

THE CITIZEN-SCIENTIST: AN ESSENTIAL SPECIES FOR OUR TIMES*

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You have honored me by electing me to be president of the Society for the past year and I thank you. It has been an exciting time with a new secretary/treasurer Jonathan Ravdin, a new editor McWilson Warren, a new program chairman Thomas Monath, and our first year under professional management. With all these changes, the year has gone well.

I was surprised, but pleased, to find that I was not alone in the anxiety of fashioning a presidential address. Most past presidents have discussed their choice between a presentation on science or on issues of concern to our Society. In the past few years, many have tended to the latter. Although, initially, I was tempted to present a talk on science, and you can be assured that some of my younger colleagues urged me to do this, I believe it more in keeping with the needs of our Society and my role during the past year to do otherwise.

Having started to put a talk together, the anxiety got so acute that I did what I found almost all other speakers had done before me. I started reading other presidential addresses. I was amazed to find that I was actually sitting at the same desk in the library of the Marine Biological Laboratory in Woods Hole that Joe Cook had used while he did the same thing.¹ It was a beautiful sunny day with a good wind. Looking out of the window at Eel Pond, I could see my new sailboat floating and beckoning like a siren to be taken into Nantucket Sound.

When I got down to work, it became clear that I wanted to talk about the logical outgrowth of the development of our Society and its problems. Actually, we have evolved quite significantly in recent years. Past presidents had suggested that we get professional management, that there be changes in our journal and that we take a more active role in seeking government funding. All

this has come to pass. We are not just standing still.

So I want to review with you what we have done, what we have learned, and what we need to do in the future to achieve one of our major goals: to obtain sufficient funds so that the spectrum of research and training covered by our Society from the most basic to the most applied can continue in a productive fashion.

One of our Council members warned me that many members were up to here—pointing to his forehead I assume, as he was on the phone—with the Legislative Task Force and suggested that my talk should be a potpourri of science, philosophy, and, above all, humor. Unfortunately, I am not the president of the Royal Society of Tropical Medicine and Hygiene, Professor George Nelson, who would have given you just that.² (Incidentally, he was made an honorary member of our Society this year.) And so I will review the actions we have taken in our venture into the real world of politics and suggest where we should go from here.

Several of our past presidents, including Paul Weinstein,³ Philip Russell,⁴ and Karl Johnson,⁵ strongly urged us to take a more active role in placing our issues before the government. Joe Cook redefined the goals of the Committee for Public Affairs (CPA), and Jack Frenkel started the process during his presidency, along with Stephanie Sagebiele, chairman of the CPA, when he hired professional help in Washington, DC. They continued as co-chairmen of CPA during the presidency of Louis Miller. This effort led to the document “Tropical medicine—proud tradition, grave new challenges,”⁶ which outlines the need for \$16 million a year for 5 years to implement some of the recommendations that had been made by the Institute of Medicine in their report “The U.S. capacity to address tropical infectious disease problems.”⁷ This “Proud Tradition” document was the basis for an authorization bill called the “Infectious Disease Control Act” which was started in the House of Representatives with the help of Representative Regula (HR 2290) and

* Presidential Address given before the 36th Annual Meeting of the American Society of Tropical Medicine and Hygiene, New Orleans, Louisiana, 3 November 1990.

in the Senate (S1874) by Senator Kassebaum. In a letter from me as president-elect (this could not come from the president, who was a government employee), our members were urged to write letters to their congressmen supporting these bills. They did so. This was our first taste of the legislative process, and things began to move.

However, the communications between the lobbying group and ourselves were poor, and parts of the bills were written and changed without our approval. Because of this, we changed our professional help and turned to Capitol Associates, directed by Terry Lierman, a man who had an excellent reputation for his work on Capitol Hill for the science community.

