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Politicians and Social Scientists

An Uneasy Relationship

pls file under Science & Technology

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This article is part of a debate that has been going on for a long time; the debate centers on the uneasy relationship between politicians and social and behavioral scientists. My objective is to make a modest contribution to this debate by outlining the range of problems and perceptions that impede effective interactions between social and behavioral scientists and politicians and identifying steps that need to be taken in order for social and behavioral scientists and politicians to work together more effectively.

Social and behavioral scientists have encountered a special set of attitudes and problems not common among colleagues in other areas of science and engineering. These circumstances involve not only individual social and behavioral scientists but also their professional organizations and societies.

Physical scientists have often experienced respect, support, and, in certain periods, an unhealthy adulation from politicians and the general public; on the other hand, all too often social and behavioral scientists have encountered lack of respect, hostility, derision, and conscious distortion of their work by "cheap shot" politicians and "fast buck" hack writers.

Regrettably, much of the abuse must be accepted—if not with detachment, then with grace. Great energy and resources would be wastefully diverted to defending against every such attack. I fully agree

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Author's Note: *This article is based in part on an unpublished paper entitled "The Social Sciences: A Political View," by William G. Wells, Jr. and Michael E. Breton.*

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with Robert P. Lowman (American Psychological Association) that both individuals and organizations should choose their responses carefully in terms of timing, tactics, and strategies.

The purposes of such responses and all interactions with politicians and the public should be grounded in the following:

- enhancing respect and standing as scientists;
- furthering communications with other parts of the scientific community;
- seeking to better inform and educate politicians and the general public about the nature and value of the social and behavioral sciences;
- developing effective alliances, personally and professionally, in a variety of ways; and
- fostering support for education and research in the social and behavioral sciences.

In presenting this array of objectives, a distinction needs to be made between ill-founded attacks and legitimate concerns. Indeed, no responsible social or behavioral scientist would argue that he or she should be immune from criticism and debate about such matters as methodologies, major research issues, and support policies.

SCIENCE AS A REVOLUTIONARY FORCE

Perhaps a good starting point is to remind ourselves about the role of science in today's world. Going to the heart of the matter, in a brief time science has proved itself an incredibly powerful revolutionary force which has swiftly and dramatically affected man's beliefs and values, created and destroyed industries, revolutionized war, transformed and overturned political social organizations, and modified people's conception of their place in the universe.

In short, tremendous changes have taken place with bewildering speed in political, social, intellectual, economic, international, and military institutions as science and technology have come to occupy a central place in the life of the entire planet. And there is little reason not to accept Bertrand Russell's view of science: "that we are only at the very beginning of its work in transforming human life" (1951: 3).

Scientific knowledge has affected basic beliefs and values, and technology has induced social changes in ways that are little understood despite the great attention devoted to them by a long succession of philosophers, scientists, and writers—mainly from the academic world.

There is a rich variety of ideas in the literature—largely from the social sciences—which illuminate the general interactions between science and social values and the societal impact of such phenomena as technological changes.

An examination of this literature reveals a fundamental challenge for politicians and social scientists: to understand the substance of science is *not* to have a sufficient basis for understanding the impact of science on society or preparing for the inevitable changes to come.

Regrettably, the record of the past four decades reveals a terribly ironic finding: Many in the political environment—*and in the scientific community as well*—have been either indifferent or hostile to one of the most promising means for coping with a vast range of human problems—the social and behavioral sciences. It is not only the broad, sweeping impacts that have been of major concern to those in the social sciences; well-reasoned, documented cases have been prepared on the value of the social sciences in solving or attacking a host of individual, organizational, and societal problems.

Indeed, it is not really possible to devise effective policies and solutions to cope with energy, environmental, industrial productivity, health, and national security problems—to mention a few minor concerns now on the national agenda—without recourse to the insights, research findings, and methodologies of the various social and behavioral sciences. Yet, the social and behavioral sciences have long faced a deep and fundamental set of problems in Washington; gaining widespread acceptance and support has been a difficult, uphill battle.

A BRIEF HISTORICAL OVERVIEW

The roots of conflict and hostility run deep. In the mid-1930s, a first major attempt by scientists to become involved in the political arena led to the establishment of a Science Advisory Board (SAB). The board was dominated by physical scientists, and those in the social sciences were virtually excluded except for subsidiary subcommittee roles.

The SAB had limited success, in that good advice was provided to a number of government agencies and a substantial number of scientists and politicians gained experience in working with each other. Yet, the board failed in its larger purpose; President Roosevelt and his senior officials saw little connection between recommendations for more federal support for university research and the problems they were struggling with—massive unemployment, widespread hunger, and rebuilding a shattered economy.

During the latter half of the 1930s, social scientists—for the only period during the past 40 years—superseded physical scientists in prominent science advisory positions via such bodies as the National Resources Development Committee. By and large, social scientists were relatively more influential than physical scientists in shaping the New Deal—and this would come back to haunt them.

To this day, the social scientist is seen by many politicians not as a scientist but as an advocate of social change and government intervention of some kind or another. It is no accident that "social engineering" is used negatively by some to encompass the social sciences and the legacies of the New Deal and the Great Society.

World War II brought science and technology into the inner councils of national government to stay. But in the minds of politicians and the public alike, it was the physical scientists and engineers—not social scientists—who produced the stunning array of war-winning technologies and weapons.

In congressional debates from as long ago as the 1940s (when the National Science Foundation was established) to as recently as the NSF budget reviews in 1981 and 1982, opponents of the social sciences have drawn on a variety of notions to build their case for reduction or elimination of federal support.

In the late 1940s, it was the natural scientists and engineers who excluded the social sciences from Senator Warren Magnuson's Foundation Bill (it was drafted by Vannevar Bush). And it was a politician—Senator Harley Kilgore—who included the social sciences in his version of the foundation in collaboration with the Bureau of the Budget. That story has been told elsewhere, but the major points are these:

(1) In the final legislation the social sciences were not included.
(2) At times the debate was acrimonious about the social sciences.
(3) The scientific establishment was *not* a friend of the social sciences in the foundation "affair."

Not since the time of FDR have social scientists held prominent science advisory positions. The physical scientists and engineers who helped build the wide-flung, post-World War II R&D structure saw little, if any, place for the social sciences in their plans.

In fact, the President's Science Advisory Committee (PSAC), created by President Truman in 1951, did not have its first social scientists until 1965, when Herbert Simon was appointed. In more recent years, social and behavioral scientists had a very limited role in President Carter's science advisory organization, and so far, they are totally absent in President Reagan's circles. For example, the newly appointed (February 1982) White House Science Council has no social or behavioral scientist among its members. One former presidential science advisor summed up a not uncommon view by observing: "they haven't discovered their Newton's Laws yet."

Although modest support for the social and behavioral sciences by the NSF actually began in the 1950s, it was not until the 1968 amendments to the NSF Act of 1950 that the social and behavioral sciences acquired a statutory base in the NSF. It is noteworthy that this action was initiated by a small number of politicians and staff members in Congress working closely with social and behavioral scientists from the academic world.

Even with this legislative change, financial support has remained at modest levels in NSF budgets. Moreover, in one way or another, political attacks have been made over the years both on the social sciences in general and on specific projects and programs. For example, during the mid-1970s, slashing, well-coordinated attacks were made on various social science curriculum developments funded by the NSF. These attacks served as the basis for a series of major assaults on the foundation and were forerunners to the Reagan administration's drastic reductions in social and behavioral research budgets.

In the 1979 House debate on the fiscal year 1980 NSF budget, Representative John Ashbrook successfully put forward an amendment which had the intent of "gutting" the social science program. Fortunately, defective wording in the amendment applied the cut to the entire line item of the biological, behavioral, and social sciences—and ultimately the cut was restored in conference with the Senate. But this incident was only a mild example of what lay ahead.

LESSONS FROM HISTORY

A review of the record of the past 40 years suggests that a number of factors influence the relationship between politicians and social scientists:

- *There is the large issue of how science and technology fit into our society*; attitudes of members of the public and politicians have become increasingly important. Problems of accountability, traditions of scientific freedom, and ethical issues come together in complex ways. Scientists in all fields—including social scientists—cannot function effectively without taking into account the interests and rights of others and the distribution of power between an variety of actors. Politicians must learn to think of science in broader terms than immediate solutions to some problem which troubles them.

• *Some think that social scientists are not really scientists.* Leigh Shaffer has quoted Senator William Proxmire as saying in an interview with the *APA Monitor*, "It's too bad they're called sciences, because they are not quite. I don't know what they are. They're somewhere between science and art." This is a view which spans 40 years of science policy debates; all too often, others in the scientific community have joined Senator Proxmire in his opinion. There is no evading this issue—social scientists must step right up to it.[1]

• *Social scientists—at least some of them—work with subjects of "common knowledge."* Politicians and members of the public often think they know a great deal about such subjects. In contrast, they are often quick to say "I never was any good at math" and feel not the least embarrassed because they know nothing of nuclear physics. Senator Proxmire, for example, has never identified a high-energy physics project for a "Golden Fleece" award. Yet, he and others considered themselves expert in societal problems and thereby "qualified" to pass on the merits of specific projects in the social and behavioral sciences.

It is doubly ironic that many of the outspoken critics of social science research are the very ones who call most loudly for increased efficiency in government and industry—increases which will depend in large measure on learning how better to operate large human organizations. Henry Ford II noted that the largest pool of untapped resources in the United States is the American worker. Learning how to "tap this pool" will not come out of physics or electrical engineering.

Yet, it is suggested by Robert Cole that American managers and engineers, drawing upon their "experience," reject social science models of management. There is an inherent tendency to minimize the contribution of worker effort and motivation with respect to increased productivity and project quality. The emphasis in the United States, in contrast to Japan, is on the "technological fix," not on securing worker cooperation and participation.[2]

• *Social scientists are seen by some as social advocates.* As noted earlier, such perceptions date back to at least New Deal days. This notion is closely related to what Robert P. Lowman (1980) has observed: "Because the subject matter of the social sciences often deals with strongly-held belief systems of members of society, or questions their values, behaviors, or convictions, the study of the social sciences is often seen as threatening by members of the public, including elected public officials."

• *Social scientists have not made the kinds of visible contributions that are associated with physical scientists and engineers.* Such attitudes persist in spite of the significant and growing contributions the social and behavioral sciences are making in our society. It is ironic indeed that technologies arising in large part from the social and behavioral sciences are of central importance in today's complex world but are not generally recognized as such. These include economic indicators, economic forecasting, demographic projects, modeling, management systems, marketing analysis, survey methods, and many others. On the negative side, Michael Pallak (1981) has noted that human factors researchers and engineers have not been used widely in the nuclear power industry. More to the point, the Kemeny Commission concluded in its Three Mile Island report that it was primarily "people-related problems and not equipment problems which brought us so close to a major tragedy."

• *Politicians and the public don't really understand the social sciences.* This perception is directly connected to nearly every one of the above-cited problems. There is an uneasiness among politicians—and probably among the general public as well—that social scientists are "messing around" with their lives. Never mind that those in the natural sciences and engineering are really "messing around" with our lives—that is progress. In any event, there is a feeling of disquiet that "we" are being probed and prodded—with just the hint that loss of control over our lives will result. From such fears arise hostility and slashing attacks.

Politicians often tend to rely on their own intuitions and convictions about human behavior in devising major social programs rather than call on the social scientists. We have seen this time and again as multi-billion-dollar programs have been launched in public housing, health, and other social services based more on how politicians "feel" than on solid information or good research findings. In short, many politicians consider themselves the experts, not the social scientists.

Barbara Tuchman, in an essay from *Practicing History*, has pointed to a special dimension of the "understanding problem." She argues that there is great creative literary potential in the sciences—and that "this writing must come from within the disciplines." However, she goes on to observe that the example of the social scientists must be avoided at all costs. It is her contention that with their writing and special vocabularies they "have painted themselves into a corner of unintelligibility" (1981: 55). Harsh? Yes. But these are views held by many in the political world as well.

Another aspect of the social and behavioral sciences which leads to difficulties is this: These areas of science are anything but unified in concept or in practice—and this troubles politicians as well as natural scientists. The social and behavioral sciences are diverse, and this diversity itself leads to confusion. The extreme breadth falling in these categories ranges from highly objective experimental disciplines in psychology or anthropology, through statistical studies in sociology and social psychology, to clinical psychology, which often relies on an almost anecdotal case history approach. And of course in every area there are many variations in method being used, such that little agreement could be reached, even among practitioners, as to how best to characterize their science. This contrasts sharply with the situation in the physical and mathematical sciences.

Just to illustrate the point, we might compare the federal funding picture in physics to that in the behavioral and social sciences. According to the *Intersociety Preliminary Analyses of R&D in the FY 1981 Budget*, published in 1980 by the AAAS, there were exactly two major sources of research funding for physics: NSF and DOE. By contrast, at least 12 cabinet-level departments and 16 independent agencies contributed to funding social and behavioral science research. Even chemistry, which claims to be "ubiquitous in the R&D budget," was funded through only six major agencies and departments.

This provides some indication of the problem faced by anyone, even a professional in these fields, in trying to understand the federal posture toward research in social and behavioral science. What emerges from any examination of these facts is that until the arrival of the Reagan administration, there was no unified federal posture, just as there is a lack of unity within these areas of science. Instead, one finds a pattern of separate centers of support for more or less isolated specialty and subspecialty areas within the whole range of these sciences. Economists do not often talk to psychologists, but generally they would not say anything against them. Anthropologists speak to political scientists only at parties. And yet they are all working toward fundamental understanding of individual and group human behavior in all of its

manifestations, from the earliest beginnings to projections of future development.

But this general common bond is in the intellectual background and does not influence day-to-day reality. Cooperation at the federal level by the disciplines involved in presenting a compelling case for public financing of social and behavioral research has been all too rare. Instead there seems to be a generalized feeling that each area is in competition with its near associates for truly scarce federal dollars. This feeling has some grounding in fact, since in every area priorities must be and are set. But the limiting factor is in the larger sum available for all.

I do not plan to discuss views held by some of those in other scientific disciplines, but they often have not been supportive allies in social and behavioral scientists' dealings with politicians. And it is not far off the mark to suggest that on more than one occasion they have been antagonists—overtly and covertly. In short, the disquiet and uneasiness felt by politicians about social and behavioral scientists have not been alleviated in discussions between politicians and a number of natural scientists and engineers.

A NEW ADMINISTRATION: A DRAMATIC CHANGE

The arrival of the Reagan administration brought the portent of major changes, but few were prepared for the draconian assaults on the social and behavioral sciences. As the budget plans for revising Carter's FY 1981 and FY 1982 budgets began to unfold in early 1981, it became clear that a determined, systematic effort was under way to virtually eliminate federal support for social and behavioral research.

In retrospect, one can build a case that what happened should not have been such a surprise. David Stockman and his aides, while in Congress, had been among the most adamant opponents of federal support for social and behavioral research. Also, a member of the NSF transition team had been one of the key staff aides to former Representative John Conlon, who led attacks on NSF in the mid-1970s.

Although only general instructions were given to various OMB offices on budget levels for hundreds of programs, Stockman issued detailed, specific "guidance" on reducing or eliminating social and behavioral research in the NSF and other agencies. In response to charges that these actions were motivated by ideological consideration (i.e., "social science *equals* social advocacy of the kind that we are going to get rid of"), a parade of administration figures in congressional forums said, "Not true. In a period of fiscal austerity, this kind of research is low priority and should not be supported."

In an exceptionally deft manner, the Reagan administration moved away from the traditional ways of attacking the social and behavioral sciences. No talk of "crazy grant titles" or "social engineering" was in administration statements; instead, they chose their battleground carefully, on terrain where the president is strongest—the budget, priorities, and the economy.

