq War", these media have been generally condemned as support vehicles for the policies of the U.S. Government rather than the impartial purveyors of news and opinion we usually expect them to be.

The U.S. media's mishandling of the Iraq war— including the build-up and aftermath — has brought an unusually wide range of criticism and condemnation. Greg Dyke, General Director of the BBC, said he was "shocked while in the United States by how unquestioning the broadcast news media was during this war."

But even within the United States, such sentiments have spilled well beyond the usual circles of right- and left-wing media critics. I recently participated in a panel discussion at the National Press Club here on the media in Venezuela. In that country the private media has openly and consciously sided with the political opposition, and in the process disgraced itself in the eyes of journalists world wide. The comparison with American reporting on the war repeatedly came up. It was striking to see such broad agreement — among people of very divergent views and politics — that our media had indeed failed miserably to fulfill its basic duty to inform the public.

.....The most obvious evidence of this failure is a "results based" measure. A Gallup poll last August found that 53 per

cent of Americans believed that Saddam Hussein was "personally involved" in the massacre of September 11. Where did they get this idea, for which no evidence exists?

..... Yes, it can happen again. The media's complicity in such scams is therefore much worse than a problem of bias or passivity. It is one of the greatest threats to democracy — and security — that this country faces.

Mark Weisbrot
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In the belief that our readers would appreciate some more direct insight into how their colleagues from Europe reacted to recent events, we present two commentaries. One is the reaction of a British physicist, who attended the spring meeting of the APS in Philadelphia. The other is an exchange of letters between a physicist in Rome, who was asked to review a paper, and the Editor of Physical Review. (This exchange appears differently in the printed version of this issue.) The exchange started with a brief note from the potential reviewer declining an invitation to review a paper. There followed a form letter from the PR Editor, sent generally to those who desire not to referee, and then a final letter from Rome. To conclude this debate, the PR Editor has conveyed, to this Editor, the following thought: "I confess to disappointment with people who can not distinguish a plea for scientific cooperation and support of a war." I share that disappointment. There seems to be no need to pursue this matter further here.

A.M.S.

"Who Needs Nukes?"

Fay Dowker

I was disturbed by the role the Forum played at the April 2003 APS meeting in Philadelphia. The meeting took place as bombs built by physicists were falling on Iraqi people, children were being sliced apart by cluster bombs¹, a city of 1.3 million people was being forced to drink sewage² and Iraqi hospitals were overflowing with corpses and limbless victims, the floors awash with blood³. A more serious and immediate consequence of the relationship between the physics community, government and society can hardly be imagined, and yet *the Forum on Physics and Society* convened no emergency debate.

When a group with an official "social responsibility" role within a larger organization, like the Forum, tacitly agrees to discuss the technical aspects of social problems without challenging the larger political framework imposed by the powers that be, then that group plays the part of siphoning off members who feel concerned about social issues and neutralizing them in an organization whose real role is to support the status quo. It does this by providing a comforting appearance of critical activity, whereas in reality, discussion is limited to within extremely narrow boundaries.

A case in point was the Forum-sponsored session titled, "Nuclear Weapons and Missile Defenses: Current U.S. Policies and Programs," which I attended. The five talks in the session⁴ were quite uniform in terms of the assumptions made. These shared assumptions, though unstated, are quite blatant and include:

1. *The US government is sincere when it claims to want to safeguard the security of the US population.*

The speakers indicated this, for example, by describing the actions of the government, when it acts in a way that manifestly makes the people of the US less secure, as a "missed opportunity" or "misguidance." They took the sincerity of the government for granted to an extraordinary extent, given that there is no shred of evidence for it. They did not entertain the possibility that the government aims to enhance the security of the economic interests of the US ruling elite, not the population as such.

2. *What critical scientists can contribute is an assessment of whether or not particular technologies can achieve specific objectives demanded by government. The objectives themselves, and wider government aims served by those objectives, are not to be subjected to scrutiny and criticism.*

The objectives are often very narrowly defined in technical terms (for example, shoot down this kind of tumbling missile surrounded by tumbling decoys, or maintain the working capability of the nuclear stockpile without physical testing), allowing scientists to maintain a veneer of neutrality and objectivity in making a judgment on them. "Missile Defense" is a case in point. Physicists' opposition to the program is overwhelmingly on the narrow, technical grounds that it won't work. Radical opposition is based on the assessment that if anything like it could be made to work it would allow the US to be even more unconstrained in its military aggression, threatening even more countries than it does at present, and on the compassionate, humane assessment that war is a catastrophe.

Of the four talks I heard, that by Richard Garwin was the most shocking. What he said was outrageous. He summarized a report, coauthored by him, that analyzed the Comprehensive Test Ban Treaty and concluded that it was better for "US national security" to have the CTBT than not. His argument was that the US can achieve everything it wants to achieve without nuclear testing. He said: In the 50s I worked enthusiastically on many types of nuclear weapon but now conventional weapons have overtaken nuclear weapons; we are seeing on the news every night just how good these conventional weapons are now. And then he said, and I quote:

"Who needs nukes?" The relish with which he celebrated the destructive capability of weaponry that was at that very moment bringing death, agony and anguish to mothers, fathers and children was appalling.