The liaison between Capitol Associates through Marguerite Donoghue and Anne Guthrie has been excellent. Their advice to change our strategy was reasonable. Authorization bills, like the one we had initiated, authorize that an action be taken. However, they do not provide money (although in the long run, they are meant to lead to appropriations bills, which do). And until new moneys are appropriated, everything that has been authorized must come out of present funds. The bill in question also authorized a new regulatory body to oversee and direct research for tropical medicine in the various government agencies. We were advised that, based on past experience with such bureaucratic devices, less money would end up going for the actual research and training for which the bill had been designed.

The problems with authorization bills as compared to appropriations bills were echoed when I met early this year with the administrators of the NIAID. They made it clear to me that if the authorization bill we were sponsoring in the House and Senate came to fruition without appropriations (that is, without more money), funds for it would be taken from the present ROIs and other funds for tropical medicine. It was obvious to us that this should not happen, so we gingerly got our message through to the principals (and informed our membership), which was not easy and rather embarrassing, that we were withdrawing our support for these authorization bills. We gave our reasons. I am told that our sponsors understood and that our cause has not suffered too much with them. At any rate, there has been no further action on these bills.

But I am getting ahead of myself. The Legislative Task Force Subcommittee met by conference call in early January this year to plan our

priorities for 1990. First, of immediate importance, we agreed that we must do all we could to be sure that funds presently allocated for tropical medicine in the USAID and Armed Forces programs were not cut but continued. Second, we focused on a long-term initiative to get more appropriations for tropical medicine research and training through the NIH. I asked that a representative of our Society be invited to present testimony at the appropriate congressional hearings this spring to promote these goals.

Our aim was not only to get the funds to increase the training and overseas activities spelled out in the "Proud Tradition" document, but also to increase the number of principal investigator-initiated ROIs for research in tropical medicine.

An informational document had been put together last year, at the request of Louis Miller, by Lydia Schindler with the help of many of you, to estimate the extent of the various "tropical diseases" in the U.S. and their cost to the American public. This was one of the documents used by Capitol Associates to develop our testimony before different subcommittees.

At the end of January, after my first visit to various congressmen and staff involved with the biomedical sciences, a visit guided by the expert help of Marguerite Donoghue and Anne Guthrie, it became clear that we could not just lobby for funds for ourselves in a narrow sense. If we were to achieve our goals, we had to help to increase, in general, the funding for biomedical research to the NIH and to other government agencies. The alternative of trying to get funds within an institute redistributed would not solve our problems. Indeed, many of us wear several hats and believe that it would not be justifiable, for instance, to transfer funds from immunology or molecular biology or infectious diseases to tropical medicine in the NIAID. All these areas need more funds.

At this juncture, we learned that the Ad Hoc Group for Medical Research Funding, an organization made up of over 150 scientific societies and advocacy groups, was trying to increase the YR1991 budget to \$9.24 billion for the NIH, a 19% increase over 1990 compared to the 4.7% increase requested in President Bush's budget. This amount would have restored the cuts made from downward negotiation, allowed for funding of approximately 35% of approved grants, instead of around 17–25%, and substantially increased funds for training and special projects.

Furthermore, Representative Barbara Boxer of California championed this increase in the NIH budget. The Council and Society members were urged to write letters supporting this increase. I should add that, in a number of other instances, the Council and CPA were faxed and urged to write letters on relevant issues. I will propose methods to involve more of the membership in these endeavors in the future.

When I testified to the subcommittee for Health and Human Services and Labor for further funds, a plea was made for an increase in funds for tropical medicine and hygiene in particular and for the NIH in general, with arguments made for both. The disastrous state of the present funding situation was emphasized. I was struck by the testimony of others. The majority also made an effort to back the Ad Hoc proposal as well as their own particular issues. It appeared that some substantial increase in the budget for biomedical science would be made. An air of cautious optimism started to be felt. Robert Shope testified before the subcommittees responsible for tropical research funded by the Defense Department in an effort to stem any cut that might come from across-the-board reductions in the defense budget, and Sanford Kuvin testified before the subcommittees overseeing the USAID budget to insure that money directed to the malaria vaccine program continue.