Of course, one would have to be more than mildly skeptical to believe the "low priority" argument. But administration figures would not budge an inch from it; moreover, they would not even debate the issue. They simply asserted their judgment of "low priority" in response to questions and went on to the next subject. On a more positive note, limited restorations have been made in fiscal year 1983 budget requests (such as the NSF); but, on the other hand, in other organizations (such as the National Institute for Mental Health) social and behavioral science support remains a "disaster area."

STEPS THAT NEED TO BE TAKEN

In surveying both the record of 40 years and the current scene, one is driven to consider what needs to be done—first in the short term and then in the longer range.

SHORT TERM

Short-term activities in recent years have necessarily been directed at "saving" as much as is possible of social and behavioral research programs in various agencies. Primarily these activities have been in the congressional arena; it is too soon to tell what the outcomes will be, but several events are instructive.

• Broad support in the congressional review processes has been provided by the scientific establishment—for example, the National Academy of Sciences and the American Association for the Advancement of Science, both in 1981 and 1982.

• Congressional action led to some restorations of social and behavioral science support in the NSF budget for FY 1982—and is leading to increases in FY 1983. Important observations, I think, are these:

—The majority of members who supported the administration in 1981 and 1982 spoke in terms of budget austerity and the president's economic program; only one member in the 1981 debate returned to the debates of earlier years, brought up "Fat City" by Donald Lambro, and referred to social scientists as "intellectual ineffectuals."

—Members of both parties in 1981 and 1982 presented well-reasoned defenses of social and behavioral science research in terms of national priorities, the ground chosen by the administration.

—The character of the defense was clearly influenced by an extensive lobbying and educational effort by individual universities and their associations, scientific and professional organizations, and particularly by the Consortium of Social Science Associations (COSSA).

—Finally, an amendment in 1981 to reduce the NSF budget to the administration request lost by a vote of 264 to 152. (This was one of the relatively few budget votes that year in which party affiliation was not a major consideration.)

The lesson here is that continuing efforts must be made in the congressional arena as part of the "salvage" operation. Tight organization and close coordination are essential in these endeavors. It is also important to remember that this is not really a partisan issue; Republicans and Democrats have been on both sides.

LONGER TERM

In the longer range, a broad array of activities seems to be called for. I argue that such measures should include the following:

• *Forging stronger links between politicians and social and behavioral scientists.* Allies in the Congress must be chosen with care—both in the Senate and House and in both parties. It is important not to forget the new representatives and senators. Another element is the building of a network of staff people in personal as well as committee offices. These linkages should be thought of as two-way communications channels.

An important development in "linkage development" during the past decade has been the Congressional Science and Engineering Fellows Program. On behalf of about 20 professional societies and organizations, the American Association for the Advancement of Science (AAAS) administers the placement of scientists and engineers with the Congress for one-year periods of service as legislative assistants either on committees or in individual House and Senate offices.

Initiated in the early 1970s by physical scientists and engineers, social and behavioral scientists began to participate by the mid-1970s. Such fellows have included psychologists, sociologists, and anthropologists.

The fellows bring to Congress new insights, fresh ideas, extensive knowledge, and education in a variety of disciplines. Not only are the fellows provided the opportunity to make a significant contribution, but they also obtain firsthand experience in the legislative and political processes. In short, the fellows offer their special knowledge, skills, and competence for the opportunity to acquire experience and the chance to contribute to the formulation of national policy.

These fellows have been fully accepted in the congressional arena; some stay on as staff members, while others return to the world of science. But whichever way individuals decide to go, the overall result is a vital enrichment of the political process and of science itself.

• *Expanding educational efforts.* The kinds of problems discussed earlier suggest a strong need for expanding efforts to explain and convey a better understanding of the social and behavioral sciences. Specific measures could include one-on-one briefings, seminars/forums on subjects of interest to politicians which involve the social and behavioral sciences, participation in hearings on key budgets, and the preparation of concise reports directed specifically to politicians. More attention must be given to presenting in understandable terms the many contributions—past, current, and potential—of the social and behavioral sciences; part of these efforts must also be placed on the negative implications of not supporting these areas.

• *Increasing lobbying activities.* The FY 1982 NSF appropriations debate and result can be traced to effective lobbying. This is an entirely legitimate function to which the scientific and engineering communities have come only reluctantly. Attempting to influence policy and budgets is a "time-tested" method in our government. A number of specific activities have been undertaken within the past two years by the Consortium of Social Science Associations—but more sustained attention is required. COSSA has, however, been quite successful in helping to coordinate a number of activities relevant to the budget process, identifying and obtaining witnesses for congressional hearings, and

providing information and resources for Congress in conducting special forums and seminars.

• *Focusing more attention on the public understanding of the social and behavioral sciences.* Such efforts are really part of a much larger subject—public understanding of science *in general.* But clearly special attention must be devoted to ensuring that the *National Enquirer* is not the only way the public acquires its information about the social and behavioral sciences. A special focus should be placed on improving text materials used in elementary and secondary schools—which is where it begins.

Another special focus for reaching out to the public is through the science museums. The AAAS has cooperated with the Association of Science and Technology Centers in developing a resource program for science museums. AAAS members are working as volunteer scientists and engineers in a wide variety of activities—helping to design exhibits, training museum staff, giving lectures, acting as "Scientists in Residence" for schools in the areas of the science museums, and so on. Social and behavioral scientists can play important roles in these outreach activities with the public.

• *Considering various forms of political action.* Without doubt, the most controversial aspect of more interactions between politicians and scientists involves direct political action. I will not attempt to put forward the pros and cons of such actions, but will only note that some in the scientific and engineering communities are moving in the direction of Political Action Committees (PACs). For example, the National Society of Professional Engineers has established both a formal lobbying arm and a PAC separate from its other professional activities. Such efforts are based on a fundamental aspect of our political system: It is entirely legal—within specified boundaries—to help politicians of one's choice with money and other support for elective campaigns. Politicians clearly understand this kind of help.

SUMMARY

In summary, one or even a few such endeavors will not be sufficient to turn the tide running against social and behavioral research. From where I sit, it would seem that a variety of sustained and coordinated efforts is the only approach that might succeed. This is true not only because the area is diverse and difficult to present in any unified fashion but because there are determined opponents of federal spending on these efforts who find political profit in exploiting the apparent weaknesses these sciences present.

Here I can only speculate, but it seems that these attacks are made possible by a general misunderstanding of the nature and value of social and behavioral scientific research. If one of these attackers makes an outrageous statement that is obviously untrue to a professional observer, it may nevertheless seem perfectly plausible to a large percentage of the general population. The truth of this reveals a large gap in the public understanding of science in these areas, and can account for much of the success that attacks of this kind are able to generate.

From many sources, it seems that public acceptance of science and scientists is still at a high level, if no longer at its peak. However, this acceptance is based on a conception of what is good science. It is all too easy, it seems, to persuade many people that large areas of behavioral and social research are bad or, at least, questionable science. As long as this unfavorable concept of social science continues in the public mind, politically motivated attacks on research funding will continue to find support. But ignoring the problem will not solve it, and I would urge the modest program of action outlined above.

NOTES

1. From "Proxmire Speaks Out," May 1975, page 6, quoted by Leigh S. Shaffer in "They Wouldn't Get an Answer Anyone Would Believe," September 1980.

2. From a seminar before the Committee on Science and Technology, U.S. House of Representatives, June 19, 1980, in U.S. Congress Hearings (1981)

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Science Advice and the Presidency

An Overview from Roosevelt to Ford

William G. Wells, Jr.

Introduction

One of the most important aspects of the broad subject of science and public policy has been the convergence of science and technology and a unique political institution: the Presidency of the United States. Unfortunately, this convergence and its implications largely have been ignored by most historians and other scholars in their studies of the Presidency; moreover, with few exceptions and until very recently, analysts of the broad problem of science and public policy have done little better.

The modern Presidency has evolved into a powerful institution as part of the changing context of our national life resulting from economic, scientific and technological progress. This is not to argue that science and technology in themselves account for the emergence of the Presidency as "our one truly national political institution";[1] however, nuclear and electronic technologies alone have given mid-20th century Presidents power undreamed of by those of the 19th century. Furthermore, all of the Presidents of recent decades have been faced with major problems either directly or indirectly related to science and technology.

The convergence of the Presidency with science and technology has led to the evolution of new functions and organizational forms at the Presidential level which fall under the rubric of "Science Advice and the Presidency." Intertwined with the evolution of these new functions and forms has been the emergence of the central role of science and technology in the modern world. Clearly we must become more "concerned with the relationship between expert knowledge and political power as revealed in the advisory function."[2]

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Certain Policy Implications of the Central Role of Science and Technology

Many of the most significant issues of contemporary life have arisen from the pervasive influence of science and technology. These issues include not only major clusters of difficult or intractable problems—such as technological change and its impact on society—but also many topics of organization, programs, budgets, and other science policy matters over which, with varying success, institutions such as the Presidency and the Congress have acquired certain measures of knowledgeability and control.

Most of the issues arise from this crucial point: In a very brief time science has proved itself an incredibly powerful revolutionary force which has swiftly and dramatically affected society's beliefs and values, created and destroyed industries, revolutionized war, transformed and overturned political and social organizations, and modified man's conception of his place in the universe. In short, tremendous changes have taken place with bewildering speed in political, social, intellectual, economic, international and military institutions as science and technology have come to occupy a central place in the life of the entire planet. And there is little reason not to accept Bertrand Russell's view of science "that we are only at the very beginning of its work in transforming human life."[3]

Regrettably, an examination of seven Presidencies from FDR onward reveals less than wholehearted acceptance at the political level either of the above ideas or of a concept which, it is argued, is central to coping successfully with the problems of a rapidly changing world: science now appears as one of the great social institutions coordinate with the other major institutions of society—the economy, education, religion, the family, and the polity.[4] More regrettably, an evolving series of Presidential science advisory organizations has shown little interest or capability in even considering broad philosophical issues comparable to those raised by Russell.

Yet, there has been consistent support of the concept of science as one of the great social institutions and the argument that its voice should be heard in the highest political circles. Moreover, there are large numbers of subjects and issues which have been understood and acted upon, in varying degrees, by Presidents and their staffs alike. Examples abound in each Presidency and include the establishment of science-based organizations, the evolution of nuclear energy and its many implications, weapons development and major changes in the organization for defense and war, oceanography, support of federal research and development, health research and organization, and many others. Thus, it seems fair to say that Presidents have, each in his own way, demonstrated a grasp of complicated public policy issues arising from or connected to science and technology.

As representative of the kind of thinking which needs to take place at the Presidential level more frequently one can point to Truman musing at midnight with John Steelman on what the world would be like as a result of the spectacular scientific and technological advances of World War II and to the far-reaching studies initiated under Roosevelt and Truman. For a different, but equally important, statement on the Presidency and the implications of the growing importance of science and technology, it is possible to turn to Eisenhower. He—as did Roosevelt—somewhat belatedly, it seems, developed a keen interest in science and technology. Even

so, most of his long discussions with his Science Advisers were devoted mainly to specific problems in the space and military areas. Only at the very end of his Presidency, and perhaps because he had found the time to think about such ideas, did Eisenhower express publicly some of his uneasiness about science and technology in connection with political and social issues.

After observing that research had come to play an increasingly crucial role in society and acknowledging that scientific research and discovery should be held in respect, Eisenhower warned about the danger that public policy could itself become the captive of a scientific-technological elite. The thought is strikingly similar to the pessimistic concerns of Victor Ferkiss and Jacques Ellul.[5] In Eisenhower's view, "it is the task of statesmanship to mold, to balance, and to integrate these and other forces, new and old, within the principles of our democratic system—ever aiming toward the supreme goals of our free society."[6] This was no small contribution to the concept of the Presidency as the logical focus in the government where the broad problems of science and society should be considered. But occasional Presidential statements, however important they may be, are not enough.

Coming to Terms with the Future

It is imperative that the White House extend part of its attention beyond the immediate array of problems confronting it at any given time. In doing so, it must come to terms not only with what has happened in the past but also with Russell's view of the future. Restating a point made earlier, for better or worse, science and technology are altering man's life and his world; indeed, it has been observed that to speak of technological change on contemporary life has become almost a cliché.[7] Unfortunately, this is correct and herein lies much reason for concern; clichés tend to be accepted at a superficial level with no effort to examine what lies behind them.

Even more unfortunate, Presidents, the Congress, and American citizens alike often have been disinclined to act until a developing situation forces decisions and the establishment of a policy. Paradoxically, important though may be the general concept expressed by Russell, it appears most often in disguise—as nuclear energy or space—which results in limited debates, decisions, and policies. In the context of this analysis, aside from academic studies, only three major endeavors related to technological change in a broad sense were undertaken during the nearly five decades covered by this paper: two originated in the Executive Branch, the other in the Congress.

The first, and only major study dominated by social scientists, was conducted in 1936 by the Science Advisory Committee of the National Resources Committee. One of the advisory committee's first comprehensive studies was concerned with the social consequences of invention; but there were more urgent problems in the 1930s and the report vanished into time with barely a trace that it had ever existed. But even if the report had reached the Presidential level, it is not likely that the Roosevelt White House could have done much with it: the Executive Office of the President had not yet been created and Roosevelt had only a handful of close aides.

Later, as one of the responses to a series of labor-management disputes involving issues of adjustment to technological change in the late 1950s and 1960s, President

Kennedy promised to establish a Presidential Commission to determine the impact of automation and technological change on the economy. On a less than high priority basis, Congress took a year to enact the legislation and Johnson six months to appoint the members to the National Commission on Technology, Automation and Economic Progress.

By the time its report was submitted in 1966 the original reason for the commission's establishment—unemployment—had gone away. President Johnson said, "thank you," and filed away a report which contained 20 major conclusions and recommendations ranging across the entire landscape of American life. They involved a complex interweaving of scientific and technological factors with political, social, legal and economic factors. The Johnson response, while depressing, should not be a surprise. At the Executive Office level there has been little decision-making machinery which consistently and effectively could bring together these diverse factors. Thus, with very good reason, the final third of the commission's report was devoted to the subject of improvements in decision-making mechanisms in American society. The absence of strategic ways of coping with overarching issues—such as technological change—at the Presidential level is evident; the requirement to go beyond the *ad hoc* and the tactical approach is apparent. Indeed, how to do so is considered to be one of the paramount problems of government today—here and throughout the rest of the world.

The third endeavor—the technology assessment movement—originated in the Congress in the late 1960s. How this came to be is beyond the scope of this paper but Congress took action independent of the Executive Branch by establishing an Office of Technology Assessment in 1972. Moreoever, there has been little interest in technology assessment at the Presidential level in the broad conceptual and organizational sense; only in terms of specific issues such as environmental pollution and energy environment trade-offs have Presidents and the Executive Office become involved.

As a practical matter, science and technology in general have been seen for the most part by Presidents as the means to achieve specific political objectives. And there can be no quarrel with this view per se: it is a logical, pragmatic approach to the decision-making and conflict resolution which comprise much of the substance of the Presidency. However, it is argued that such a view in itself is less than adequate for the long-run. A better understanding must be achieved of the implications of this earlier stated crucial point: in a very brief time, science has proved itself an incredibly powerful revolutionary force.

A More Sustained Effort

While it is possible to take some encouragement from occasional Presidential attention to the broad, philosophical aspects of science and society, it is argued that a more sustained effort must be mounted. A major implication for public policy is that continued growth and development of the United States and the rest of the world requires the adoption of a strategy of maturity for concentration on the vital

issues that in the long-run will have first-order impact on society's genuine well-being.[8]

Widely divergent views have been held, and continue to be held, about the effects of science and technology on society. These views range from enthusiastic optimism to despairing pessimism about the future and it seems clear that the effects of the contending views will influence public attitudes and government decision-making about science and technology. Presidents, their staffs, and especially those involved with a Presidential science advisory apparatus must be fully conversant with this new dimension of public involvement and its potential impact.