During the question time I stated that I found it horrifying that he could praise the capabilities of weapons that were being used in a criminal⁵ invasion of a poor third world country. His response was, "Iraq is only a poor third world country because of its bad leaders [an irrelevant assertion that neglects the fact that the US bombed Iraq into a preindustrial state in 1991⁶ and devastated its economy with a twelve year military siege⁷, and this is not a criminal invasion. I am not in favor of the war, but it is not a criminal invasion. You can read about my opinion."

I have not yet read Garwin's opinion of the Iraq war. But I think I can predict, using my analysis, what it will be. He will take for granted that US aims in Iraq are what the government claims — removing weapons of mass destruction and so on — despite the lack of evidence for that; he will agree with those claimed aims; and he will criticize policy only on the grounds that invasion isn't the best way to go about achieving them. Am I right?

Fay Dowker

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References:

¹ Robert Fisk, "Wailing Children, The Wounded The Dead; Victims Of The Day Cluster Bombs Rained On Babylon," *The Independent*, 3 April 2003.

² Ewen MacAskill (in Basra), "Three weeks on, and still no water," *The Guardian*, 14 April 2003.

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⁵ "To initiate a war of aggression, therefore, is not only an international crime; it is the supreme international crime differing only from other war crimes in that it contains within itself the accumulated evil of the whole." Nuremberg Judgment, September 1946.

⁶ Martti Ahtisaar, Report to the UN Secretary General on humanitarian needs in Kuwait and Iraq, 20 March 1991.

⁷ "In search of an Iraqi policy," *The Economist*, 24th February 2001.

A Scientist's Decision Not to Review Papers for Phys. Rev.

Daniel Amit

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Received 08 January 2003

Dear Dr. Amit:

We would appreciate your review of this manuscript, which has been submitted to Physical Review E. This message is the COMPLETE REFERRAL. No hardcopy will be sent unless requested.

From: "Daniel Amit" <daniel.amit@roma1.infn.it>

To: "Physical Review E" <pre@ridge.aps.org>

Sent: Friday, March 21, 2003 6:11 PM

Subject: Re: Review_request ...

I will not at this point correspond with any american institution.
Some of us have lived through 1939.
Daniel Amit

From: "martin blume" <blume@aps.org>
To: <daniel.amit@roma1.infn.it>; <damita@green.fiz.huji.ac.il>
Subject: your email to the American Physical Society
Date: Tuesday, April 08, 2003 10:31 PM
Dear Dr. Amit,

We have received your email with your decision not to review a paper for us in light of American actions in the middle east. We recognize that reviewing manuscripts is a voluntary activity, one that you perform as a service to the physics community, and we thank you for your efforts.

Given the voluntary nature of your participation we of course respect your decision to cease, and have made an indication in our database so that no further papers will be sent to you for review until you inform us otherwise.

We ask, however, that you consider the following in hopes that in the not too distant future you will decide to review for us again.

We regard science as an international enterprise and we do our best to put aside political disagreements in the interest of furthering the pursuit of scientific matters. We have never used other than scientific criteria in judging the acceptability of a paper for publication, without regard to the country of origin of the author.

We have done this even in cases where some of us have disagreed strongly with the policies of that country, and we will continue this practice. We believe it is essential that all parties involved make every effort to separate social and political differences from their participation in scientific research and publication. The pursuit of scientific knowledge needs to transcend such issues.

Sincerely,
Martin Blume

From: "Daniel Amit" <daniel.amit@roma1.infn.it>
To: "martin blume" <blume@aps.org>
Date: Wednesday, April 09, 2003
Dr Blume, Editor in Chief

American Physical Society

Dear Dr Blume

Thank you for your letter of April 8. I would have liked to be able to share the honorable sentiments you express in your letter as well as your optimism in the future role of science and the scientific community. To be frank, and with much sadness and pain, after 40 years of activity and collaboration, I find very little reason for such optimism.

What we are watching today, I believe, is a culmination of 10-15 years of mounting barbarism of the American culture the world over, crowned by the achievements of science and technology as a major weapon of mass destruction. We are witnessing man hunt and wanton killing of the type and scale not seen since the raids on American Indian populations, by a superior technological power of inferior culture and values. We see no corrective force to restore the insanity, the self-righteousness and the lack of respect for human life (civilian and military) of another race.

Science cannot stay neutral, especially after it has been so cynically used in the hands of the inspectors to disarm a country and prepare it for decimation by laser guided cluster bombs. No, science of the American variety has no recourse. I, personally, cannot see myself anymore sharing a common human community with American science. Unfortunately, I also belong to a culture of a similar spiritual deviation (Israel), and which seems to be equally incorrigible.

In desperation I cannot but turn my attention to other tragic periods in which major societies, some with claims to fundamental contributions to culture and science, have deviated so far as to be relegated to ostracism and quarantine. At this point I think American society should be considered in this category. I have no illusions of power, as to the scope and prospect of my attitude.

But, the minor role of my act and statement is a simple way of affirming that in the face of a growing enormity which I consider intolerable, I will exercise my own tiny act of disobedience to be able to look straight into the eyes of my grandchildren and my students and say that I did know.