More scientists came to Washington to solicit a bigger research budget for YR1991 than ever before.⁸ Chairman Natcher of the House Health and Human Services subcommittee commented that the witnesses this year were very compelling, maybe because an increased number of basic researchers came to tell their story. When an assistant professor of cell biology at Johns Hopkins reported how grants for non-AIDS research fell 27% at Hopkins between 1988–1990 and that young researchers were virtually shut out, Natcher told her not to give up. Our voices seemed to be being heard.

But a problem arose in getting all the scientific groups behind a common cause. The need to pull together as a science community hit a serious snag. The American Society of Cell Biology and the American Society of Biochemistry and Molecular Biology sent a "Dear Colleague" letter to Congress in the spring, stating that all that was really needed was \$200 million to support 1,000 new and competing ROIs. This recommendation left congressmen confused. Why should they have

to spend \$1.3 billion more for the NIH when respectable societies of scientists said that all that was needed was \$200 million. It appeared that these two societies had totally blown it and undercut the gigantic efforts of many, many groups to get increased funding across the board.

David Korn, Dean of Stanford University, commenting on this situation said that competing messages create the appearance that scientific societies care only for their own specific areas of interest.⁸

When speaking to the staff of the Health and Human Services Subcommittee, I saw other evidence of conflicting testimony that hurts our cause. One staff member told me that a Nobel laureate had assured him that there was really no funding problem because all good scientists get their grants funded. This is not true. It was made quite clear to me by administrators at the NIH that some excellent grants that had been approved last year were not funded because of budget limitations. I know personally of an excellent scientist whose NIH grant was turned down, only to receive a large Merit award in response to the repercussions of that decision. By then, it was too late; he was fed up and had gone into industry. In response to the setback caused by the disparate advice given to congress just described, Capitol Associates moved to convince congressmen that the Ad Hoc Committee's proposal reflected much more closely the needs of the biomedical research community than that stated by the two societies. On April 19th, the House Budget Committee with the aid of Representatives Barbara Boxer and Richard Durbin added an extra \$750 million to the NIH budget. During the summer, the House and Senate Appropriations Committees marked up the budget, a procedure which puts the finishing touches on what they want. After a compromise, they came up with a budget for the NIH of \$8.5 billion, 12% over 1990.

We helped draft report language with Capitol Associates supporting tropical disease research and convinced the Congressional committee staff and Senator Harkin to insert it into the report of the Committee on Appropriations.

It summarized well the points in our testimony and read,

The Committee has received a copy of the report prepared by the Institute (NIAID) on the subject of tropical medicine and infectious

TABLE 1
Budget for National Institutes of Health

Budget FY 1990	% change over 1989	Dollars in Millions		Approved B. FY 1991	% change over 1990
		President B. FY 1991	% change over 1990		
\$7,576	6%	\$7,929	4.7%	\$8,306	9.4%

diseases. In addition, we have heard testimony regarding the devastating impact that these diseases are having worldwide and the increasing incidence of traditionally tropical diseases occurring in the United States. Today, many tropical diseases such as malaria, dengue and toxoplasmosis pose a direct and costly threat to the lives and well being of many Americans travelling or living abroad, and living in the United States. Further, tropical medicine specialists have played a major role in providing expertise to address many parasitic and infectious diseases occurring in the United States such as Lyme disease and other emerging viral diseases.

The Committee believes that it is imperative to maintain expertise and revitalize research efforts in this important area of research. The Committee is particularly interested not only in ROI's but also in programs to strengthen centers in the United States and for training specialists with an overseas component to increase our capacity to deal with these diseases. Therefore, within the increase provided to the Institute, the Committee requests that additional funds be directed to research in this crucial area and that a spending plan be submitted to the Committee within 90 days as to the amount of new funds to be provided out of the increase and the Institute's plans in this high priority area.

At this point, we could not have asked for more. Our message had been heard.