In recent years, former Presidential Science Advisers Edward E. David, Jr. and Lee A. DuBridge, among others, have clearly articulated the implications of the growing public involvement in decisions related in some way to science and technology, although outside the government the most persistent voices have been those of the public interest groups. There is full agreement with William D. Carey, who contends that one of the outstanding features of American science and technology in recent decades is that "they are being *secularized* as lay publics participate in negotiating their right uses."[9]

This growing public involvement brings one to another significant public policy aspect of science and technology. A terrible fear in the scientific community of the 1930s was that becoming involved with the Federal Government and accepting financial support would lead to political domination of science. This issue is far too complex to be examined in detail and goes far beyond the scope of this paper, but it is clear that large-scale Federal involvement in and support of science and technology results in major public policy implications which are at the center of science advice and the Presidency.

In a broad, general policy sense, science and technology have come under political domination. It must be of concern at the Presidential level—from a public policy point of view—that the Federal government is the largest provider of research and development funds in the world and is engaged in roles as a performer, a manager, as a stimulus and as a policy and direction shaper. And it is true that Presidents have intervened directly from time to time in making large decisions affecting the use of science and technology for what they perceive to be in the national interest. However, there seems to be no sound basis for the fears of the 1930s that politics would take over and decide entirely what science would do. In practice, the multitude of decisions made every year on what specific research and development tasks and projects should be undertaken and how they should be conducted are decided by or strongly influenced by the scientific and technological communities—within the broad context of general guidelines and budgets provided by various Federal agencies. Indeed, Presidential intervention more often than not has been to make decisions to provide more support for basic research. The type of political intervention at the laboratory level which exists in the Soviet Union does not occur in the United States. Yet, a different kind of intervention may be emerging as a result of various kinds of public and political interest in areas where the potential effects of work in the laboratory are perceived as dangerous (e.g., the recent controversy over recombinant DNA research).

Shifting Patterns

Further, from a public policy perspective, large-scale Federal involvement has led to broad political domination—as noted above—in the sense that an examination of Federal support of R&D reveals a number of shifting patterns which have resulted from decisions by government. And it is argued that, at the Presidential level, these patterns must be analyzed, understood and adjusted when necessary. For example, from the early 1960s to the mid-1970s the aerospace-defense-military-atomic energy sectors dropped relatively while various civil sectors increased relatively and absolutely. On the other hand, an important trend from the mid-1970s has been that defense and energy R&D have accounted for the largest increases since 1974. These various trends reflect the durability and high priority of defense R&D as well as the emergence of new concerns about energy, world food production, the quality of the environment, the cost and quality of health care delivery, inadequate transportation networks, and an entire array of urban and rural problems—and they often reflect the intervention of presidential decisions beginning with the time of Roosevelt. This is not to say that presidential decisions alone have determined the patterns—far from it. Many factors and forces are active in influencing not only *policy for science* but *science for policy.*[10] Congress has increasingly asserted a greater role in every facet of science and technology; the organizations of the Executive Branch, often in alliance with the Congress or outside interests, exert powerful influence; and in certain areas, the scientific community and industry groups each have played significant roles in decisions.

As a result of analysis similar to that presented here, the Congress made a strenuous effort to place a "strategic tone" in key provisions of the National Science and Technology Policy, Organization and Priorities Act of 1976 (or "The Act"). The underlying purposes were to exert pressure on the Executive Office and the Executive Branch to devote more attention to thinking ahead and to urge that decisions involving the use of science and technology would be considered in the broadest possible context. Unfortunately, the Carter Presidency's performance in this respect has been little better, if any, than that of its predecessors.

A Presidential science advisory office generally will do what the President wants it to do, whatever the Congress may have written into law. And this leads to a concern related to the lack of attention to strategic thinking and "horizon scanning." In the high pressure environment of the White House, great value is placed on rapid responses and "fire fighting" and one fact is quite clear: the high pressure environment is a function of the Presidency, not only of the President. It is just that the pressure has been higher under some Presidents—for example, Lyndon Johnson—than under others.

In concluding this section, it is suggested that a continuous thread can be seen throughout the decades of writing and public debate and the operations of seven Presidencies: science both affects public policy and is affected by it. New administrative devices and organizational approaches have been required with each substantial increase in the size and nature (e.g., atomic energy, space exploration, energy research and development) of the Federal research and development effort.

Moreover, since the 1940s, there have been various new organizational mechanisms within the President's Office and attempts to bring about an improved central perspective involving science and technology—not only for the development of scientific and technological capabilities but also in terms of relating the R&D efforts of the various agencies to particular social or other national problems that transcend the mission of a single agency. Such thinking has not led to the development of a single, comprehensive American science policy; rather, the literature and actual practice reflect a "many policies" approach. And arrival of "The Act" in 1976 did not change this situation in any significant way—landmark legislation though it may be.

Evolution of Presidential Science Advisory Machinery: Highlights[11, 12]

Despite varying attitudes about science and technology, about concepts of the Presidency, about political philosophies, about Science Advisers, each President from Franklin D. Roosevelt through Jimmy Carter has made important decisions affecting science and technology and important decisions affected by science and technology. In doing so, the Presidents have drawn upon a variety of sources for their advice in making decisions. And while Science Advisers have had at various times and for certain issues much influence, they have had no monopoly on providing science advice.

Roosevelt

The halting steps of Bowman and Compton in the mid-1930s to establish some kind of science advisory capability—while not a total failure because of the experience gained for later use—failed because it was not possible to link the activities of the Science Advisory Board to the President's perceptions of his major political problems in the mid-1930s. In sharp contrast, Roosevelt swiftly saw the connection between his objective of military victory during World War II and Bush's proposals for harnessing science and technology for the war effort.

Moreover, Bush, along with Conant, designed an organization of extraordinary competence which had the flexibility to shift rapidly not only in meeting the needs of the President but also in exercising independent judgment on military requirements if the occasion arose. But, on the whole, Bush used this latter power sparingly and relied on persuasion in working with the military forces. Bush and Conant had finely tuned political sensitivities and chose to work with the President primarily through Hopkins; in the tough, but delicate, task of working with the Congress, Bush decided to handle this himself. Perhaps his only major mistake in the Roosevelt years was to disregard Harold Smith, the formidable Director of the Bureau of the Budget, who eventually got the upper hand in science policy matters during the early part of the Truman Presidency. Indeed, it may be argued that the bureau made an institutional decision of far reaching consequence: it would be at the center of science advice in the future, no matter who else was also providing it.

What could have been a problem with different people turned out well because Bush and Conant worked well as a team; still, Conant had his own independent relationship with Roosevelt which in one sense was closer than Bush's. Conant was very much the "political" Science Adviser, who was called upon in later years for far more than science advice. Indeed, he was more politically attuned to both Roosevelt and Truman than was Bush, and eventually became High Commissioner of the German Occupation for Truman.

In one sense, it may not be fair to compare Bush with some of those who were to follow him in the task of providing science advice for Presidents; the looming war created special circumstances and the establishment of OSRD was a special case in that Bush was both an adviser and a manager. Further, Bush made no pretense of advising Roosevelt on any aspect of science not related to the war. On the other hand, Bush provided the first significant model of a scientist being able to work in a highly successful manner at the right hand of a President and he was instrumental in starting a process that has continued with varying success to the present time: Presidential science advising.

Truman

The institutionalization of science advice which had begun to evolve under Roosevelt changed rapidly under Truman with the ending of the war. This was not because Truman was opposed to the use of science advice or did not appreciate the powerful role that science and technology had played in achieving victory. Indeed, this was far from being the case; Truman understood far better than did some of his successors the potential of science and technology for remaking the world. But at a time when Truman was in great need of science advice of the very highest calibre, a break appeared in the closeness of the relationship which Bush had maintained with Hopkins and Roosevelt.

Slowly at first, then more rapidly, communications began to break down between Truman and Bush—especially after the ending of the war. Political differences and disagreements on the organization and administration of science in the post-war world came to the fore, and Bush was eventually shoved aside by Truman's staff. Relations did not break in the Nixon sense and Truman was always willing to see Bush whenever the latter asked, but Truman did not ask to see him; they were on opposite sides of the major post-war debates on the National Science Foundation (NSF) and on the Atomic Energy Commission (AEC). However, despite their differences, there appears to have remained a great deal of mutual respect between the President and his displaced Science Adviser.

Bush never was fired by Truman; in fact, he stayed on as part of the official White House staff for nearly two years after Truman became President. But Harold Smith and Don Price of the Bureau of the Budget took on for a time the major task of advising the President on post-war science policy and organization. Another key figure—particularly in the atomic energy area—was a young lawyer, James R. Newman. The principles of public administration, espoused by Smith, Price, and Newman, under which the science organizations of the post-war world would be responsible to the President and not to the scientific community, clearly appealed to Truman's sense of his constitutional responsibilities as President. Bush on the other hand, was seeking to protect, as had the scientists of the 1930s, science and the traditions of scientific freedom from political interference. Bush always thought he had been "poisoned" by Truman's staff—and there was some of this—but the fundamental incompatibilities in outlook were far more important in the dissolution of the Bush-Truman relationship.

Truman paid a price for not having a strong Science Adviser more compatible with his political views. Compounding Truman's difficulties, there was little continuity; Smith and Price left not too long after the war was over and were unable to carry through on their intention to develop a comprehensive plan for the organization of science in the postwar world. A very busy John Steelman, who became Truman's senior aide, also became a *de facto* Science Adviser—aided by a young attorney, Byron S. Miller—and took over from Smith and Price as the architect of science policy planning for the White House. In this same time period, two young Bureau of the Budget officials were beginning to become involved in science policy matters—William D. Carey and Elmer B. Staats—and they would play active roles until the mid-1960s.

One result of the acutely fragmented approach to the use of science advice by Truman was that the single most important policy decision affecting postwar science, other than the Atomic Energy Act of 1946, was decided virtually by default: as the foundation debate dragged on year after year, the military departments and the National Institutes of Health—in league with the Congress—established the organizations, the funding patterns, and the management policies which set the major outlines of postwar science organization and Federal funding support for decades into the future. The irony of this situation is that preoccupations of the Executive Office and the Congress during these years were the fragmentation of research effort and the necessity to achieve an effective system of coordination for Federal research and development. And, well into the 1950s, the Executive Office —under Truman and then Eisenhower—kept trying to get the infant National Science Foundation to take on this task. Fortunately, the foundation chose to survive and resisted the mandate given to it by two Presidents and the Congress.

Despite the lack of a broad-gauged Presidential Science Adviser and the absence of focus which could have been provided by a science advisory apparatus, several important steps were taken during the Truman period which would have positive results in later years. First, the President's Scientific Research Board—headed by Steelman—was established in 1946 and eventually produced the "Steelman Report." This was a wide-ranging political document on national priorities, resource allocations, policies, organization and directions for science and technology. All of its recommendations were eventually adopted—including the establishment of the NSF, large increases in support of Federal R&D, the creation of an Interdepartmental Committee for Scientific Research, the establishment of a unit in the Bureau of the Budget for reviewing federal research and development, and the designation of a member of the White House staff for scientific liaison. Along with Bush's report, *Science: The Endless Frontier*, the seeds were planted for much of the institutionalization of science advice and the growth of federal support of science which would develop in the years to follow.

Another institutional contribution by Truman came in 1951 as one response to the outbreak of the Korean War. There had been demands for the creation of a new OSRD; but those who made such demands did not understand that the national capability and organization for science was far different in 1950 than it had been in 1940. William T. Golden was the author of a report to Truman which recommended the establishment of the position of a Science Adviser to the President and a Presidentially appointed Science Advisory Committee, and the preparation for standby plans to establish an OSRD-type organization. But Golden's recommendations, though approved by the President, were modified radically and the end result was the establishment of a Science Advisory Committee placed within the Office of Defense Mobilization (ODM).[12]

Under an ill, ineffective chairman (Oliver Buckley), the committee languished unused during the remainder of the Truman Presidency. Communication channels to the President, although technically available, were never used by Buckley; he appears not to have taken a very active role and certainly did not wish to take on the forceful General Lucius Clay who headed ODM—and who had insisted that the committee report to him rather than to the President. Apparently, for more reasons than one, Truman chose not to enter what had become a major jurisdictional battle. The National Science Board was just getting started at about this time in 1951 and strongly opposed the idea of a Science Adviser to the President or a committee reporting directly to the President. The board saw such moves as downgrading its role and status. Truman was busy with the war and a host of domestic problems and, aside from the jurisdictional squabbling, there seemed little that the committee could do for him; thus, once again, the situation of the 1930s appeared. There was no apparent identity of interest between the committee and the President, so he did not use it. Furthermore, Buckley's approach was passive—he saw his role as waiting until the President asked for something to be done; this was a far cry from the forceful Bush approaching Roosevelt saying this is what the scientific community can do for you and the country.

And the Interdepartmental Committee for Scientific Research—launched with high hopes in 1947—remained nearly invisible instead of becoming an effective tool in assisting the Executive Office to manage the far-flung research and development establishment. Not until 1959, in the post-Sputnik crisis, would the committee be pulled from obscurity and be re-established as the Federal Council for Science and Technology. Despite the repeated urgings of individuals such as Carey for greater attention to the problem of managing and coordinating the Federal R&D program at the Executive Office level, most of the administrative and organizational measures of the 1940s and 1950s were dismal failures or met with very limited success. And the end of the Korean War removed the urgency from such matters and there was little inclination in the early Eisenhower years to undertake any major steps in the direction of further institutionalization of science advice at the Presidential level.

Eisenhower

The President did, however, express interest in better management and coordination of Federal R&D and, at the urging of the Bureau of the Budget, attempted to give the task to the National Science Foundation. But this did not work out. More specifically, Waterman (the first NSF Director) properly resisted any ideas that the NSF should undertake such major assignments as "developing policy" and "evaluating research programs" for all of Federal R&D. It is easy to conclude that these tasks were important in the early 1950s and are still important today; but it is also easy to conclude that Eisenhower and Truman before him—both urged by the Bureau of the Budget—were trying to get the wrong organization to do them. As an infant organization in the early 1950s, it very likely would have suffered fatal injuries; and today, NSF still would be the wrong choice, even though it is now a large and relatively powerful agency.

Despite the lack of organizational initiatives by Eisenhower with respect to science advice during his early years, it seems clear enough that he was willing to use a revived Science Advisory Committee under Lee A. DuBridge who replaced the ailing Buckley. DuBridge and the other members determined to make it a more active body. After an abortive attempt to escape from ODM, the committee engaged in a number of important investigations which gradually led to a convergence of their work and the interests of the President in certain urgent defense problems.

And the Science Advisory Committee—with its panel on Technological Capabilities headed by James Killian—eventually came together with two outside "gadflys," Trevor Gardner and General Bernard Schriever, to convince Eisenhower to undertake an acceleration of the ballistic missile program in the mid-1950s. However, this process had required several years to force the ballistic missile decision to the Presidential level. And as a result of a combination of Executive Office timidity and a lack of comprehension of the potential of space, Eisenhower was persuaded—over the objections of Nelson Rockefeller, at the time a White House aide, and a number of leading scientists—to approve only a very modest US civilian space effort for the 1957 IGY. It is argued that the presence of a strong Presidential Science Adviser might have had some effect, first, in bringing the ballistic missile decision to the White House earlier and, second, in convincing Eisenhower to place a higher priority on the IGY satellite.