With regard
Daniel Amit

PS I intend to distribute our exchange as much as possible. I authorize and pray that you do the same.

NEWS

Low yield Nuclear Warheads

The AIP's FYI #61, dated May 9, 2003 and authored by Richard M. Jones, concerns House and Senate considerations of nuclear weapons research, development, and testing. The considerations stem from the Bush Administration's interest in using low-yield nuclear warheads for destroying deeply buried enemy assets. The Armed Services Committees of both houses of Congress are nearing completion of defense spending bills for FY2004 that include provisions for low-yield nuclear weapons' research as well

as future testing of nuclear weapons. The APS recently reaffirmed a Statement on Nuclear Testing that warns of "serious negative international consequences" from nuclear testing by the U.S.

In addition, during the same week, the House Subcommittee on Strategic Forces considered draft provisions of HR 1588, The National Defense Authorization Act for FY2004. According to Jones' FYI, Section 221 of HR1588 "rescinds the prohibition on research and development of low-yield nuclear weapons (with yields of five kilotons or less.)"

Sidney Drell, at an arms control press conference last week, referred to the proposal to use nuclear weapons for bunker busting as a “dangerous thought”. In response to Drell and other critics who contend that conventional weaponry, used appropriately, can suffice for bunker busting, supporters of the use of nuclear weapons for such purposes argue that radiation is necessary to kill biological weapons of mass destruction that are hidden in bunkers.

There is also momentum in the Congress to reverse the current moratorium on nuclear testing. According to Jones, “The [House Subcommittee on Strategic Forces] defeated, on a party line vote, an amendment offered by Spratt and Tauscher to make the observed testing moratorium official U.S. policy.”

UC Must Bid to Run Los Alamos

This was a headline on page 1 of the San Francisco Chronicle on May 1, 2003. Energy Secretary Spencer Abraham announced on April 30 that UC will have to compete with other bidders to keep its contract to manage Los Alamos National Laboratory after the present contract expires in September 2005. Among the organizations against which UC will likely have to compete is the University of Texas. The value of the contract is \$2.2 billion. The Secretary’s decision is an unprecedented event in the 60-year tenure of UC as the LANL manager, and it follows months of very visible news and acrimony surrounding charges of mismanagement of LANL by UC. From the standpoint of UC, a positive aspect of the announcement is that UC will be allowed to continue in its management role until September 2005. Secretary Abraham had recently considered immediate termination of UC’s contract owing to charges of fraud and theft.

U.S. Participation in International Thermonuclear Experimental Reactor (ITER)

The International Thermonuclear Experimental Reactor (ITER) is a program that originated with a 1985 proposal in Geneva, by the Soviet Union, for an international collaboration on fusion energy involving nations with the world’s leading fusion energy programs. The ensuing program involved Europe, Japan, the Soviet Union, and the United States. However, in 1998 the US withdrew from ITER over concerns about cost and management effectiveness.

On January 30, 2003 Secretary of Energy Spencer Abraham announced President Bush’s decision that the U.S. will rejoin negotiations to build and operate the international fusion energy project, and a major milestone was achieved in St. Petersburg, Russia in February when representatives from the US and China joined those from Canada, the European Union, Japan, and Russia at the Eighth ITER Negotiations Meeting on planning the next steps for ITER. At the meeting, several of the delegations reiterated their governments’ commitment to fusion energy development and pointed out advantages of particular sites in their countries for ITER. The Canadian delegation, for example, emphasized the excellent technical and cultural characteristics of the municipality of Clarington in the Region of Durham, whereas the French delegation offered Cadarache as the European site. The four sites under consideration include Clarington, Cadarache, Vandellós in Spain, and

Rokkasho-mura in Japan. The Report on the Joint Assessment of Specific Sites can be found on the ITER Website (www.iter.org/jass).

Delegations discussed approaches to decision making and emphasized their desire to start ITER construction as soon as possible. The Ninth Negotiations Meeting will be held on 20-21 May 2003 in Vienna. US Secretary of Energy Spencer Abraham stressed that U.S. participation in ITER will be in parallel with a continued American research effort into controlled fusion, specifically at Princeton.

Cosmic Ray Muons versus Terrorism

Cosmic-ray muons might be put to use in the fight against terrorism. The March 20 issue of *Nature* and the March 22 issue of *Science News* describe a technique developed by scientists at Los Alamos National Laboratory in which the high-angle scattering of cosmic-ray muons by heavy metals is exploited to detect metals, such as plutonium and uranium, inside of containers that are opaque to visible radiation. According to the *Science News* article, the technique relies on the formation of free electrons when muons collide with argon molecules and the detection of such electrons by a grid of wires. Two chambers filled with argon gas and equipped with wire grids, located on opposite sides of a container such as a truck, are used to determine particle trajectories and, from those trajectories, the shape of heavy metal objects between the chambers.

Unfortunately, fissile materials could be nestled among other metals (e.g. tungsten, or even steel) so as to obscure their apparent shape. However, enthusiasts of the LANL idea are working on ideas to make the cosmic-ray equipped detector smart enough to foil attempts at heavy-metal camouflage.