Then came the notorious budget summit. We were asked to help to prevent one Senator from moving \$68 million from the NIH budget to the homeless, and other attempts to divert funds from the NIH to a new but unfunded AIDS authorization bill. Letters were sent out to the appropriate members of Congress on these issues.

At last, Congress passed the final budget, with an across-the-board cut of 2.41% of all programs in the Labor/HHS Appropriations bill, and adjourned. The analysis of the final bill, sent to me

by Capitol Associates, shows that overall the NIH gets \$8.317 billion, 9% more than 1990 (see Table 1). NIAID gets \$910 million, a 9.4% increase over 1990. This is a larger increase than several other institutes received, including the Cancer and Heart and Lung Institutes.

The CDC Infectious Disease Program received an 11.5% increase (\$44.3 million) over 1990. We also had included, in the committee report, language requesting analysis of their priorities.

A Foreign Operations Appropriations bill was passed after an 11th hour compromise, on Saturday, October 27th. This contained the language we had developed in support the AID Malaria Vaccine Research Program.

The Defense Appropriations bill stated that the Committee direct that the increase in \$4,000,000 be used to support infectious disease research which is not classified as biologic defense or AIDS research.

It is indeed fortunate that despite our present economic problems, the mega-deficit, and the Gulf crisis, we got the increases we did. Surely, it was worth the effort. We convinced the Congress to insert language into the bill to direct that some of the increased funds for NIAID go for tropical medicine. Now we must work with NIAID to be sure that this language is translated into action.

To get all the funding we need will take time. We must not be discouraged because we were not completely successful on our first try. We are learning and will undoubtedly learn more as we continue. Most important, we have laid the groundwork for future efforts.

So what should we do?

We need to increase our work on several fronts. First, we should persist in promoting our cause with the government, on Capitol Hill, the White House and the NIH. Related to this, we should join with others to seek funds for tropical medicine from sources other than Health and Human Services. Philip Russell, in his Presidential Address in 1983, bemoaned the fact that we were

not using the potential of medicine and public health as an effective tool to further our own national interests and to improve the quality of life in developing countries. The Department of State is a source of such funds. We should try to re-direct some of these funds into positive programs. I understand that the Institute of Medicine now has a committee chaired by William Foege looking into the role of the U.S. Government in international health. We hope this will lead to re-direction of funds to tropical medicine.

Second, we need to develop strategies to attract interest and support from the American people for biomedical science in general and our field in particular. Third, we should make sure we are in the arena to influence the major decisions made in government that determine the priorities for funding: i.e., how much money goes into health research and how much goes into other areas. Simply, this means we must be active citizens.

As far as the first effort aimed directly at legislation, we should continue to work with Capitol Associates. They have proved to be an intelligent, well-informed and active lobbying group for science. There has been a traditional belief held by some that scientists do not involve themselves with politics—even that science is separate from politics (anyone from Harvard is excepted, of course). As long as the mass of funds for biomedical science come from government, we must make the case for what we need. Senator Lowell Weicker, Jr., R. CT, a long-time champion of the biomedical sciences, has always encouraged individual scientists to get involved. “You’ve got to get your jerseys dirty. You’re needed on the field of politics,” he says.

Indeed, we must reach more of the Congress. One Washington lobbyist said that the science community this year reached only a small segment of Congress, about thirty people, focusing on chairmen and the staff of budget and appropriations committees. If we do not reach out further, it is difficult for the subcommittee leadership to get the kind of broadscale support necessary to get appropriations bills passed.⁸ Senator Barbara Mikulski, who chairs the Senate appropriations committee, with purview over much of federally funded science research, told Dr. Allan Bromley, the President’s science advisor, that although she was besieged by letters on issues such as veterans’ pensions and homelessness, she got few from individuals requesting

support for research and yet NIH is housed in her state.⁸

Moreover, our approach must be thoughtful and broad. I believe it is important to continue to join with other science groups lobbying for increases in funds in general. It is easier to put the point across and the voice is stronger and louder. And, in fact, when increased funds are appropriated, we will automatically get our share of ROIs at NIAID, as these are given on a competitive basis. Similarly, the need to obtain funds for training and to improve the terrible state of old laboratory facilities and build new ones is a general problem, not just one for our Society. However, for special programs related to tropical medicine, including specifics in training, overseas activity, and core support, we must lobby not only Congress, but also the NIAID administration itself. This was told to me many times by the Congressional staff.