At the time of Sputnik, Eisenhower reacted swiftly—but not in panic. Among his first steps were to appoint Killian as his Special Assistant for Science and Technology and to elevate the Science Advisory Committee from the ODM to be the President's Science Advisory Committee (PSAC).[14] As noted above, in 1959 the Federal Council for Science and Technology was established. Direct communication channels were established between Eisenhower and his Science Advisers as the President took personal charge of the national response to Sputnik—and a close rapport developed between them. Thus, with the exception of one major change by Kennedy—the establishment of OST—Eisenhower finished the work started by Roosevelt and Truman by putting into the Executive Office the basic components of a science advisory structure which would last for nearly 15 more years. Despite the achievement, one is left with this general criticism: more often than not, the nation reacts in an *ad hoc* tactical way rather than in a strategic manner. Eisenhower himself later reflected that he underestimated the impact of Sputnik and its aftermath. It is argued that the shock of Sputnik and the charge of a "missile gap" may well have cost the Republicans the 1960 election.

Killian and Kistiakowsky were similar to Bush in that each of them came to the White House when there was a strongly perceived need for their services by President Eisenhower. The emergency was not as acute as that which had faced Roosevelt, but Eisenhower was experiencing severe political problems over space and various military matters following the national state of shock after Sputnik. Although Eisenhower had placed high value on science and technology in the earlier years of his Presidency, it was not until highly visible political problems crashed about him that he fully embraced science and technology as instruments of national policy. And Killian and Kistiakowsky, each in his own way, responded to and assisted the President in ways that he and his senior staff considered important.

Killian and Kistiakowsky were similar to Bush in another way; they had a great deal of influence in the White House and throughout the government because of their close connection with the President, although they consciously stayed away from any attempt to "manage" any of the space and military programs under their purview. Furthermore, they—and especially Killian—went out of their way to work with and through other individuals in the White House even though each of them had easy access to the President. Another factor which provided underpinning for the high degree of influence and power held by Killian and Kistiakowsky—as for Bush and Conant earlier and Wiesner later—was that all five of the individuals were "old Washington hands" and understood the political aspects of science advising. By virtue of their long Washington service and outstanding records, each of the five had an independent standing in the White House which put them on a peer basis with their respective Presidents' principal assistants.

Again putting Bush, Conant, Killian, Kistiakowsky and Wiesner together, it would seem that each had, in his own special way, a close relationship with his President. This is not mean to convey "closeness" in the sense of friendship. It is intended to mean that they were part of the inner circle of Presidential advisers who have that commodity so precious in the White House—the ability to influence Presidential decision making. Indeed, in no instance was a Presidential Science Adviser part of the President's social circle of friends—except perhaps Conant in his relationship with Roosevelt.

The strong roles performed by Bush and Conant for Roosevelt were entirely in keeping with Roosevelt's view of the Presidency and the role of the White House staff in becoming involved in the affairs of the departments and agencies. Not until the time of Kennedy would such an approach be followed again. In contrast, Eisenhower was very disinclined to intervene except on very special occasions when he had a deep interest such as the "Atoms for Peace" proposal. Therefore, Killian and Kistiakowsky, as noted above, while exercising strong influence on agency programs and budgets, did so by working behind the scenes with the Bureau of the Budget and department and agency heads. Working with a small staff and PSAC, neither of the two nor the President was interested in pushing the institutionalization too far. Eisenhower did worry, however, that the science advisory role might vanish at the end of his Presidency.

Kennedy

The arrival of Kennedy in the White House brought many changes—but not the one that Eisenhower had been concerned about (i.e., that the position of Special Assistant for Science and Technology would not be continued by his successor). Indeed, Kennedy embraced the entire apparatus which had been constructed over the years by Truman and Eisenhower and, working with the Congress, gave it an even more powerful mandate than it had held under Eisenhower.

From the very beginning of his Presidency, Kennedy saw that science and technology were important instruments of national policy which could contribute to the solution of critical national problems. And he was acutely aware of the political power available to him and the international prestige potentially available in the space program. While science advice was an element in Kennedy's thinking, the Apollo decision was made on political grounds. And while he worried about the cost of the program, it did not deter him as it had Eisenhower and Kistiakowsky.

The Apollo decision and his deep involvement in negotiating the Limited Nuclear Test Ban Treaty underscore Kennedy's style in reaching out in all directions for advice. While most Presidents have been disinclined to tie themselves to a single source of advice, Kennedy was more like Roosevelt than, say, Truman, Eisenhower, or Nixon in his insatiable need for information and advice from a variety of sources. Indeed, Wiesner saw this as an important part of his responsibility to Kennedy and played an active role in insuring that Kennedy was exposed to all sides of a problem—and did not appear to be threatened if the President heard advice which differed from his own.

Clearly a mature and experienced Science Adviser must accept that Presidential advisers ply their trade in the highly competitive arena of palace politics—a competition which centers on the giving of advice. One of DuBridge's failures was that, notwithstanding his Washington experience and long years as president of a major university, he seemed not to understand this important characteristic of White House life—or chose not to play the game. And the record of the Johnson Presidency suggests that Hornig philosophically accepted a secondary role in the White House power structure. Finally, David understood very clearly the power realities in the Nixon White House and attempted to reverse the slide downward in influence of the science advisory apparatus—but it was already too late by the time he arrived on the scene.

In the giving-of-advice competition even such towering figures as Bush and Conant had to accept Roosevelt's disagreement with them on the matter of sharing atomic secrets with Great Britain after they had vigorously pursued their point of view. The occasional disagreement, especially over fundamental issues such as the atomic argument, is in the nature of things at the White House level. It is only when the disagreements become and remain persistent and deep—such as with Bush and Truman and between Nixon and PSAC—that the advisory arrangement becomes untenable. Also, a measure of maturity and responsibility on the part of a President and his senior aides is required in dealing with differing points of view from Science Advisers. And the record and actions of the Johnson and Nixon Presidencies are less than admirable on this score. It is one thing to suggest that general compatibility of views is important but it is quite another to demand and expect absolute agreement with the political views of the President on every issue.

Not only were Kennedy and Roosevelt able to handle dissent, their operating styles inevitably created it. And Kennedy was much more activist-oriented than Eisenhower before him or Johnson and Nixon afterward; as a result his White House staff—including Science Adviser Jerome Wiesner—plunged into the operations and management of the Executive Branch. Kennedy was determined to gain control of the bureaucracy and developed a powerful White House staff with the intent to do so. Wiesner's close relationship to Kennedy, based on their prior connection, put him in the inner circle of Kennedy's advisers. And in Washington it soon became clear that in many areas related to science and technology, "Wiesner spoke for the President." The nature of Washington is such that this simple fact invokes no inconsiderable amount of power, and Wiesner was both admired and criticized for exercising it. Bush had held a similar power under Roosevelt and he, too, provoked criticism as well as admiration. In stark contrast, Hornig did not "speak for Johnson," nor did DuBridge and David "speak for Nixon;" and the diminished power and influence of the science advisory machinery in the years after Kennedy reflected these simple facts.

The Kennedy style of making a vigorous effort to take charge of the bureaucracy was consistent with a major advance in the institutionalization of science advice at the White House level. Responding to Congressional initiative, Kennedy and Wiesner were very receptive to a proposal by Senator Henry Jackson to provide the Presidential science advisory function with a statutory underpinning. By agreeing to the establishment of the Office of Science and Technology, Kennedy achieved several objectives: first, the science advisory function was further institutionalized—although future events would show that this action did not guarantee either its future use or its continuance and that unforeseen problems were created; second, pressures from some in the Congress and elsewhere for a Department of Science and Technology were greatly reduced; and third, and very important, one of the very real and very legitimate grievances of Congress—lack of access to a top Executive Office official for matters concerning science and technology and national science policy—was removed.

Thus, with the establishment of the Office of Science and Technology, a new dimension of institution building for Presidential science advice was added by Kennedy to the structure and process built incrementally by Roosevelt, Truman, and Eisenhower. In terms of structure, the institutionalization was completed and no further changes would be made until the Nixon banishment of 1973; however, in terms of process, the institutionalization continued to develop during the Kennedy, Johnson and even the Nixon years. There is more to be said about this later.

The concerns of Truman and Eisenhower about foreign affairs and peace were carried forward into the Kennedy Presidency as major, if not dominant, concerns; but added were new dimensions related to energy, the environment, natural resources, and a plethora of social issues—as Kennedy picked up the domestic mantle worn by Roosevelt and Truman and constructed the programs of the New Frontier on the building blocks of the New Deal and the Fair Deal. With respect to science and technology—perhaps more important than the organizational changes—the Kennedy Executive Office—including Wiesner, as earlier noted—was very much inclined to pick up the reins of control for a sprawling scientific and technological establishment which no other agency could safely grasp—and to look beyond the horizon to new areas such as energy and natural resources. The presence of a "central scientific organization" at the Presidential level became more broadly apparent than during any period since the days of Bush in World War II; and to the present time no science advisory apparatus has had such visibility and status.

Kennedy has been called a truly modern man and his vision and outlook made it easy to understand the products and uses of science and technology; and important, too, was that he understood the social significance of science and technology. It was Kennedy who initiated what would become the Commission on Technology, Automation and Economic Progress as one of the very few efforts at the Presidential level to cope with such broad issues as technological change. It was Kennedy's conviction that science provided vast powers for good, and this led to much of his hopefulness about the future. He was forever pressing to put technology to work: in foreign affairs; for helping other nations (an idea that he had inherited directly from Truman); for insuring national security (in which he followed directly in Truman's and Eisenhower's footsteps); and, in seeking solutions to major domestic problems, he looked to science for clues.

While new dimensions were added to the science advisory function during the Kennedy years for dealing with problems of energy and the environment, civilian technology, natural resources, water resources, and food and nutrition, the Kennedy science advisory apparatus under Wiesner sustained the high level of involvement in arms control, space and military problems that had been the case under Eisenhower. Since the major contributions were in the latter categories, it must be recognized that the new dimensions and new initiatives were only beginnings. However, they represented the beginnings of significant change in the agenda facing the apparatus; also, they represented the beginning of change in the nature of the advisory function as the new dimensions brought new complexity which, it turned out eventually, the science advisory machineries of later Presidencies were not able to handle very effectively.

When Johnson inherited the Presidency, a watershed was crossed in terms of science advice and the Presidency and the use and influence of the science advisory apparatus. A decline began regarding both use and influence of the apparatus and the individuals who served as Science Advisers. Whereas Bush, Conant, Killian, Kistiakowsky, and Wiesner were in the inner circles of their respective Presidents and were essentially on a peer basis with senior White House aides, the situation changed dramatically under Donald Hornig and his successors Lee DuBridge, Edward David, and H. Guyford Stever.

Johnson

As a political outsider both to Johnson and to Washington, Hornig definitely was not in the inner circle of Johnson's advisers, and was not able to play in the same league as had his predecessors. Without doubt, Hornig was not a peer of such top aides as Bundy, Rostow and Califano; moreover, Hornig did not have an effective alliance with any of Johnson's top staff over the five years he served as Johnson's Science Adviser. Hornig's relatively low status in the White House could not have been a positive influence on the important process of Presidential decision making.

The Presidential agenda, while inherited in large part from Kennedy, began to change under Johnson as he attempted to carry out both the programs of his Great Society and to conduct an increasingly major war in Vietnam. While the record of the Johnson years suggests a President who expressed support and a sophisticated understanding of science and technology, it was also a period when R&D growth came to a virtual halt. It was inevitable that the growth rates of earlier years could not be sustained, but in what was probably an over-reaction, Congress, Johnson—and Nixon after him—held essentially to a no-growth policy for the rest of the 1960s. Johnson placed a very high priority on his Great Society programs and, by 1966, Vietnam began to be a major drain on national resources.

Yet, in the face of such obstacles, while the total Federal R&D allocation increased only 10% during the Johnson years, basic research increased by 50%. This kind of anomaly suggests some policy selectivity on the part of Johnson and indicates that Hornig had a degree of influence. But exerting influence at the Presidential level on behalf of basic research—which was nothing new from the 1940s onward—would increasingly be seen in the future as performing an advocacy role in the White House for science; during the Nixon years it would translate into the "kiss of death." Despite the halt in budget increases, Johnson (as had Kennedy) was continually pushing to put science and technology to work: in international cooperation, in health, in environmental quality, in natural resources, and in other domestic areas. In most of his statements related to science and technology, there are echoes of the Great Society, but, despite the social sciences' function as the basis of most of the Great Society programs, there is little indication of effective science advice being provided at the Presidential level in connection with the social sciences, or any aspect of the Great Society.

While Kennedy had sought science advice widely, he was inclined to have Wiesner help him seek out a variety of sources; in contrast, Johnson seems to have simply ignored Hornig on a number of major issues which one might reasonably have expected a science adviser to perform at least some role: the SST, health research, and the automation-unemployment issue. On the other hand, Hornig and PSAC played prominent roles in the years that Johnson sought to delay development and deployment of an anti-ballistic missile system. Yet, as an overview comparison, Hornig definitely did not have the prominent role held by Bush under Roosevelt in large strategic matters—and for the most part Hornig was ignored on Vietman—nor did he have the influence of Killian, Kistiakowsky, and Wiesner in other national security matters.

An important casualty of the Vietnam War was the relationship between Johnson and PSAC and very likely this had no small effect on Hornig. Despite PSAC's role in the anti-ballistic missile debate (referred to above) and major contributions in two areas high on the President's agenda (environmental quality and the world food problem), the relationship between PSAC and the President deteriorated as the war continued and PSAC's opposition increased—notwithstanding the fact that it was privately, not publicly, expressed. But PSAC came to be viewed as the embodiment of the academic world's violent and vocal opposition to Johnson's (and later Nixon's) war policies. Other factors were at work, too, such as the variety of PSAC's work in diverse fields, and there was much less direct contact with the President. But the war was the crucial factor in the breakdown of a long-standing relationship. Inevitably, in combination with the continuing deterioration of the PSAC relationship with Nixon, this raises the large issue of how science advice is to be provided if basic political differences are present, and not solely those related to scientific and technological issues. At the end of the Johnson Presidency, indeed, even to the present time, no good answer has been found to this fundamental issue.

An apparently unanticipated, but important, result of the establishment of OST by the Congress and Kennedy was that the Presidential science advisory machinery increasingly and inescapably became more institutionalized. In certain respects, the apparatus took on more and more of the characteristics of a central scientific organization—although not as visibly as under Wiesner. The range of problems expanded dramatically, staff was increased and new coordination and evaluation functions were performed that had nothing to do with providing science advice to the President. While an "institutionalized memory and capability" are important to assist the President, dangers and problems accompanied the increasing institutionalization.

In solving one problem—being accessible to the Congress—another one was created: requirements to appear before the Congress were extensive and there was less time to spend on providing advice to the President and working on the problems which were important to Johnson, and later to Nixon. Also, the requirements for coordination and evaluation placed upon OST by the Congress and accepted by Kennedy in 1962 led to the establishment of an active bureaucracy in the Executive Office which Hornig admitted was difficult to control and manage, along with his many other responsibilities. By the time David arrived on the scene in mid-1970, the all-important relationship with the Office of Management and Budget had virtually disintegrated, and one of David's first priorities was to restructure OST and re-establish working arrangements with OMB.

Another implication of the growing institutionalization of the science advisory machine under Johnson and Nixon was that more and more of its work took place out of sight of the President and his top aides: in short, beginning in the Johnson years and continuing into the Nixon years, the apparatus was not seen as being responsive to the President's needs. Thus, one encounters the ironic situation in which the science advisory apparatus had become engaged extensively in activities related to management and coordination of the Federal R&D establishment which had been so highly desired by Truman, Eisenhower, Kennedy, and the Congress, only to find itself perceived as not being helpful first to Johnson, and later to Nixon.