Physical Science - Biological Science Funding Imbalance

The website <http://www.govexec.com/dailyfed/0403040303tdl.htm> concerns critical remarks from U.S. Senators, such as Christopher Bond (R-Missouri) and Barbara Mikulski (D-Maryland), regarding the disproportionate funding for physics research vs. that for biological sciences that is proposed by the Bush Administration. Senator Bond stated, “I am alarmed and troubled by this disparity because the decline in funding for the physical sciences has put our nation’s capabilities for scientific innovation at risk and, equally important, at risk of falling behind other industrial nations.” This subject is also the concern of the AIP’s FYIs #32 and #33. The House Science Committee raised concern that the biomedical sciences “continue to dwarf the remainder of the R&D budget.” Audrey Leath wrote in FYI #52, “Dismal” and “inadequate” were some of the terms used by members of the House VA/HUD Appropriations Subcommittee as they reviewed NSF’s FY 2004 budget request on April 10. After Congress passed legislation last year authorizing the doubling of the foundation’s budget over five years, the subcommittee was disappointed that the \$5.5 billion requested by the President for FY 2004 would not keep NSF on track toward that goal.... Noting that President Bush had signed the doubling legislation, Chairman James Walsh (R-NY) asked, “Did he really mean it?”

REVIEWS

The New Economy of Nature: The Quest to Make Conservation Profitable

By Gretchen C. Daily and Katherine Ellison Island Press/Shearwater Books, 2002, 260 pages, ISBN 1-55963-945-8, \$25.00

The subtitle of this book might strike some as a contradiction in terms. After all don't most of us believe that the destruction of our environment is due in part to the uncontrolled desire to make money? Yet it is the intriguing premise of this book that those forces that seem to be the cause of much of the degradation of the environment might be harnessed to solve the severe problems that face our planet now and in the near future. As the authors state: "A great unanswered question is whether the drive for profits which has done so much harm to the planet can be possibly harnessed to save it."

Written by a collaboration between Pulitzer Prize-winning journalist Katherine Ellison and noted Stanford University ecologist Gretchen C. Daily, this book is a lively collection of case histories that describe various efforts to do the right thing and make money at the same time. The various chapters describe the efforts of what some may call visionaries and others eccentrics to think creatively while staying inside the box imposed by economic constraints. In a few cases the choices presented seem quite clear cut. An example is the project by New York City to improve the quality of its water supply by enhancing and expanding the protection of the upstate watershed area. The city, under mandate by the Environmental Protection Agency, had the choice of building an expensive filtration system or of helping nature naturally filter the water. The latter choice was cheaper and at the same time helped preserve streams and forests.

Other examples are a bit murkier. For example, the Australian company Earth Sanctuary Ltd. owns and runs several private nature preserves which support themselves by hosting eco-tourism. Among the compromises this enterprise has to make in its attempt to turn a profit is feeding "snacks" to the rare species under its care to make them more accessible to those touring its preserves.

Setting up exchanges to provide a market in carbon emissions and carbon sinks is another example. Here one attempts to emulate what is touted as the success of the market in sulfur dioxide emission permits in the reduction of acid rain to the emission of carbon dioxide through the sale of similar carbon sinks and emissions instruments. Some raise the question as to whether creating such markets enables companies to continue to pollute. It is precisely such compromises with principle that the authors suggest are both troubling and interesting since in many cases they highlight the crux of the issue, namely whether what some may call greed is too powerful an instinct to ignore.

The authors argue in part that market forces must be understood and utilized when possible in the struggle to preserve the environment. They write: "More important, it would require a willingness to look at the world's economy in an entirely different

way, starting with the assumption that ecosystems are assets whose output has concrete financial worth....One thing is clear: private enterprise cannot substitute for governments, particularly in view of the increasing risk of climate change, a global problem requiring global cooperation if it's not to override all other environmental and economic worries in a matter of decades. We strongly believe that government regulation is called for to kick-start and supervise the profound economic transformation needed to ward off this and other environmental threats. Yet we also believe this transformation can be speeded with the use of market mechanisms and other financial incentives, tactics that have been glaringly underemployed."

The book makes a strong case for the growing study and appreciation of the economic value of what are called nature's services and work. In a past era of much lower human population and overall impact on the environment much of what we received from nature was so plentiful that it was essentially free. A few such examples are clean air and water and the cooperative work of many animals and insects in providing our food. Today we are placing such large demands on these resources that they are no longer relatively plentiful and we are forced to account for the real value they contribute to the overall economy. This analysis of economic value and market forces is alien to the aesthetics and ethics of many who are concerned about preserving and improving our environment. They are also often absent from the formal training that most scientists receive. Yet no matter what one may ultimately conclude is the correct course to pursue, one must confront market forces and the current faith that free markets will ultimately make the correct decisions—although one should note that there is now increasing skepticism regarding the directions that pure market forces take us.

As seen in the above quotation, accompanying this book's discussion of economic incentives is also a clear recognition of the importance of national and international regulations in dealing with environmental problems. In many of the case studies presented, governmental policies and laws form the long-range framework that creates the very markets that are being exploited. The entire issue of whether carbon trading will ever make economic sense would seem to depend entirely on the implementation of regulations such as the Kyoto treaty.