Each of you should try and see your member of Congress when you come to Washington, DC. You may be surprised how pleased they and their staff are to see you. You should also invite them to visit your laboratories when they are at home in your district. I was intrigued to see how many were interested in biomedical science and thought it should have increased support. But, they have competing pressures, so we must increase our numbers, broaden our appeal and persist in presenting our case.

In our Society, we should continue to expand the activities of the Legislative Task Force, the subcommittee of the Committee on Public Affairs, which means that we must continue to fund this effort. We need to have better communication with the membership so that they can write to Congress on specific issues. We are starting to develop a network with at least one coordinator for each state. Then when important issues come to committees in Congress, our Legislative Task Force could target members, through the state coordinators, whose representatives are on key committees, to urge our case. We should also continue to use the News for these activities.

The second avenue takes a different path to making direct interactions with Congress more successful: that is, influencing Congress through a grass roots policy. This is a complicated and long-term task. But we do not need to start from scratch. For one thing, we should join actively with Research!America, a new organization in Washington, DC whose president is Senator

Lowell Weicker, Jr. The stated goals of Research!America are to gain public awareness of the benefits to humankind of medical research and to build a base of citizen support for more research into the cure, treatment and prevention of physical and mental disorders. This covers all of biomedical research.

The powerful tone set by Senator Weicker, Jr., is sounded in one of his editorials published in the *New York Times* (1 February 1990). It starts, "Every American ought to be outraged about what is happening to one of our great public assets—the National Institutes of Health. The NIH is to medical research what NASA is to space exploration: uncontestedly the best in the world. Unfortunately, we're letting this great national resource run down badly." It ends, "There is no better time and no more urgent cause for Americans to rally around than medical research. There is no more deserving government enterprise than the NIH.

Research!America has been gathering information and spreading it in excellent editorials which have appeared in many newspapers. One entitled "To save on treatment, find cures" by former U.S. Surgeon General C. Everett Koop, was published in the *L.A. Times* 25 June 1990. It states that "of the billions we spend on health, little goes for research. But that's where the big payoffs come from." He further points out that, "the \$1.5 billion a day we spend to care for the sick is the biggest single line item in the federal budget. Bigger even than defense. We spend \$3,000 a year per American for health care; by contrast the annual federal investment in biomedical research is only \$35. Less than 3% of the health-care dollar is earmarked for the scientist at the bench." He estimates that the development of vaccines for polio, measles, mumps and rubella has saved us more than \$2 billion a year. "Medical research historically offers an excellent return on taxpayer money. Studies show a \$13 return for every research dollar invested by the federal government between 1900–1975." Further, "There are direct and indirect spinoffs. More than \$40 billion is contributed annually to the GNP from medical discoveries used in non-health-related products. Medical research has spawned over 100 new high-tech companies—the kind of economic development most needed to make America competitive and build a strong base for the future." He ends with, "Spending

for biomedical research is smart politics, sound national policy and a good business investment."