Even so, the Congress was not entirely satisfied with the attention given by Johnson's Executive Office and his science advisory apparatus to a variety of areas. Beginning in the mid-1960s, Congress became quite involved with various science policy issues and moved to organize itself more effectively for dealing with science and technology. Hence, Congress became increasingly confident about initiating actions when it did not think the administration was performing effectively. A case in point is the marine sciences: Congress established two separate "science advisory" organizations to carry out its mandate because it did not believe that the Federal Council for Science and Technology was giving the field proper attention. In effect, the science advisory apparatus was being pressed to do more by the Congress along the lines of managing the Federal R&D enterprise at the same time that the President and his senior aides saw it as less helpful in working on *their* problems. Hornig has seen the dilemma more clearly in retrospect but already had begun to think out loud about what should be done about it not long before he left office. For example, he called tentatively for a new look at a Department of Science and Technology. This analysis of the problems of institutionalization is connected directly to a general analysis of the problems of mixing advisory and management functions within the Presidential science advisory apparatus at the Presidential level (to be discussed later).

Nixon

At the beginning of his Presidency, it appeared that Nixon would raise the science advisory apparatus to the former influential status that it enjoyed under Eisenhower and Kennedy. Among his very first appointments was DuBridge and among his first press conferences was one devoted to extolling science and DuBridge. DuBridge had outstanding credentials: a brilliant record of public service extending back to World War II, long service as president of one of the country's leading universities, and high standing in the scientific community.

But things did not work out. First, as pointed out earlier, DuBridge seemed not to appreciate the nature of the White House political arena; moreover, he simply was "too nice" to be a member of the Nixon White House. In this respect, he was similar to Hornig, who was a "Mr. Nice Guy" in the Johnson White House. One is forced to the conclusion that both lacked a certain inner toughness which is required of anyone who plays on the "first team" in the White House. While both are good, decent men, and performed creditably under trying circumstances, they were not very effective in the ferocious competition in the White House which centers on the giving of advice. Inevitably, DuBridge, as had been the case with Hornig, was increasingly seen—along with his staff—as being outside the main stream and, therefore, as somewhat irrelevant to the principal business of the White House and the President.

DuBridge was the essence of integrity but nevertheless became increasingly ineffective as time passed. The alienation which took place was due in part to his not understanding how the White House worked, to decreasing Presidential access, to not developing alliances; however, probably as important as all of these factors combined was that he came to be seen by Nixon and his senior aides as the "representative of science." And, as was noted earlier, in the "them-against-us" psychology of the Nixon White House, this was a fatal perception for DuBridge.

This perception developed on the part of the President and his aides, despite the fact that DuBridge was actively involved from the early days of the Nixon Presidency in problems important to the President: environmental quality (including a major oil spill in California for which Nixon very publicly made a show of giving DuBridge responsibility for reviewing the situation and recommending corrective actions), the earlier noted Nixon decision on chemical and biological warfare, and the SST.

Unfortunately, initially DuBridge was on the "wrong" side of the SST issue and was opposed to proceeding; subsequently he went to Congress to defend the President's decision to go ahead, citing, in response to criticism about his earlier views, that the President has the total responsibility for a decision while an adviser, as in his case, provides only one perspective. But the Nixon White House was not a place for dissent—even when it was private, and, when the initial opposition of DuBridge and PSAC became public knowledge (long after the Congress had voted to cancel the program), this was the beginning of the end.

More than one individual has voiced the opinion that the DuBridge period actually marked the beginning of the end for a science advisory apparatus in the Nixon White House. There is good reason to believe that the position of Science Adviser and the associated apparatus would have been abolished upon DuBridge's departure—if it had been judged politically feasible. But, in 1970—before the overwhelming 1972 victory—Nixon was still concerned politically about the academic community and the uproar which such an action would provoke.

Before the end came, the President made what was an apparent attempt to change the nature of the advisory apparatus and, more specifically, the nature of the role of Science Adviser to the President. The appointment of David, an engineer from industry, caused no small surprise. Despite his outstanding credentials as a manager, scientist, and engineer, he was not well known in Washington and represented a break in the links with the past; he was not a member or protege of the fairly small group that had dominated the upper levels of government science advice since 1940. At David's swearing-in ceremony, Nixon gave an indication of just what kind of change he had in mind for the science advisory function: he expressed strong emphasis on the applications of science and technology and referred to David as "a very practical man." Indirectly, Nixon was making it plain that he had had more than enough of the antagonistic scientific community and its advocacy of more and more support for basic research. Ironically, David turned out to be a strong supporter of basic research and was successful in arguing for limited increases.

David had no personal relationship with the President and dealt primarily with Ehrlichman and Kissinger—although occasionally he had access to Nixon when he thought it sufficiently important, as on such issues as nuclear proliferation, or when the President was particularly interested, as on health policy matters and environmental health. The lack of close communications with the President did not deter the energetic David from trying to make the science advisory apparatus work. For example, he took swift action—as noted earlier—in repairing relationships with the Office of Management and Budget which *was* working on the President's problems. Also, he set out to establish better working arrangements with Ehrlichman and Kissinger on domestic and national security matters, respectively.

There seems to be little doubt that David had the inner toughness lacked by

DuBridge and Hornig, and, while he did not achieve peer status with Ehrlichman and Kissinger, he was able to work with them without being intimidated. Moreover, as suggested above, to the extent that any Science Adviser would have been able to communicate with Nixon, David apparently was able to get through when necessary. But the tragedy of David's service was that as hard as he tried to turn things around, in all likelihood by the time he arrived (as suggested earlier) it had already been decided by Nixon and some of his top aides that the science advisory apparatus would go after the 1972 elections.

By the early 1970s, Nixon and his top advisers were not really interested in whether or not the science advisory apparatus was performing effectively—and the record shows that David, as well as DuBridge before him, turned in performances that by any objective evaluation would be considered effective in an institutional sense. However, objective evaluations were not what the President had in mind and the studies performed by the Domestic Council and OMB on the value and effectiveness of OST and the rest of the science advisory apparatus must be taken with some skepticism—given the barely concealed hostility of the President and his senior aides to PSAC and OST. And apparently they were so unaware of the Federal Council in Science and Technology that it escaped the Nixon "axe" quite by accident.

The scientific community, with its strong opposition to the war policies in Vietnam, and its personification in the form of PSAC, came to be seen, as had been the situation with Johnson to a lesser degree, as the "enemy within." On too many issues, as seen by the President and his senior aides, PSAC opposed the President. But beyond the opposition, PSAC had become anathema to the Nixon White House because its opposition on at least two major issues considered vital to the President—the SST and the ABM—had become public information. This exacerbated an already deteriorating relationship and permanently damaged the relationship between Nixon and his science advisory apparatus.

The record of the Nixon Presidency is not one that shows the President hostile to science and technology *per se*, even though he came to hold a hostile attitude toward the scientific community and, hence, his own science advisory apparatus. The evidence suggests he simply was not interested and did not have a very deep comprehension of the role of science and technology in modern life: his attention could be captured only by the occasional technological spectacular such as the SST, the cancer crusade, and Magruder's proposed New Technological Opportunities Program. Even in the vital field of energy, he was not much interested in the important preliminary work accomplished for him by David before the energy crisis struck; and then the President leaped unknowledgeably, based on idiotic political advice, to such nonsense as "Project Independence" by 1980.

It is somewhat ironic that Nixon abolished his science advisory apparatus at just the time when it perhaps could have helped him and the White House staff cope more capably with energy problems which were crashing all about them in early 1973 like boulders from a mountain slide. It is argued, as it was argued in the case of Truman in the science organization debates of the 1940s, that Nixon impaired his own effectiveness and that of the administration by not having a strong, stable, full-time science advisory capability in the Executive office during a critical period when decisions were being made that could affect the nation for decades to come. Roy Ash's theories of management and organization turned out to be of little use —perhaps because Ash and his council never really understood an important characteristic of Presidential decision making: in the public sector the problems are fundamentally political and not managerial.

It is possible, only possible, despite the increasing paralysis brought on by Watergate, that the effects of the ludicrous "revolving door operation of energy czars" and the associated "crisis policy making" could have been moderated by the presence of a science advisory capability which had a sense of continuity, history and the politics of the energy area. The science advisory apparatus had been active in the energy area since the days of Wiesner, but had not been successful in translating their projections of coming energy problems into action at the presidential level. At least one result of the energy "shambles" in the Nixon White House was that Congress virtually took away the overall problem of energy organization from the President—including the establishment of the Energy Research and Development Administration (ERDA).

This brings one to an important point about Presidential advising, including advising about science: in large part, Presidents determine the range and quality of the advice they get. A President cannot be forced to take advice—on science or any other matter—unless he wants it. On the other hand, in a number of ways, the science advisory apparatus of the Nixon White House was not successful; for example, it seems not to have had a finely-tuned political sensitivity to its environment and there were some very real deficiencies in its operations and performance —above and beyond the misperceptions of the President and his top aides.

After more than a decade of grappling with civilian-oriented problems in the domestic field, the performance of the apparatus was very mixed and, except in a few areas such as energy, there was relatively little quality thinking to show for the effort. Also, it is important that not only the Science Adviser have good working relationships with senior aides but also the staff of the science advisory machinery have effective working contacts at the mid- and lower-levels of the Executive Office and White House staffs; unfortunately, this was not the case—until David arrived and attempted to change the situation.

After the abolishment of OST and PSAC and the transfer of certain residual functions to Stever as Director of the National Science Foundation, the science advisory apparatus and the science advisory function at the Presidential level was placed in virtually a caretaker status. In turning to Stever, it is concluded that he did what was possible: he sized up the political realities and performed in a greatly truncated science advisory role by making the best of a difficult situation. He was under no illusions that he was to perform in the conventional Science Adviser's role of the preceding 15 years. Therefore, he did his job and publicly defended the President's decision as does any official who wishes to stay. Finally, he took the necessary steps to preserve a Presidential science advisory capability for such future use as it might be called upon to perform. In the meantime, he focused on re-establishing relationships with OMB, in developing an expanded capability for the Federal Council for Science and Technology, and in providing a center for energy R&D programs and policy.

Ford

After Nixon's departure, Gerald R. Ford came to the Presidency with a significantly different outlook on a large number of issues—including science and technology and science advice. As President, Ford displayed a well-developed sense of using science and technology in achieving national goals. He may not have had Kennedy's intellectual fascination with science, but he was equal to Kennedy in every way that really counted with respect to science and technology: accessibility to a wide variety of views, strong support of R&D budgets (especially basic research), a feeling of ease in dealing with scientists and engineers, and receptivity to science advice.

In another way he was very similar to Kennedy: he was highly receptive to working cooperatively with the Congress to modify the Presidential science advisory apparatus which had been placed in the NSF by Nixon. The initiative for change may have originated in the Congress—as it did in the Kennedy Presidency—but Ford soon took over the initiative as "his proposal." One major difference in Ford's Presidency from Kennedy's was the receptivity of their respective staffs to working with a science advisory apparatus. Ford, and Vice President Rockefeller, had to cope with strong opposition—and even some hostility—on the matter of re-establishing a science advisory apparatus in the White House. And after it was in place, there was no Hopkins, no Steelman, no Cutler, no Bundy who could serve either as an intellectual or administrative coupling for science advice to the President. In the absence of such couplings, except that through OMB, it was fortunate for Stever that Ford's operating style and staff system permitted a high degree of accessibility.

A very positive aspect of the Ford Presidency is that Ford did not think about providing support of science and technology in terms of mollifying the scientific community—in the sense that Johnson and Nixon had considered the absence or presence of political support or opposition. And whereas Nixon had expressed himself on occasion in strategic policy terms under David's influence, he acted strictly in an *ad hoc* manner or not at all. In contrast, by the end of his Presidency, Ford was beginning to think "strategic" and make plans for using science and technology in terms of linking investment in R&D with the future achievement of great long-term national goals. This was no small achievement on the part of the President and he was assisted by an effective working alliance between Stever and OMB.

From time to time, Ford spent a considerable amount of time personally on the matter of science advice and the Presidency. His work with the Congress in bringing about enactment of "The National Science and Technology Policy, Organization, and Priorities Act of 1976" represents a detailed example of how joint Presidential-Congressional lawmaking—particularly in the area of science and technology—has become institutionalized during the past several decades. Ford's approach was directly descended from the work of Truman, Eisenhower, and Kennedy in building the great postwar science and technology organizational establishment in the United States in the form of new agencies and developing new capabilities in existing departments and agencies. Through the decades of institution building, including that at the Executive Office level, the joint, but not always harmonious, efforts of the President and the Congress were highly important.

Even as the Ford Presidency was ending, there was taking place a new beginning for the support of science and technology and for the re-establishment of a presidential science advisory apparatus. During the short and troubled Ford years, one could well have expected the affairs of science to take a back seat. Notwithstanding the fact that Ford's main problems were restoring confidence in the Presidency, coping with inflation and a stumbling economy, and searching for an appropriate energy policy for the nation, Ford turned out to be not only a good friend of science but also developed a long view of the future and of the role that science and technology would play in shaping the world.[13]

Observations and Conclusions

A major conclusion is that there is a close and intimate connection between expert knowledge and political power as revealed in the science advisory function. Notwithstanding periods when Science Advisers and their advice were ignored or were assigned secondary status in the processes of Presidential decision making, this broad sweep of seven Presidencies and nearly five decades demonstrates that science advice at the Presidential level has been an extremely important feature of the modern Presidency. From Roosevelt's decision to develop the atomic bomb to Ford's far more complicated problem of proposing an appropriate mix of energy R&D strategies, Presidential Science Advisers have performed in significant roles. In varying degrees, Presidential science advice has affected or influenced a great variety of Presidential decisions—in war and in peace, on budgets and organizations, on domestic and international problems.

However, it also is suggested that the far greater number of the problems and issues which confronted Presidents Roosevelt through Ford were either not directly involved with science and technology or the degree to which science and technology were involved was seldom clear. As one moves from problems which involve the physical sciences—for example, the decisions to develop the atomic bomb and the H-bomb—to programs arising from the social sciences—the New Deal, the Fair Deal, the New Frontier, and the Great Society—the scientific and technological content in Presidential decisions has not been perceived at all or has been assigned minimal weight. This is consistent with observations that the great social and political changes underway in the world, largely in response to the impact of science and technology, are not really understood. Moreover, the presidential science advisory apparatus—from Roosevelt to Ford—was not well equipped to deal with or understand problems of this kind, despite their great importance.

As newly-emerging societal problems moved onto the Presidential agenda and that of the science advisory apparatus in the late Eisenhower and early Kennedy years, it was not as clear—as it was in national security and space matters—just how science advice could perform an effective role. This difficulty persisted throughout the remaining years covered by this paper. Another important point is the absence of a crisis in problems such as energy and the environment in the early 1960s, say, in comparison with the military crisis of the 1940s, and the space and military crises of the late 1950s. Clearly the agenda of the Presidential science advisory machinery has changed over the years and former Science Advisers are even today troubled by the difficulties in mobilizing the government to cope with the new societal problems.

Some are pessimistic enough to believe that even with a crisis it may not be possible to do anything about some of these problems. While an entirely pessimistic view is not endorsed, there is agreement that there is substantial cause for concern; it arises from the fact that a high degree of political uncertainty and deep divisions of attitude pervade socio-technology. In short, much of the growing complexity encountered by the Presidency and a series of science advisory machineries arises from an increasingly intricate involvement of science and technology with political and social processes. Major implications for the future are that Presidential science advisory machinery will be required to engage in far more sophisticated analysis than was required in the past. Implicit in this growing involvement with social and political processes is the necessity for the Executive Office to develop better capabilities for interweaving scientific, technical, legal, social, economic, and political factors. How to perform this interweaving process effectively is a major problem facing the Presidency.