Though some sections of this book may seem a bit repetitious and a few others seem out of place or irrelevant, things are summed up nicely in the epilogue which notes that recent events such as 9/11, recession, etc. have put a severe damper on some of the more ambitious efforts described. Whether one ultimately agrees or disagrees with the main premise of this book it is certainly worth reading. The authors, although clearly believing that conservation can be made profitable, generally give a balanced perspective to the issue and do so in a well-written book that is both easy and enjoyable to read.

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Energy and Society (An Introduction)

By Harold H. Schobert (Taylor & Francis, NY, 2002), 672 pp, ISBN PB 1-56032-767-7, paperback \$49.95.

At a time when the public needs a much better understanding of our possible energy futures, books aimed at increasing energy knowledge for a non-technical audience are a welcome addition. Today, there are a number of texts for introductory college courses on energy, ranging from those focusing mostly on policy to those including some physics and math. **Energy and Society (An Introduction)** takes a somewhat different approach, describing comprehensively the historical development of energy technologies and sources. The book provides both biographical sketches of scientists and technologists as well as a societal context for their discoveries. In addition, the author uses a consistent approach to understanding energy based on the scientific definitions of energy, work and power.

The initial chapters provide a succinct overview of scientific questions which non-scientists may have on topics relating to human energy, food, and digestion. This leads into discussions of the human use of fire, the use of wood energy, and early waterwheel and windmill technologies.

The narrative then shifts to the industrial revolution with its emphasis on the steam engine, heat and thermal efficiency, and the subsequent development of electrical concepts and electricity production. The discoveries and inventions of major scientists and technologists, and the reasons why certain technologies and approaches won out over others, are vividly described. A chapter on hydropower examines the development of water turbines and the role of hydroelectricity today. A section on transportation, focusing initially on steam engines and ships, but then leading into early aviation technology and the Otto and diesel engines, provides a transition into the petroleum age.

The chapters on nuclear energy, including the discovery of x-rays and radioactivity and ultimately nuclear fission, are clear, but fairly standard. While the treatment of nuclear reactors and nuclear waste issues is also conventional, descriptions of the Three Mile Island and Chernobyl accidents are nicely developed and detailed.

The final section of the book describes current energy technologies, their environmental impacts, and alternatives. The author highlights chapters on acid deposition from coal combustion, smog from vehicle exhaust, and the greenhouse effect. A chapter on remaining fossil fuel supplies provides the rationale for investigating energy alternatives. The text ends by examining biomass, solar, and wind energy, and the prospects for developing electricity from fusion power.

The treatment of controversial topics such as nuclear power, global warming and pollution from fossil fuel combustion is generally balanced and fair. The writing is clear and at a level that the non-scientist can comprehend. There is a glossary of energy terms and highly recommended sources. Figures and graphs are clear and appropriate to the text and the topic, while citations and annotated bibliographies at the end of each chapter provides sources for further reading and research.

The text is strong in describing basic science and the historical development of energy sources and technologies. The first two thirds of the book is presented with charm, wit and scientific insight. However, the treatment of nuclear and renewable energy is somewhat disappointing compared to the earlier material. Terms and concepts important in understanding current energy technology decision-making, such as the uranium fuel cycle, electrical load peaking, net energy, net metering, deregulation, and distributed generation are missing or inadequately covered. In addition, each source is treated in isolation rather than looking at an integrated systems approach, which is critical in understanding any possible energy future. Some statements and facts are misleading or out of date. For example, passive solar heating can provide much more than 10-20% of the heating load of a house. And toxic anti-freeze, mentioned by the author, has been mostly replaced with propylene glycol in solar hot water collector systems today. Although the chapter on global warming provides ample factual information, it vacillates awkwardly between doubt and belief, leaving the reader confused. Based on the scientific evidence of the past several years, there is no need to be timid about the scientific basis of climate change, and its seriousness. The discussion of policy options for global warming is weak, not distinguishing the full range of options and strategies in terms of cost.

In addition, the focus of the book in the later chapters is primarily on the United States. International energy developments, such as the rapid growth of wind and photovoltaics around the world, are not analyzed. Another gap is that Enron and the California power crisis are barely mentioned (although to be fair, the book was probably mostly complete as they unfolded). More seriously, the reader will find little about energy politics and policies surrounding the restructuring of the present electrical energy system, an area that has been widely debated for over a decade. Nor will the reader find an explicit discussion of entropy (or even the word entropy), a critical term that should be familiar to non-scientists. Unfortunately, the title of the book implies a broader coverage of current energy and society issues than is actually present.

In spite of these comments, the book is a valuable contribution to the energy text field. The multidisciplinary energy area is a difficult one to cover fully in any book of reasonable size. The publisher describes some 13 courses for which the book might be appropriate, including environmental engineering, environmental science, alternate sources of energy, science and society, and energy, politics and the environment. However, the book's strength lies in areas such as man and technology, the historical development of technology, and a qualitative introduction to energy. For the many introductory energy-related courses that are also trying to develop some measure of quantitative skills in students, this book is not particularly strong or suitable. However, for courses focusing on a historical understanding of energy and technology development, the text, particularly the first two thirds, is highly recommended.