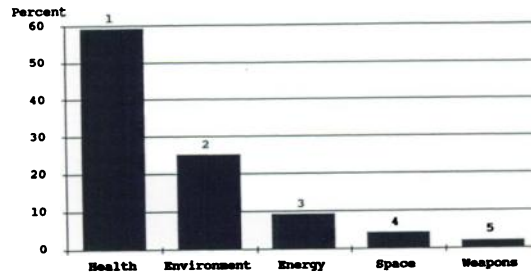
A variation of this editorial was published in the *Boston Globe*, 20 August 1990, by Thomas P. O'Neill, Jr., former Speaker of the U.S. House of Representatives who is now a board member of Research!America. In addition to some of the data given by Dr. Koop, he stresses the problems of funding. "At a time when the world's best scientists are on the brink of important breakthroughs, they are being restrained in their work. Young scientists can't get funds to get started and senior investigators are having their grants cut by 10–20%." Further, "the percentage of health-care dollars devoted to biomedical research has been declining steadily for years. Under 2% of the \$600 billion we spent on health care last year was devoted to research. NIH was able to fund six out of ten eligible new research projects in 1979. In this fiscal year, only one out of four outstanding projects will be started. This downward trend cannot be allowed to continue without increasingly harmful consequences. Renewed national commitment to medical research represents investment in our future that has to be made soon before we fall behind in the high-tech global economy of the new century. Let's not blow our lead in this critical area of scientific enterprise. Health research, more than any other government activity, holds the opportunity for big economic payoffs and personal benefits for all Americans."

This group enlisted the help of Ann Landers, who writes a column syndicated worldwide to 1,200 newspapers and read by 80 million people. She presented similar arguments and instructed her readers to write to Congress. It is difficult to imagine how one could get this message to more people. But, to be effective, the message must be sent over and over and over again.

Research!America is not promoting any particular disease or discipline, but uses current medical problems in the best ways it can to get the public's support. The Society has joined it and is listed as one of their sponsors in their literature. But now we need to interact with them in a more active manner. With them, we should develop editorials or TV spots using tropical infectious diseases to illustrate the need for research in general, as well as getting our particular research problems before the general public. I have discussed with the Council the need to have a subgroup of the CPA whose main mission is

Americans Give Medical Research Top Billing in Nationwide Poll

Recent polls show that, of five research programs, Americans rank health research as the number one priority in allocating federal funds. Research to improve weapons is a distant fifth priority.



Asked which of five research programs is their "top priority" when allocating federal funding, those surveyed responded as follows:

1. Research to improve health care/find cures
2. Environmental research to reduce pollution
3. Research ways to use energy more efficiently
4. Research to advance our space exploration program
5. Research to improve weapons

The nationwide public opinion poll of 1,000 adults was conducted February 24-26, 1990 by Market Facts, Inc., and has a margin of error of plus or minus three percent.

Source: American Federation for Clinical Research

to interact with Research!America and devise other ways to get our message to the public.

Since many of our goals are similar to those of related societies, we should aim to join with them and have them join us. The Entomologic Society of America has said they wish to do so, as have the Parasitologists. By joint effort, we would increase our effectiveness and share the financial burdens. I believe that this should be the charge of a subgroup of the CPA.

The third avenue, that of influencing the priorities of government spending, is the most difficult of our options to carry out effectively. Yet this is where we obtain the greatest changes in allocation of funds for biomedical research versus other projects. We constantly hear that Congress has increased the budget of the NIH in the past years. It has. But the increase has not kept up with the explosion of new opportunities in the biomedical sciences. Imagine that you live in a two-bedroom house and your heating bill goes up through inflation. You'll be okay if your salary keeps up with inflation. This is the case of the NIH budget. If on the other hand your family grows and your house now has five bedrooms but your salary only keeps up with infla-

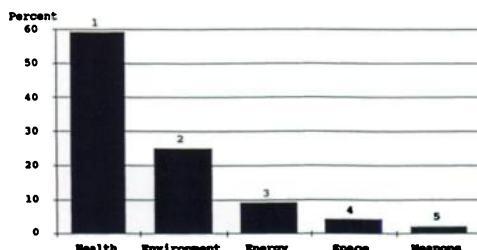
tion to heat two bedrooms, your pipes will freeze and so will you. We are not keeping up with the needs and opportunities laid out in the increasing numbers of excellent grants coming to the NIH. And, in basic research, the feeder level for scientific development, we are losing some of our best and brightest young scientists.