The social sciences virtually have been ignored at the Presidential level since the time of Roosevelt although a few limited endeavors were undertaken over the years. While PSAC published four or five reports related to the social sciences, and many New Frontier and Great Society programs were based on the social sciences, there is little evidence of science advice regarding the social sciences being provided on any regular, sustained basis by the Presidential science advisory machinery. In fact, it was not until 1968 that a social scientist (Herbert Simon) was appointed to PSAC; a general feeling about the social sciences and social scientists was expressed by one former science adviser: "They haven't discovered their Newton's Laws yet." Only after the science advisory apparatus had been moved to the National Science Foundation in 1973 did a systematic study of what was happening in the social sciences get underway during the Ford Presidency. However, the effort came to naught as the office began to phase down in anticipation of returning to the White House.

This paper underscores an important aspect of Presidential science advising: there should be at least a general political rapport between a President and his Science Adviser. This is not to argue that the post of Science Adviser should be strictly a political appointment in the sense that many administration posts must be. Yet, there is no escaping the reality that the White House is a political place, that the problems of the public sector are primarily political, and that a science advisory apparatus—especially the President's Science Adviser—must be able to function in an intensely political environment. And while a specific research project in a laboratory may be far removed from the political arena and the scientists performing the research may be entirely apolitical, in a large sense science is affected by political outlooks and attitudes. Examples include the NSF and AEC debates of the 1940s, the Apollo decision by Kennedy, the debates on the content and directions of health research of the Johnson and Nixon years, and the energy-environment debates of the 1970s. The closer a President comes to perceiving some facet of science and technology as being related to the national interest, the more likely political considerations will become important and make the task of a science advisory apparatus more difficult.

The formal Presidential science advisory apparatus has not had a monopoly on providing science advice. In many respects the Office of Management and Budget (and formerly the Bureau of the Budget) has been more influential than the actual science advisory apparatus. Other important sources of science advice have been the departments and agencies, with the degree of influence varying according to the nature of the issue and the style of a particular President. Still other sources include individuals and organizations outside of the government. This suggests that a Presidential science advisory machinery must be capable of both cooperating and competing with these other sources of science advice; in doing so, it needs to be concerned with establishing its credibility and reputation by being responsive to the needs of the President and his principal aides.

The lack of a monopoly on providing science advice by the Presidential science advisory machinery is directly related to a general conclusion about the establishment of national policy with respect to science and technology both in the *policy for science* and the *science for policy* senses. A science advisory apparatus potentially can have an important influence as policy is established through Presidential statements, messages and budgets. Numerous examples are available. However, a more general responsibility for a science advisory apparatus is to comprehend and be prepared to react to the emerging of policies from the clash of ideas in the congressional arena in which various factions have allies—in and out of government; and it must be understood that there are complex interactions between various parts of the government with different elements of the academic, scientific, and technical communities which over the years have resulted in an elaborate network of policies.

This leads to a conclusion that one must consider the respective powers and roles of the Presidency and the Congress in considering and establishing national science and the constraints of each of the institutions in relation to the other actors in the and the constraints of each of the institutions in relation to the other factors in the science policy arena—the bureaucracy and their allies and enemies in the private sector. One must understand that the system requires eventually a general convergence of views, if the system is to work at all, and this calls for an ability to tolerate the long perspective and a diversity of views.

A more specific conclusion, arising from the above, is that the years of inquiry and debate, first in the Congress, beginning in the early 1970s, and later including the Ford Presidency, which led to "The Act" should not be considered merely, as did many, an examination of the Presidential science advisory system. The evolution of "The Act" is more properly regarded as another, albeit important, episode in the long debate over policy, organization and goals related to science and technology and their uses which has been underway in this country from its very beginning, but particularly since the 1880s. Thus, it becomes clear that the evolution of Presidential science advisory machinery has taken place within the context of this larger debate. There is as yet no final answer, and there may never be one, to the question of how best to devise an organization arrangement in the Executive Branch which encompasses providing science advice to the President, assisting the various units of the Executive Office, and providing some kind of central managerial perspective for the enormous Federal R&D enterprise.

It is believed that A. Hunter Dupree's concept of a long-term search for a central scientific organization is a useful analytical tool for examining the above issue and the evolution of science-based organizations in the United States.[14] In the history of American science and technology and their interactions with government and other institutions, the demands of pluralism have had their counterpart in the quest for some form of central scientific organization. Dupree suggests that two broad types of effort have been involved in attempts to achieve what many perceive to be a desirable unifying focus: (1) the building of a central scientific organization, and (2) the adaptation of a predominant agency to take on the more general business of serving as a central scientific organization. Most parties involved call for coherence, coordination and appropriate relationships between government and science; however, disagreement arises because the centralists believe in the need for decisive action at the center to attain their ends, while the pluralists see these same ends accomplished through both cooperation and competition between the individual institutions themselves.

It is argued that this disagreement is closely associated with and has had a marked impact on the evolution of Presidential science advisory machinery. The centralists have argued for and have seen the placement of a science advisory apparatus in the Executive Office as being essential for decisive action at the center. Moreover, most centralists have endeavored to provide the Presidential machinery with appropriate capabilities to provide for "coherence, coordination and appropriate relationships between government and science." As often as not, the centralists have pressed upon Presidents more capabilities and responsibilities than Presidents have preferred.

Since the early 1940s the power base of the centralists has been the Congress; however, beginning in the early 1950s, important elements of the scientific and technological communities increasingly have allied themselves with the Congress on the general desirability of establishing a strong science advisory function at the presidential level. The pluralists have had their power base in the Executive Branch—with some assistance from a minority of the scientific and technological communities; there has never been a clamor by the departments and agencies for the establishment of such a function. Indeed, there has been hostility and resistance both specifically to the science advisory apparatus and generally to the Presidency over the decades. In contrast, and perhaps as part of their efforts to control the bureaucracy, the Presidents themselves seem to have been more centralist-oriented; of seven Presidents, only Nixon displayed an outright hostile attitude and used pluralist doctrine as his underlying rationale for abolishing the science advisory apparatus from the White House.

Another manifestation of the centralist-pluralist disagreement has been a recurring debate over a Department of Science and Technology which began in the 1880s and continues to the present. Indeed, the initial debate resulting from the Allison Commission of 1884 contained the department idea and the high level

science advisory function as integral elements, and the two concepts have been commingled ever since. As one examines the evolution of science advisory organization at the Executive Office level, the idea of a Department of Science and Technology emerges from time to time—particularly when Congress is in the midst of one of its periodic forays into overall science policy matters and the organization of science.

Support of Dupree's concept of the quest for the central scientific organization must be qualified to this extent: the idea of adapting a predominant agency to take on the more general business of serving as a central scientific organization does not appear to be useful in explaining what has actually happened in the post-1940 period. Only the National Science Foundation was singled out unsuccessfully by several Presidents (Truman, Eisenhower, and Nixon) to take on the "general business of serving as a central scientific organization," and by no stretch of the imagination has the NSF ever been a predominant agency. It might be possible to argue that for a number of years the Department of Defense was a *de facto* central scientific organization. This is because it was the largest supporter of Federal R&D and established patterns of support and management procedures which have endured to the present time—with major modifications taking place over the years as other science-and-technology-based agencies evolved as part of the postwar creation of a national R&D structure. Finally, there have been some attempts by the Congress to give the NSF and NASA respectively some of the attributes of a central scientific organization but these efforts have not been successful—either in getting out of the Congress in recent years or in being implemented by the NSF in earlier years. In any event, the predominant agency approach does not appear to be useful as an analytical tool in examining the recent historical record in terms of the quest for a central scientific organization.

A major observation on the "quest" concept is that the commingling of the Presidential science advisory function and the Department of Science and Technology in debates over the years has led to confusion and disagreement about the appropriate responsibilities of the Presidential machinery in terms of how extensive they should be. And confusion has occurred as a result of mixing the advisory function with major responsibilities for the management—with frequent special emphasis on coordination—of the entire Federal R&D enterprise as part of the growing institutionalization process of the science advisory apparatus over the years.

From the early 1940s, when Senator Harley Kilgore pressed for greater coordination of the growing Federal R&D establishment, to the 1970s views of Edward E. David, Jr., that an effective science and technology presence in the Executive Office required statutory management authority, some have argued that, in effect, an organization with certain attributes of a department should be located in the Executive Office. Intermediate views earlier led to the establishment of PSAC, the Federal Council for Science and Technology, OST and, finally, the evolution of the current Office of Science and Technology Policy. In contrast to these two somewhat oversimplified sets of views, Presidents and most former Science Advisers have held to a more limited view of what functions a Presidential science advisory apparatus should perform. Emphasis from this quarter has been on "advice for the

President'' even as the institutionalization of the apparatus took place over the years—partly from internally perceived needs but in larger measure as a result of pressure from the Congress.

In the end, one is left with a cruel dilemma which is implicit in the disagreement between the centralists and the pluralists. Virtually all parties can agree that good management and effective coordination of the Federal R&D enterprise are desirable, and many can agree that providing science advice to the President effectively is important. However, on the one hand, a department has never gained wide acceptance; and, on the other hand, it would seem that the mixing of ''advisory'' attributes with ''management'' attributes has been inimical to the effective performance of Presidential science advisory machinery in carrying out the central role of advising the President. ''The Act'' did not satisfactorily resolve the dilemma; as Congress often does, when it reaches the limits of the workable agreement, it passes the unresolved issues to the future. Thus, a dilemma which has been near the center of the pluralist-centralist debate for nearly a century was passed along to the future virtually intact.

Contributing to the difficulties arising from this dilemma is that, on the one hand, the President has been and should be involved in establishing broad policy and must acquire appropriate information for effective decision making. On the other hand, it is not easy to distinguish between the types of activities which must be performed and the kinds of information which must be acquired for the development of Presidential policy and the broad evaluation of programs and similar, but more detailed, activities and information gathering which are more properly in the realm of managing the Federal R&D enterprise, directly or indirectly.

As observed earlier, ''The Act'' side-stepped this issue and settled for continuing the pre-1973 arrangement with these major exceptions: the Office of Science and Technology Policy was given more ''managerial'' and ''horizon scanning'' responsibilities than had been held by the defunct Office of Science and Technology and a specific mandate was given to the administration to examine once more the division of responsibilities by studying the feasibility of a Department of Science and Technology, as well as other organizational and policy issues. President Carter has, however, for the most part, ignored this latter provision of ''The Act''; in fact, he abolished the advisory committee which the Congress and President Ford had agreed on as being essential to performing the legislative mandate.

Notwithstanding the Congressional mandate, it is concluded that Presidents will devise arrangements which are compatible with their style and concept of government organization; moreover, it is not believed likely that a Department of Science and Technology will be established within the next few years so that, as a practical matter, the real focus will be on what kind of organizational arrangement can be established within the Executive Office to perform the various functions which have been discussed in this analysis.

DuBridge actively studied an arrangement which generally follows the provisions of ''The Act'' and the pre-1973 structure but which would allow for a better division of responsibilities to offset some of the negative features of increasing institutionalization. The custom of the Science Adviser to the President being the Director of OST, Chairman of the Federal Council, and the Chairman of PSAC just happened that way; it turned out to be convenient in the early days and also was effective under an activist such as Wiesner. The ''four-hatted'' arrangement was not dictated by law or by Executive Order. Although DuBridge and Nixon ended up not making any changes in the structure inherited from Kennedy, it would seem that this subject might be investigated again with the purpose of determining the feasibility of different individuals handling the advisory function and the ''management'' functions, but within the purview of the Executive Office. It is not considered feasible to place major policy and management functions related to attaining a central perspective in one of the departments or agencies.

The construction of ''The Act,'' while overly cumbersome and loaded with too many responsibilities for the Office of Science and Technology Policy, did set the stage for a continuation of the comprehensive debate on science policy and organization which began anew in the early 1970s. It called for the type of concentrated analysis by the Executive Branch which would have complemented the earlier congressional examination. Moreover, it is believed that the studies called for in ''The Act'' would be of crucial value to both the administration and the Congress. No comparable study of the various complex facets of R&D has been attempted since the Bush and Steelman Reports of the 1940s—and such a study is long overdue.

Having said this, it is clear that the Presidential science advisory apparatus cannot be considered without reference to the rest of the Executive office. Yet, one is faced with the dilemma that this paper was not directed at a comprehensive examination of the entire domain of the Presidency. Nevertheless, to avoid a complete impasse, it is a general conclusion that the short-term perspective of the Executive Office must be modified to permit the attention of some individuals or units to be directed beyond the immediate set of problems before the President at any given time.

Without specifying in detail what form such a capability should take, it seems reasonably clear that a Presidential science advisory apparatus must be closely connected with this kind of institutional capability. The role of the science apparatus would be to assist in performing what many have called the ''horizon scanning'' function. The revolutionary impact of science on society—as discussed earlier—demands that more attention be devoted to thinking ahead and to insuring that decisions involving the use of science and technology are considered in the broadest possible context.

This conclusion leads directly to another major point: it is essential that the Presidency, assisted by the science advisory apparatus, be organized in such a way as to permit a more strategic outlook on the problems of the nation and the world. The *ad hoc* ''fire-fighting'' approach which has characterized the operation of the Presidency in the past will not be sufficient to cope with the problems of the latter part of the 20th century and the beginning of the 21st century—which is now closer than 1950. Yet, the Presidency—and the Congress—still act as though it were 1950. A vital perspective on the future must be attained, and it is argued that a science advisory apparatus is one of the best organizational forms to help achieve this perspective.

Finally, it is possible to state the following overall conclusion. At one time, Bush was able to say that the value of the position of Presidential adviser turns on who the individual is, who is the President, and how they get along together. It is agreed that this remains a fundamental aspect of science advice and the Presidency. But it is also argued that science advising is a highly complex process which is affected by a rich variety of influences, some resulting from the nature of the times, some resulting from the nature of the institutions involved, and others arising from the types of problems facing a President and how he perceives them in terms of the national interest. It is believed that the function of Presidential science advising has proved its worth in the past; how valuable it will be in the future depends upon the extent to which the problems identified in this paper are solved in the context of preparing for the 21st century.

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A Scientist in The White House: A Sociological View

Emanuel R. Piore

The concept of a Science Adviser to the President has been accepted in Washington for over three decades. Seven Presidents appointed individuals, a scientist or engineer, to such positions, with ill-defined functions. Ten distinguished individuals served the Presidents in that capacity. Seven or eight of those served on a full time basis. Five of the seven Presidents found the President's Science Advisory Committee (PSAC) useful. Nixon during his tenure abolished it. Carter never put it in place. The Science Adviser traditionally was Chairman of the Committee.

The functions and tasks that the adviser and the committee performed changed during the decade. The changes were gradual. The initial pattern was established during the Eisenhower and Kennedy Presidencies. The interaction between the two Presidents and their Science Advisers was unique. The Presidents changed, the Science Advisers changed. There were changes in the White House and the other parts of Washington.

The White House staff grew, the Science Adviser's staff grew, the National Security Council became operative, the Domestic Council was created, the Bureau of the Budget became the Office of Management and Budget. The White House staff became more structured, more formal. The concept of completed staff work took hold. Nixon and Carter felt the need to designate a Chief of Staff. The Science Adviser was given additional functions, becoming head of the Office of Science and Technology. This office and new function legislated by Congress reflected the needs of Congress rather than the operational needs of the White House. On second thought, the legislation modulated the work of the Science Adviser and the President's Science Advisory Committee. The staff of the Science Adviser was increased to comply with Congressional mandate. Administrative duties increased, deflecting the Science Adviser's attention from concerns that may

Emanuel R. Piore (b. 1908) was a member of the President's Science Advisory Committee (1959 to 1961) and was appointed consultant-at-large in 1963. He was formerly Vice President and Chief Scientist and a Director of International Business Machines Corporation; he has also been a member of the National Science Board, Chairman of the Naval Research Advisory Committee, and Deputy Chief and Chief Scientist of the Office of Naval Research; he is a member of the Council of the National Academy of Sciences, National Academy of Engineering, American Philosophical Society, and American Academy of Arts and Sciences.