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and Dissent: Scientists in the Political Arena. He directed the Federation of American Scientists project on Protecting the Space Environment, and has recently written articles on space debris constraints on weaponizing space. He has served on the Nominating Committees of both APS and AAAS, and is currently a member of the APS Panel on Public Affairs. He is a Fellow of APS and AAAS, and recently received a Humboldt Award.

Statement: I am concerned about the lack of appreciation for science in Washington — both the slow growth of science budgets (except for medicine), and claims that there is inadequate scientific understanding to support action on global warming but plenty to justify scrapping the ABM treaty, for example. We physicists can help by doing more good studies on topics in which our expertise is relevant and then publicizing our conclusions. I also think it is important to promote increased public understanding of our exciting field, and to improve the quality of education about physics in primary and secondary school. Among other issues, we need to continue to defeat attempts, as by the Kansas School Board, to remove cosmology — as well as geology and evolutionary biology — from the school curriculum. Like the experimental sciences, these “historical sciences” develop theories that are tested by the success of their predictions concerning new knowledge. It is important for people to appreciate that science is now obtaining reliable knowledge about the past — including the history of stars, galaxies, and the entire universe — as well as about its fundamental constituents and structure.

SECRETARY-TREASURER

Andrew Post-Zwicker

Background: Andrew Post-Zwicker is the Lead Scientist of the Princeton Plasma Physics Laboratory’s Science Education Program. He presently serves as the Secretary/Treasurer of the Forum (term expires 12/03) and the Committee on Science Education for the American Physical Society’s Division of Plasma Physics (APS-DPP). His primary interest is in finding novel ways of making plasma physics and fusion energy research accessible to students, teachers, and the general public through workshops, research opportunities, and interactive world wide web sites. He received a Ph.D. in physics from Johns Hopkins University and a bachelor’s degree in physics from Bard College.

Statement: For the past two years I have had the wonderful privilege of serving as your Secretary/Treasurer and I am honored to be nominated for a second term. During my first term, we took an important (and hotly debated!) step of reducing the number of paper copies of our newsletter from four to two. This brought us out of debt and to the point where we now have “money in the bank.” The challenge is now to spend this money wisely and in ways that will have the greatest impact, while supporting the mission of the Forum. I believe that this Forum must continue to provide unique

opportunities for our members to proactively break down the walls between scientists and non-scientists. In our increasingly technological society, which is driving a bigger and bigger wedge between the “haves” and the “have-nots,” it is crucial that the Forum reach out to the underrepresented and help to foster relationships with our members who wish to become more active in our mission. I would like to see this Forum sponsor programs that provide these opportunities along with the tremendous job it does creating sessions at the March/April APS meetings

FOR FORUM COUNCILLOR TO THE APS EXECUTIVE BOARD

Phillip W. (Bo) Hammer

Background: Philip W. “Bo” Hammer is vice president for The Franklin Center at The Franklin Institute in Philadelphia. He received his PhD in Physics from the University of Oregon in 1991. From 1991-93, he was an Office of Naval Research Postdoctoral Fellow at the Naval Surface Warfare Center in Silver Spring, MD. Hammer spent the ‘93-’94 academic year as an APS Congressional Science Fellow working on the staff of the Subcommittee on Science in the US House of Representatives. His areas of responsibility were post-SSC high energy physics policy, earthquake hazards reduction, and the Government Performance and Results Act. During this period, Hammer advised the APS Washington Office as it began to strengthen its efforts to engage Congress through more active grassroots political involvement among the APS membership. From 1994-2000, Hammer worked at the American Institute of Physics, starting as assistant to the executive director and culminating as director of the Society of Physics Students / Sigma Pi Sigma, and of the AIP Corporate Associates program. While at AIP, Hammer initiated *Take Physics Local*, a program to address simultaneously the professional development needs of physics students, and the technical and workforce needs of industry and communities. He was also co-principle investigator on the AIP/Sloan Professional Masters Degree project. Additionally, Hammer worked with APS to develop stronger ties to SPS and to have more student involvement in APS meetings. Hammer was a participant in President Clinton’s *Forum on Science in the Public Interest* in 1994, served on the APS Panel on Public Affairs (POPA) from 1995-1996, and was a panelist on the US House of Representatives *Early Career Scientists Roundtable* in 1997. He was Chair of the APS Forum on Physics and Society in 2002. While serving as Chair of the Forum, he worked to establish a permanent FPS position on POPA. Hammer currently serves on the Haddon Heights, NJ Board of Education and is a past-President of the Rockville, MD West End Citizens’ Association. Hammer is a Fellow of the American Physical Society and a member of Sigma Pi Sigma.