Several factors will help us in this quest. First, we are swimming with the tide of public support, not against it. A recent nationwide public opinion poll of 1,000 adults and 200 Congressional offices shows that both the public and members of Congress overwhelmingly support medical research as "top priority" (see Fig. 1⁹).

In the face of this sentiment, I was particularly upset when I read about the most recent Institute of Medicine report. *Nature* reported that "Based on two years of meetings between some of the top names in biomedical research, the report takes the position that, given constant budgets, more money should be taken from research and put into training and facilities." There is no question that we must spend more on training and facilities. But this report assumes that it is impossible to get added funds for the entire endeavor. Apparently this was one of the ground rules these

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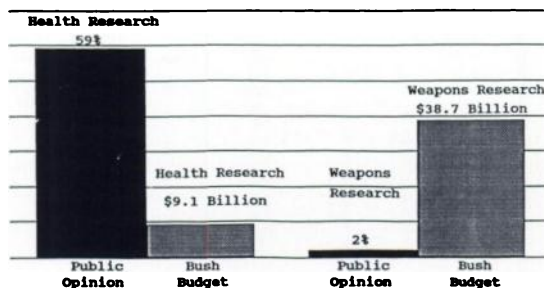
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Source: American Federation for Clinical Research

Bush R&D Budget Priorities Out of Step with Public Opinion

In sharp contrast to public opinion, the Bush Administration gives top priority to research to improve weapons, based on its proposed FY91 R&D budget allocations for the same five programs.



experts were constrained by at their outset. This is an untenable proposition. I doubt that the public would accept a reduction in biomedical research at this time if they were consulted. Funds must be found in other areas that we feel have lower priority without carving up an area the majority of us believe to be of top priority. We have not heard the end of this report and I fear it will be used against us when we go to Congress again.

It is also interesting to see how President Bush's research and development budget priorities are out of step with public and Congressional opinion (see Fig. 2^o).

A recent story in the *Boston Globe* on October 25 by Fred Kaplan illustrates why we need to reorder our priorities. About the Hawk air defense missiles that Iraq captured from Kuwait, Kaplan writes, "Analysts have commented in

recent days on the irony and possible danger of American pilots facing American anti-aircraft weapons." "The issue," several specialists said, "is not whether the Iraqis can aim and fire, but whether they can maintain and repair the weapons. . . ." "They couldn't possibly get them working," said a former Pentagon air warfare specialist. "Even the U.S. Army couldn't get them to work. We were lucky if they were working 20% of the time. There is no picture on the radar screen or there's no connection between the electronics and the missile. Without American advisors and technicians, they can't get these things working. Period. Not a Chance. . . ." "Just sitting there, not even being used, the missile dies on you," said a former missile testing officer. "We have 30% of the missiles sitting in storage just die. You get something that complex, with millions of possibilities to go wrong, it will go wrong."

Further, "even if a lot of Iraqi-held Hawks did work, most of them would not hit their targets. . . . If American pilots can maneuver, there's no danger," and on and on and on. For years now, we've had a government that never saw a weapons system it didn't like—whether it works or not. Surely we can save money without endangering our defense posture by not investing in weapons of mindboggling cost that don't work. Then there is the small budget item of defending Europe and Japan, our developed allies. Representative Barney Frank recently said that the only reason we can possibly have for keeping our troops in Europe now is if we honestly believe that Bulgaria is about to invade France.

It is only by reordering our priorities as a nation that we can develop and support research with the amount of money that will be necessary to renovate biomedical research facilities, provide appropriate training, and allow research scientists to consider that this is a reasonable career in which you will be funded if you do good work.

Unfortunately, the days of the quiet academic life in science are no longer with us. A fact of life is that we must fight for what we need. We need to find more members who are willing to do this, who, when they draw the short straw, will put energy and spirit into the task. If you want to go

off on an expedition, whether you're off to discover the source of the Nile, like Burton and Speke, or to find the basis of drug resistance in parasites, you have to sell your scheme. Actually, when you get going, it's a lot of work, but it's also a lot of fun.

Thank you.

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