Sci & Tech

THE WHITE HOUSE

WASHINGTON

April 18, 1990

MEMORANDUM FOR THE FILES

SUBJECT: FCCSET Formation

BOTTOM LINE: The Federal Coordinating Council on Science, Engineering and Technology is in the process of completing the formation of its committee structure. Actions need to be taken now to ensure appropriate coordination with the new structure.

BACKGROUND: You will recall that, at the last FCCSET meeting (March 14), Dr. Bromley asked for the names of suggested chairpersons for each committee. Since then, the membership and structure of 7 committees have been created (see attached list).

Charters are being prepared for all the committees, and they will be sent to Dr. Bromley by the end of the week. There will be a meeting on April 24 (Tuesday) of all the committee chairmen to discuss the charters and make any necessary changes. The charters will then be tabled at a meeting of the full FCCSET on April 30 for final approval. It is then planned that the charters will be published in the Federal Register, possibly with the names of the members.

Staff of FCCSET have stated that the charters will not be made available for review until the FCCSET meeting. Of course, at that time there may be no way to make appropriate changes. In addition, it is difficult to determine whether the activities contemplated by the FCCSET Committees will overlap or conflict with other interagency working group activities. Finally, absent any movement to form or convene the Cabinet Council Science and Technology Working Group, there may be a natural tendency for the FCCSET committees to take up the issues more appropriate to the Working Group.

RECOMMENDATION: The Science and Technology Working Group charter should be prepared, Dr. Bromley could announce formation of the Working Group in the FCCSET and other meetings, and meetings of the Working Group should be started as soon as possible, to show there is a viable process for taking issues to the Cabinet Councils. In addition, The EPC and DPC executive secretaries should be able to participate in the April 24 meeting to ensure adequate coordination on issues with FCCSET. We should also request copies of the charters, to ensure they do not inadvertently conflict with DPC and EPC charters and activities.

FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING & TECHNOLOGY COMMITTEES MARCH 1990

Earth and Environmental Sciences

Chairman: Dallas Peck, Director, US Geological Survey, Department of the Interior
Vice Chairmen: Erich Bretthauer, Assistant Administrator for Research, Environmental Protection Agency
Lennard Fisk, Associate Administrator for Space Science and Applications, National Aeronautics and Space Administration
OSTP Liaison Member: James B. Wyngaarden, Associate Director for Life Sciences

Education and Human Resources

Chairman: Adm. James Watkins (Ret.), Secretary, Department of Energy
Vice Chairmen: Ted Sanders, Deputy Secretary, Department of Education
Luther Williams, Senior Science Advisor, National Science Foundation
OSTP Liaison Member: J. Thomas Ratchford, Associate Director for Policy and International Affairs

Food, Agriculture and Forest Research

Chairman: Charles Hess, Assistant Secretary for Science and Education, Department of Agriculture
Vice Chairmen: David O'Neil, Assistant Secretary for Land and Minerals Management, Department of the Interior
James Benson, Acting Commissioner, Food and Drug Administration, Department of Health and Human Services
OSTP Liaison Member: James B. Wyngaarden, Associate Director for Life Sciences

REVISED 4/4/90

International Science and Engineering

Chairman: Reginald Bartholomew, Under Secretary for Security Assistance, Science and Technology, Department of State
Vice Chairmen: Fred Bernthal, Deputy Director, National Science Foundation
Philip Schambra, Director, Fogarty International Center, National Institutes of Health, Department of Health and Human Services
OSTP Liaison Member: J. Thomas Ratchford, Associate Director for Policy and International Affairs

Life Sciences and Health

Chairman: James O. Mason, Assistant Secretary, Department of Health and Human Services
Vice Chairman: David Galas, Associate Director for Health and Environmental Research, Office of Energy Research, Department of Energy
OSTP Liaison Member: James B. Wyngaarden, Associate Director for Life Sciences

Physical, Mathematical and Engineering Sciences

Chairman: Erich Bloch, Director, National Science Foundation
Vice Chairman: Charles Herzfeld, Director Defense Research and Engineering, Department of Defense
OSTP Liaison Member: Eugene Wong, Associate Director (designate) for Physical Sciences and Engineering

Technology and Industry

Chairman: Thomas Murrin, Deputy Secretary, Department of Commerce
Vice Chairman: J.R. Thompson, Deputy Administrator, National Aeronautics and Space Administration
OSTP Liaison Member: William D. Phillips, Associate Director (designate) for Industrial Technology

Sci & Tech

THE WHITE HOUSE

WASHINGTON

April 17, 1990

MEMORANDUM FOR DAVID Q. BATES

FROM: KENNETH P. YALE KY

SUBJECT: Meeting of the FCCSET Education Committee

A meeting of the FCCSET Education Committee was held yesterday on the issue of the Administration position on math and science education legislation proposed by Senator Kennedy.

Draft testimony, prepared for a hearing scheduled for next month, was distributed and discussed. There was general consensus that the testimony was good. It generally highlighted the problem and noted that the Administration was most concerned about the trend in math and science education.

There was some interest expressed in additional testimony on proposed Administration action to address the problem. In addition, some parties thought it would be appropriate to prepare a counteroffer for negotiations with Sen. Kennedy on the legislation. However, it was noted that the group was not sure of the appropriate policy direction for any Administration action, nor were they able to decide the appropriate legislative strategy. It was recommended that the DPC Education working group be asked to determine how the Administration should be politically and legislatively positioned on this issue.

Subsequent conversations with Ted Saunders after the meeting resulted in the recommendation of a small, education strategy group meeting to address these issues and determine the appropriate avenue for their resolution.

Document No. ~~file~~ CA

OFFICE OF CABINET AFFAIRS STAFFING MEMORANDUM

Date: 3-20-90 Due by: ----

Subject: Comments on Title V -- Science, Tech., and American Diplomacy

From: Yale/Danzansky

	ACTION	CONCUR	FYI		ACTION	CONCUR	FYI
BATES	☐	☐	☑	JACKSON	☐	☐	☑
DANZANSKY	☐	☐	☑	MCBEE	☐	☐	☐
ADAIR	☐	☐	☐	SCHALL	☐	☐	☐
BUCHHOLZ	☐	☐	☐	WETHINGTON	☐	☐	☑
D'ANDREA	☐	☐	☐	WILLIAMSON	☐	☐	☐
DEWITT	☐	☐	☐	YALE	☐	☐	☑
DUGGAN	☐	☐	☐	______	☐	☐	☐
EVANS	☐	☐	☐	______	☐	☐	☐
FARRAR	☐	☐	☐	______	☐	☐	☐
HEIMBACH	☐	☐	☐	______	☐	☐	☐

Comments:

The attached changes were agreed upon by Steve D. and Ken for the Title V report. This was delivered to Cicconi at 7:30 pm. Thanks.

THE WHITE HOUSE

WASHINGTON

March 20, 1990

MEMORANDUM FOR JAMES CICCONI

FROM: KENNETH P. YALE KY

SUBJECT: Comments on Science, Technology and American Diplomacy

Following are some changes suggested by Cabinet Affairs and the Domestic Policy Council. I must admit that I am not fully aware of the appropriate tone for this document, and therefore found it somewhat difficult to determine appropriate changes. Nevertheless, I have reviewed the document and believe that the following changes would have the approval of OSTP. I would be happy to further discuss these suggested changes with anyone, should there be any questions.

On page 2 or 3, add the following under the environmental section:

> The President also announced an international meeting at the White House in 1990, for top scientific, environmental, and economic officials to discuss global change issues. In addition, he signaled the interest of the United States to host a conference to begin the steps towards a framework convention on global climate change, after completion of the reports by the working groups of the United Nations sponsored Intergovernmental Panel on Climate Change.

On page 7, add, after the sentence "...with oversight responsibility for issues related to oceans, science, technology, and environment.", the following:

> In response to the increasing importance of the domestic ramifications of the global change issues, a Global Change Working Group was formed under the Domestic Policy Council in October. This group has the lead responsibility to review, formulate, coordinate, and implement all global change policy issues that might have an impact on the United States. The working group has Cabinet and sub-Cabinet level representation and is chaired by the Assistant to the President for Science and Technology Affairs.

On page 25, elaborate on the section inserted in page 2 and 3 (noted, supra) on the activities to host a negotiating session and to convene an international meeting on the science and economics research related to global change.

On page 39, after a reference to the PCC in the left column, add the following:

> The Global Change Working Group under the Domestic Policy Council was formed in October to review, formulate, coordinate, and implement all global change policy issues that might have an impact on the United States. The working group has developed policy responses to several international initiatives that could impact the United States.

On page 50, under Recommendations, Environment, please add another recommendation, as follows:

> Further our research and understanding of the science and economics related to global change.

On page 58, at the top of the second column, please delete "formulation" from the phrase: "U.S. policy formulation, for the IPCC in general...", add the following before that phrase:

> Overall U.S. policy formulation and implementation is coordinated for the President by the Domestic Policy Council Global Change Working Group. This is a Cabinet and sub-Cabinet level group that receives materials from the National Security Council PCC on issues having a domestic impact.

On page 62, at the bottom of the first column, after "..., and Cultural Organization (UNESCO), and UNEP." Please add the following:

> The CES also provides technical expertise, advice and information to the Global Change Working Group in the Domestic Policy Council.

File PCAST

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release February 2, 1990

SCIENCE AND TECHNOLOGY ACCOMPLISHMENTS
AND INITIATIVES OF THE BUSH ADMINISTRATION

FACT SHEET

The President announced today the appointment of the members of the President's Council of Advisors on Science and Technology (PCAST). This distinguished panel of scientists, engineers and industry leaders will provide high-level advice directly to the President on a wide range of important issues concerning science and technology.

Advances in science and technology are a key to increased economic competitiveness and improving our quality of life. The President's action today caps a year of vigorous activity by the Administration to advance science and technology issues on a broad front. The three broad areas of activity are summarized below:

I. Strengthening Federal Science and Technology Policy

II. Enhancing Federal Research and Development Activities

III. Encouraging Increased Private Sector Research and Development Investment

I. Strengthening Federal Science and Technology Policy

- Establishing the National Space Council. -- The President issued an Executive Order on April 20, 1989, establishing the National Space Council, chaired by the Vice President. The Space Council provides advice and assistance to the President on space policy and strategy and monitors and coordinates the implementation of space policy among the civil, national security and commercial space sectors.

- Establishing the Administration's Council on Competitiveness. -- The President established the Council on Competitiveness, chaired by the Vice President, to oversee regulatory and other competitiveness issues, such as reform of product liability laws. A new Working Group will coordinate and review Administration policy and regulations, and will focus on enhancing applied research and on streamlining risk-based regulation of new biotechnology products to ensure safety and promote competitive economic development.

- Upgrading the Status of the Science Advisor and Increasing the Budget for the Office of Science and Technology Policy. -- The President has raised the status of the Science Advisor to Assistant to the President for Science and Technology. The Science Advisor now participates in deliberations of the Cabinet and of the Domestic and Economic Policy Councils to ensure that science and technology issues are fully reflected in Administration policy development. In addition, the FY 1991 budget proposes $3.3 million for OSTP, double the FY 1989 level.

- Strengthening the Federal Coordinating Council on Science, Engineering and Technology (FCCSET). -- The Science Advisor initiated action to improve the interagency coordination apparatus for science and technology by consolidating and enhancing the current FCCSET committee structure. Building on the successful experience of the FCCSET Committee on Earth Science, new committees will be formed to coordinate Federal efforts in education and human resource development, materials science, and others.

- Reinvigorating the Council on Environmental Quality (CEQ). -- The President is committed to strengthening the CEQ and to ensuring that it has the capacity to serve as an effective source of environmental analysis and information in the White House. Accordingly, the President's FY 1991 budget increases CEQ's budget by 90 percent and CEQ's staff by 70 percent.

II. Enhancing Federal Research and Development Activities

A. Increased Investment in Federal R&D

- The President has proposed a total of $71 billion for research and development (R&D), including R&D facilities, in his FY 1991 budget. This is an increase of $4.5 billion, or 7 percent, over FY 1990 enacted levels.

- Civilian R&D will increase by 12 percent, and defense-related R&D will increase by 4 percent.

- The President has also proposed to allocate $12 billion for basic research, an increase of $1 billion, or 8 percent, over FY 1990. Basic research is an essential investment in the nation's scientific and technological future, including its future scientists and engineers.

B. Science and Technology Education

The President has moved aggressively to address the shortcomings in the nation's science and technology education enterprise. He has set goals for the nation's schools and students in science and math, and the FY 1991 budget will provide over $1 billion in direct spending in five agencies for science, mathematics and engineering education.

- National Science Foundation (NSF). -- NSF will allocate $463 million in FY 1991, a 30 percent increase over FY 1990, for a wide variety of education activities to improve the quality of teachers and students, the numbers of students choosing science, math, or engineering careers, and the numbers staying in those fields, particularly those in traditionally under-represented groups.

- Department of Education. -- The Department will continue to build on its strong relationships with State educational entities. The FY 1991 budget proposes $230 million, an increase of 69 percent, for the Dwight D. Eisenhower Mathematics and Science program, which provides funds to States to implement improved programs for teaching math and science. In addition, five million is requested for the new National Science Scholars program to recognize outstanding high school students by providing fellowship support for them to study in the fields of mathematics and science in college. The Department will also launch an initiative under its Upward Bound program to provide academic assistance and encouragement to help disadvantaged students pursue study in mathematics and science.

- National Aeronautics and Space Administration (NASA). -- NASA will allocate $51 million in FY 1991, an increase of 21 percent, for education activities including the "Spacemobile" program, teacher and student workshops and research experiences at NASA laboratories, and special efforts to increase minority participation in science and engineering.

- Department of Energy (DOE). -- DOE will provide $25 million in FY 1991, a 47 percent increase, for educational activities including support for graduate and undergraduate students and high school and university faculty. DOE will implement a new program, in collaboration with the private sector, to train high school faculty in the state-of-the-art science and technology conducted at the DOE laboratories.

- National Institutes of Health (NIH). -- The research training grant program will be funded at a level of $292 million, which will support almost 12,000 graduate trainees in research laboratories throughout the nation.

C. Doubling the Budget of the National Science Foundation

The President has maintained his strong commitment to the importance of basic research by proposing $2.4 billion in budget authority, a more than 14 percent increase, for the National Science Foundation in FY 1991. This will continue progress toward doubling the NSF budget by FY 1993.

- World-Class Research Equipment. -- The President has also recognized that world-class science and technology requires world-class research equipment. He has supported the construction of a replacement for the important radiotelescope at Greenbank, West Virginia, and, for FY 1991, has proposed the initiation or continuation of several high-priority, specialized research facilities including the National High Magnetic Field Laboratory, the Laser Interferometer Gravitational Wave Observatory, and two 8-meter optical/infrared telescopes.

- Academic Research Facilities Modernization. -- In addition to research support, the President will also continue the Academic Research Facilities modernization program begun by NSF in FY 1990. Continuing the program will increase management experience and permit evaluation of its impact on U.S. science and technology.

- U.S. Antarctic Program. -- NSF manages the U.S. Antarctic Program for the government. This program supports national goals in the Antarctic and is the principal expression of the U.S. presence on the Antarctic continent. The FY 1991 budget will expand an important environmental, safety, and health initiative in the Antarctic to ensure that this world scientific resource is preserved and that the safety and health of scientists working on the continent are assured.

D. Understanding and Exploring Space

The President is committed to a continuing, active and exciting American presence in space -- indeed, to America's leadership in space science and exploration. Overall, the FY 1991 budget proposes $15.2 billion for NASA, an increase of $2.9 billion, or 24 percent. NASA's budget has increased by almost 40 percent over FY 1989.