Statement: When I became a member of APS as a beginning graduate student, I was impressed by the distinctive impact APS has had on issues residing at the intersection of science and society. Indeed, physicists’ sense of social responsibility

distinguishes our field, and should continually be enhanced. If elected to serve FPS on the APS Council, I would represent FPS members' interests in the APS Council's deliberations, particularly in the area of maintaining the active engagement of APS in societal issues involving physics and physicists. There are several challenges the APS currently faces in this regard: declining revenues that impact the ability of APS to conduct policy studies and fund many other important programs; continuing stresses on the physics education system due to low numbers of US-born undergraduate and graduate students; inadequate K-12 science education; and the growing problem of visa restrictions on foreign graduate students. APS will also need to continue addressing the role of physics in homeland security, nuclear nonproliferation, energy and environment, and humanitarian issues such as de-mining. As a member of Council, I would work to address these issues within the context of maintaining the strength and relevance of physics research and the funding that enables it.

Anthony Nero

Background: Dr. Nero is a senior scientist (emeritus) at Lawrence Berkeley National Laboratory, is affiliated with the University of California, Berkeley's Energy and Resources Group, and devotes part time to independent writing and policy analysis. He received his Ph.D. in nuclear physics from Stanford in 1970, and was a postdoc at Caltech and an assistant professor at Princeton. He joined the LBNL Energy and Environment Division in 1975, working primarily on environmental aspects of nuclear power. He spent 1978 on leave at the nonproliferation bureau of the Arms Control and Disarmament Agency, and published *A Guidebook to Nuclear Reactors* in 1979. Beginning in 1980, he led LBNL's indoor radon group, later taking broader responsibility for the lab's efforts on indoor air pollution. He is a fellow of the APS and received the 1989 *Leo Szilard Award*, primarily for his work on indoor radon, on which he has published widely for both the scientific community and the public. He has been a member of the Forum on Physics and Society's executive committee, and served as Forum Chair in 1994-1995; during that time he initiated substantial activities on the issue of jobs and education, contributing partly to the formation of the APS Committee on Careers and Professional Development, of which he has more recently been a member. Other APS service includes membership on the Panel on Public affairs (serving as chair of the subcommittee on studies), the Committee on Meetings, and the Szilard/Burton-Forum Awards Committee (recently serving as chair).

Statement: The Forum on Physics and Society is the broadest entity for expressing APS members' interests in technical and policy issues that are important for society at large. As a member of the council, I would represent such interests in the broadest body of the APS. First, the Forum concerns itself with specific issues such as arms control, energy, and the environment. The APS should continue to

foster physicists' contributions to such areas, and to conduct studies on topics where the APS can make important and unique contributions. In this regard, the APS should look for ways to continue such studies despite increasing difficulty in obtaining external funding. The Forum also concerns itself more broadly with preparing physicists for working in such areas and for exercising their diverse capabilities regardless of what they may work on. The physics community has made progress on these issues, but I believe that continued attention is needed on the degree to which physics departments develop or take advantage of the diverse capabilities, backgrounds, and interests of their students and faculty. I note finally the Forum support for various modes by which APS members can voice their concerns and interests and interact with each other and with the APS on such questions. The Forum provides avenues for expression through its invited-paper sessions and its publication of *Physics and Society*, but I suggest that new means are now available for fostering discussion within the APS of all kinds of matters, and that we should examine how they might be utilized. For example, within the Forum we are planning to test the use of an internet bulletin board for extending for a period of time discussions stimulated by papers presented at a session, so that even those who did not attend can see what took place at the session and participate in the subsequent dialogue. It goes without saying that such approaches might be utilized for topical discussions by any Forum, or by the APS at large. The APS is a large and diverse community, and means should be found to take advantage of this breadth wherever possible.

MEMBERS OF THE EXECUTIVE COMMITTEE

Maureen Mellody

Background: Dr. Mellody is currently a Study Director at the National Academy of Sciences, managing policy studies related to aeronautics and space. Previously, she served as the 2001-2002 AIP Congressional Science Fellow in the office of Congressman Howard L. Berman (D-CA), working on intellectual property and technology transfer. Dr. Mellody received a B.S. degree in Physics from Virginia Tech in 1995, an M.S. in Applied Physics from the University of Michigan in 1997, a Ph.D. in Applied Physics from the University of Michigan in 2000, and worked as a post-doctoral research scientist at the University of Michigan in 2001. Her research specialties include acoustics and auditory signal processing.

Statement: Scientific discovery is now the result of complex interrelationships among scientists, funding organizations, government policy-makers, and the public. As someone who straddles the line between science and public policy on a daily basis, I am keenly interested in supporting and promoting the activities of the Forum on Physics and Society. I would contribute to the Forum primarily in three ways: 1) recruiting and interesting young physicists in the work of the Forum, thereby increasing the number of members and the

dissemination of the newsletter and other Forum activities; 2) facilitating increased communication between scientists and government policy-makers by leveraging my professional relationships in the National Academy of Sciences, Congress, and executive branch agencies; and 3) promoting the role of women and minorities in science, both as students and as educators/researchers.

Robert Nelson

Background: Dr. Nelson is a Senior Fellow in Science & Technology at the Council on Foreign Relations and a member of the Research Staff at the Princeton University Program on Science and Global Security. He has a PhD in theoretical astrophysics from Cornell University and held postdoctoral appointments in astrophysics at the University of Toronto, the California Institute of Technology and Princeton University. Since 2000 his research has concentrated on nuclear arms control and nonproliferation issues. His most recent work includes analysis of the effects of use of low-yield earth penetrating nuclear weapons (nuclear “bunker busters”).

Statement: The Forum on Physics and Society is one of the few professional organizations that actively encourages physicists to discuss the social implications of science and technology and to become involved in the political process. I intend to use my tenure as a member of the Executive Board of FPS to encourage other physicists to become involved in the messy world of Washington politics. An increasing number of U.S. domestic and foreign policy issues require basic understanding of science and technology, yet few Washington policymakers have any technical background. Scientists and engineers have a unique ability to contribute to their country by applying unbiased technical analysis to sometimes highly controversial issues. I would encourage FPS to sponsor frequent seminars on science-policy topics facing Congress. I also would promote activities that make young physics PhDs more aware of alternate career paths at the interface between science and public policy.

Michael Sanders

Background: Dr. Sanders is currently Professor of Physics, emeritus, at the University of Michigan (Ann Arbor). His doctorate is from Columbia University; he was a post-doc at Stanford University, and was on the faculty at University of Minnesota (Minneapolis) before moving to Michigan in 1963. He has been a visitor at Bell Laboratories, University of California (Berkeley), Cornell University, and Università di Firenze. His research has been in atomic, molecular, and condensed-matter physics — especially superfluid liquid helium. He has held fellowships from the Sloan and Guggenheim foundations and is presently North American Editor of the journal *Contemporary Physics*.

Statement: My first encounter with the nexus of Physics and Society came in August, 1945. I had finished a year of college, and was on my “boot leave” in the US Navy when I

read of the dropping of an atomic bomb on Hiroshima. I returned to college a year later and completed my physics major. In graduate school I decided against work in nuclear physics. Although I would surely have been eager to work for the military during WWII, I have avoided any participation in such work since then. I had wanted, for many years, to teach a course which explored the relationship between government and science which evolved after WWII. I finally found an opportunity to develop “The Physicists and the Bomb”, and taught it rather regularly until (actually past) my retirement. The issues raised by our past and present collaboration with government should be examined both by the public and by the (younger) members of our profession. I see the Forum as a means to facilitate this examination.

Stephen Pierson

Background: Dr. Pierson works in the Office of Public Affairs in the Washington Office of APS lobbying for increased science research budgets. He is on leave from Worcester Polytechnic Institute (WPI) in Worcester, MA where he is an associate professor of physics. During his seven years as a physics professor, he has been extensively involved with advising WPI students doing their junior year project addressing the interface of science, technology and society. In this capacity, he has done two month advising stints in Namibia, Bangkok, and Boston as well as advising on-campus projects on wind energy and junk science. Steve has a PhD from the University of Minnesota, held a NRC postdoctoral fellowship at the Naval Research Lab and taught for a semester at Georgetown University. He pursued science policy work in Washington after being inspired by an FPS session at the Centennial March Meeting. During his years in Massachusetts, he was active with arms control issues, going to Washington twice to participate in lobbying activities.

Statement: The FPS sessions at the APS March and April meetings have long been talks that I look forward to. The research sessions organized by the Divisions are of course very important but I enjoy getting the broader societal implications of our work. Physicists have a long history of involvement with societal issues; indeed, I view it as one of our responsibilities. FPS plays a key role in fulfilling these responsibilities and I would like to help FPS sustain and broaden this work. In addition, having made a transition from academia to science policy, I know that there are many physicists that have made similar transitions and many that would like to. In the year and a half that I’ve spent in Washington, I have witnessed first hand the value of having PhD scientists sprinkled around Congress, the Federal Government, think tanks and numerous other organizations. Yet I also see the need to put more scientists into these roles given the valuable perspective that they bring to the process. Since it is not easy for interested APS members to know how to pursue these positions, I would like to see FPS expand its role in facilitating such transitions.

FORUM ON PHYSICS AND SOCIETY

2004 ELECTION BALLOT

This is your election ballot.

(You can also vote via a Web Ballot at: <http://www.physics.wm.edu/ballot.html>)

Information on the candidates appears in this issue of *Physics and Society*, paper and Web.

Put an X next to the name of the candidates of your choice:

Vice-Chair (vote for one):

_____ Mark Goodman

_____ Joel Primack

_____ (space for write-in candidate)

Secretary-Treasurer (vote for one):

_____ Andrew Post-Zwicker

_____ (space for write-in candidate)

Forum Councillor (vote for one):

_____ Phillip (Bo) Hammer

_____ Tony Nero

_____ (space for write-in candidate)

Members of the Executive Committee (vote for two):

_____ Maureen Mellody

_____ Rob Nelson

_____ Stephen Pierson

_____ Michael Saunders

_____ (space for write-in candidate)

Please vote by the www address at <http://www.physics.wm.edu/ballot.html>

Or fold and tape this self-mailing ballot, place a stamp on it, and return it to

Andrew Sessler

so that he receives it no later than **September 1, 2003.**

The return address is pre-printed on the reverse.

Thank you.

Fold Here and Seal with Tape (No staples please)

(Fold Here)

(please print name legibly)

signature please

Place
Stamp
Here

Andrew Sessler, Secretary, Chair
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