- Space Shuttle. -- The current fleet of three Space Shuttles are the world's most versatile launch vehicles. In FY 1989, the Space Shuttle fleet completed four successful flights. The Space Shuttle Columbia recently accomplished the spectacular retrieval of the Long Duration Exposure Facility. The FY 1991 budget proposes $4.2 billion, an increase of 22 percent, for Space Shuttle production and operations. This funding will allow for a safe build-up to 10 Shuttle flights, the delivery of the fourth Shuttle, Endeavor, and enhancements such as the Advanced Solid Rocket Motor and the Extended Duration Orbiter capability.

- Space Station Freedom. -- Space Station Freedom is the largest international R&D project ever undertaken. In FY 1989, the program underwent a reevaluation that has resulted in a more achievable program and funding profile. The FY 1991 budget continues the President's commitment to the Space Station by proposing a total of $2.6 billion, an increase of 36 percent. This will provide for the critical transition from design to actual fabrication.

- Moon/Mars Exploration. -- On July 20, 1989, the President proposed that America undertake an ambitious mission of manned exploration of the solar system. This journey will begin with the first step in the FY 1991 budget towards this new goal -- nearly $1.3 billion, an increase of 47 percent -- to support robotic science missions and to develop the pacing and innovative technologies that will be needed. Of particular interest is the continued commitment of the Administration to the National Aerospace Plane (NASP) program. In FY 1989 the National Space Council reviewed and revised this program in keeping with a more stable and sustainable pace of technology and funding.

- <u>Space Science and Applications</u>. -- The U.S. is committed to maintaining its world leadership in space science. An exciting new era of discovery has now begun in unmanned planetary exploration, astronomy, and Earth observations. In 1989, three important scientific missions were launched: Magellan to Venus, Galileo to Jupiter, and the Cosmic Background Explorer. The FY 1991 budget proposes $3.3 billion, an increase of 22 percent, for the continued support of missions planned for launch in 1990 including the Hubble Space Telescope, the Gamma Ray Observatory, and the Ulysses mission to explore the Sun, and development of future missions such as the Comet Rendezvous/Asteroid Flyby and the Cassini mission to Saturn.

E. <u>Global Environmental Change</u>

- <u>U.S. Global Change Research Program</u> (USGCRP). -- The U.S. is the world leader in global change research. The President has endorsed the USGCRP, a coordinated, multi-agency research program of space- and ground-based research and observations designed to provide a sound scientific basis for rational policy decisionmaking on global change issues. The FY 1991 budget proposes over $1 billion for this effort, an increase of 57 percent.

- <u>Mission to Planet Earth</u> (MTPE). -- On July 20, the President also affirmed the importance of NASA's contribution to the USGCRP, Mission to Planet Earth. The largest part of this initiative consists of a major new program for FY 1991, the Earth Observing System, a series of space platforms and instruments developed by the U.S., Europe and Japan, which will collect a broad spectrum of environmental data related to global warming, drought, oceans, etc. MTPE will permit, for the first time, an analysis of Earth as an integrated system.

- <u>International Activities</u>. -- The President believes that continuing U.S. scientific leadership is needed to address global environmental issues. In the past year, the

President announced U.S. support for a worldwide phaseout of chloroflurocarbon (CFC) production to the extent safe substitutes are available. In 1990, the U.S. will host the Plenary Session of the Intergovernmental Panel on Climate Change (IPCC) in February; a meeting of the world's economic, scientific, and environmental officials to discuss global environmental issues in the Spring; and the first negotiation session on the Framework Convention on Climate Change in late Fall.

F. Environment

- Clean Air Act. -- The President demonstrated his commitment to clean air by transmitting Clean Air Act Amendments to Congress in July 1989. The President's plan allows for both environmental protection and economic development and is based on a commitment to using the best science available. In support of his Clean Air proposals, the FY 1991 air research budget of the Environmental Protection Agency will increase by $8 million to a total of $95 million.

G. The Superconducting Super Collider and High Energy Physics

- The Superconducting Super Collider (SSC). -- The SSC will provide an enormous advance in the capability to explore the secrets of matter and energy. Over the past year, the Department of Energy has established the SSC laboratory at a site near Dallas, Texas. The new laboratory team is conducting a thorough reevaluation of all technical systems with particular attention to magnet design and technical performance of the accelerator. In FY 1989, research continued on the design and testing of magnets. Approximately 8,000 magnets will be used in the 53-mile SSC tunnel. In addition, during FY 1989, DOE continued work on the site-specific Environmental Impact Statement (EIS). The EIS is necessary before DOE makes a decision on the "footprint" of the SSC and starts acquiring land for the project.

- High Energy and Nuclear Physics. -- The President supports a robust program of research in the areas of high-energy and nuclear physics, which offer the prospects of increasing our knowledge of the basic constituents of matter. Last year, scientists discovered and conducted measurements of the Z-nought particle utilizing the recently upgraded Stanford Linear Collider. The Z-nought particle is important because it transmits one of the basic forces between elementary particles. The FY 1991 budget provides a funding increase of 8 percent to continue research at Stanford and the three other large accelerator centers: the Brookhaven National Laboratory on Long Island, the Cornell Electron Storage Ring in New York State, and the Fermilab National Laboratory.

H. Life Sciences

- o Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS). -- The Administration remains committed to making continued progress against HIV and AIDS. Five therapies have been approved for use, and since January 1989 over 35 clinical trials have been initiated in a search for additional therapeutic drugs. The Administration has recently taken action to enable State Medicaid programs to cover the costs of the drug AZT for HIV-infected individuals who do not yet exhibit AIDS symptoms. The FY 1991 budget proposes $3.5 billion in total for HIV/AIDS research, treatment, prevention and income support, an increase of 18 percent.

- o Human Genome Project. -- The evolution of genetic engineering techniques over the last decade has enabled the initiation of one of the most exciting science projects ever undertaken -- the development of a map of the full complement of human genetic material (the human genome). Such an undertaking will vastly increase our understanding of the nature and cause of many diseases. Over the past year, important advances have already been made, such as the identification of the gene that accounts for a large proportion of all cystic fibrosis cases. The FY 1991 budget proposes $108 million for the National Institutes of Health and $46 million for the Department of Energy to pursue collaboratively this important project.

- o Biotechnology. -- Recent breakthroughs in biotechnology, such as recombinant DNA techniques, cell fusion and gene therapy, offer unprecedented opportunities for improving the nation's productivity, health, and well-being. Increasing Federal investment in basic biotechnology research will spur further advances, as will initiatives that improve payoffs on investments. The FY 1991 budget proposes $3.6 billion for biotechnology R&D, an increase of 6 percent over 1990.

- Agricultural Research Initiative. -- American farmers are among the most productive in the world. New techniques in genetics, molecular and cell biology have led to innovative approaches that will enhance our ability to produce food, while addressing concerns of safety, nutrition and the environment. The FY 1991 budget will launch a National Research Initiative to more than double the size of USDA's competitive grants program. This will expand funds for plant and animal biotechnology to $50 million, with a particular emphasis on mapping the genome of important crop plants. Like the Human Genome Initiative, this effort will create new opportunities to explore the genetic potential of plants.

I. Energy

- National Energy Strategy. -- The President has directed Secretary of Energy Watkins to develop a National Energy Strategy to guide the Administration's energy policies and programs. The Department has held two rounds of public hearings and plans to issue a draft document in April. A key element of the strategy will be a blueprint for future energy R&D programs and activities.

- Clean Coal Technology. -- The Administration is committed to a $2.5 billion program to demonstrate emerging clean coal technologies. This program will provide additional cost-effective alternatives for reducing acid rain.

- Solar/Renewables and Energy Conservation R&D. -- The President is committed to assisting the development of emerging technologies that offer the potential to provide new sources of energy as well as new ways to use it more efficiently, while protecting the environment. On January 26, 1990, the Department of Energy announced a new 11-point initiative in this area. The FY 1991 budget provides an increase of 8 percent in funding for conservation, solar and other renewable energy technology R&D.

- Enhanced Oil and Gas Recovery Research. -- Up to two-thirds of oil and gas reserves are still left in the ground with conventional recovery techniques. In order to stimulate the use of new technologies to increase production from these existing fields, the President proposed four new tax initiatives, including a 10 percent credit for new tertiary enhanced recovery projects. In addition, the FY 1991 budget proposes $17 million to establish oil and gas geosciences research consortia with industry and universities to advance the science underlying oil and gas recovery.

J. Advanced Technology

- National Institute of Standards and Technology (NIST). -- The FY 1991 budget proposes $198 million for NIST, a 21 percent increase over the 1990 enacted level, and includes substantial increases for core NIST research programs such as robotics, lightwave technology, quality chemical measurements, and advanced semiconductor measurement. NIST research programs form the basis for the development of the measurements and standards on which U.S. industries depend. The FY 1991 budget also includes increased funding for improvements to NIST facilities. In addition, the budget includes funding for two programs to encourage the development and transfer to the private sector of a wide range of advanced technologies.

  -- Manufacturing Technology Centers. -- The budget proposes to continue funding for these centers, requesting $5 million in FY 1991. This program provides matching grants to universities or non-profit organizations to establish centers for the transfer of innovative, advanced manufacturing technology to small and medium-sized businesses.

  -- Advanced Technology Program (ATP). -- The budget requests $10 million in FY 1991, the 1990 funding level, for this program. The ATP will provide seed money to industry-led consortia doing generic, pre-competitive research into promising technologies.

- Magnetic Levitation Transportation. -- The FY 1991 budget proposes nearly $10 million for R&D on this emerging technology, an increase of almost 400 percent. These efforts are being carried out by both the Department of Transportation (about $6 million) and the Army Corps of Engineers (almost $4 million). Each agency is pursuing a public-private partnership designed to facilitate private development of an operational maglev system in the U.S.

K. National Security

- DOD Technology Base. -- The President supports a strong technology base to develop options for future weapons systems and to guard against technological surprise by adversaries. The FY 1991 budget includes $3.4 billion for the technology base (basic and applied research) funded through the Department of Defense. This will support programs ranging from basic research in the physical sciences to development of high-speed semiconductors for use in advanced communications systems and computers.

- Strategic Defense Initiative (SDI). -- The SDI program remains a high priority of the President. The FY 1991 budget requests $4.5 billion for SDI, an increase of $0.9 billion over 1990. The SDI program is developing options for strategic defenses based on advanced technologies. Particular emphasis is being placed on promising new concepts such as the "Brilliant Pebbles" small space-based interceptor missiles.

III. Encouraging Increased Private Sector R&D Investment

Private sector investment accounts for about 50 percent of the total national investment in R&D. In addition, the private sector is the principal performer for R&D and is ultimately responsible for transforming R&D results into useful new products and processes. The Administration has taken a number of steps to encourage increased private sector R&D investment and technological innovation.

- Encouraging Savings and Investment. -- The President is proposing the Family Savings Account to stimulate increased savings that provide the resources needed for investments in the future. In addition, the President is proposing to lower the tax on capital gains in order to promote increased entrepreneurial activity and investment.

- <u>Research and Experimentation Tax Credit</u>. -- The President again proposes to make permanent the 20 percent tax credit targeted specifically to research and experimentation (R&E) by allowing 100 percent of total research expenses to be used for the computation of the credit for all years after December 31, 1989. In 1989, the Congress enacted a short-term extension in response to the President's proposal of last February.

- <u>Encouraging R&D by Transnational Companies</u>. -- The President proposes to make permanent the rules, as modified by the Omnibus Budget Reconciliation Act of 1989, for the allocation of foreign and domestic R&E expenditures for companies with foreign operations. The proposal would also allow 100 percent of U.S. expenditures to be covered rather than the current 75 percent. This proposal would apply to all tax years beginning after August 1, 1990, when the current rules expire.

- <u>Intellectual Property</u>. -- The President is committed to pursuing aggressively improved international protection of intellectual property. The current negotiations in the Uruguay Round of the General Agreement on Tariffs and Trade are an important forum for this activity.

- <u>Tort Reform/New Product Liability</u>. -- The Administration has endorsed changes in product liability laws to help restore balance to the tort system, to increase competitiveness, and to reduce uncertainty, particularly for new products, while providing incentives to produce safe products.

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THE WHITE HOUSE

Office of the Press Secretary
(Knoxville, Tennessee)

For Immediate Release February 2, 1990

The President today announced the appointment of the President's Council of Advisers on Science and Technology (PCAST), comprised of 12 distinguished scientists and engineers. This panel will provide high-level advice directly to the President on a wide range of important issues concerning science and technology.

PCAST will be the first Presidential scientific advisory group in many years to report directly to the President. Its establishment is a measure of the Bush Administration's high esteem for science and a recognition that advances in science and technology contribute in a major way to increased economic competitiveness. It also reflects the President's desire to strengthen Federal science and technology policy, enhance Federal research and development activities, and encourage private sector involvement in research and development.

The United States scientific community leads the world in creating new knowledge. Through PCAST, the President is seeking to provide the best obtainable private sector advice to Executive Branch decision-making in science and technology.

PCAST will be chaired by Dr. D. Allan Bromley, Assistant to the President for Science and Technology. A list of the members and their affiliations is attached, along with a fact sheet on science and technology accomplishments in the Bush Administration.

PCAST was established January 19, 1990, by Executive Order 12700. Its members will be sworn in later today by the Vice President at the White House.

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NORMAN E. BORLAUG

Nobel Laureate Borlaug, of Texas, is currently leader of the Sasakawa-Global-2000 agricultural program in sub-Saharan Africa, Distinguished Professor of International Agriculture at Texas A&M University, and a Senior Consultant to CIMMYT. He was Director of the Wheat Research and Production Program of the International Maize and Wheat Improvement Center, Mexico, from 1964 until his retirement in 1979.

Dr. Borlaug's career began in 1935 in the U.S. Forest Service, and he subsequently worked as an instructor in plant pathology at the University of Minnesota in 1941, where he received his Ph.D. From 1942 through 1944 he was a microbiologist with the E. I. DuPont de Nemours & Co.. He also served as research scientist in charge of wheat improvement with the Cooperative Mexican Agricultural Program, Mexican Ministry of Agriculture and the Rockefeller Foundation, 1944-60, and later, as Associate Director of the Foundation assigned to the Inter-American Food Crop Program, 1960-63.

D. ALLAN BROMLEY, CHAIRMAN

D. Allan Bromley, of Connecticut, is Assistant to the President for Science and Technology and Director of the Office of Science and Technology Policy (OSTP).

Dr. Bromley carried out pioneering studies on both the structure and dynamics of nuclei and is considered the father of modern heavy ion science. He has played major roles in the development of accelerators, of detection systems, and in computer based data acquisition and analysis systems. He is currently on leave from his position as Henry Ford II Professor of Physics at Yale University, where he was founder and Director of the A.W. Wright Nuclear Structure Laboratory.

Dr. Bromley has been a leader in the national and international science and science policy communities for more than 20 years, serving as a member of the White House Science Council throughout the Reagan Administration and as a member of the National Science Board in 1988-89. He received the President's National Medal of Science in 1988 and the Presidential Medal of the New York Academy of Sciences in 1989. He has served as President of the American Association for the Advancement of Science and of the International Union of Pure and Applied Physics.

Dr. Bromley received the B.Sc. degree in 1948 at Queen's University, Canada, the M.Sc. degree from Queen's University in 1950, and the Ph.D. degree in nuclear physics from the University of Rochester in 1952. He has since been awarded 10 honorary doctorates.

SOLOMON J. BUCHSBAUM

Solomon J. Buchsbaum, of New Jersey, has been Senior Vice President, Technology Systems, at AT&T Bell Laboratories since 1979. His early career included work at the MIT Research Laboratory of Electronics. He received his Ph.D. in physics from MIT in 1957. He joined Bell Laboratories in 1958 as a member of the technical staff and later became department head and director of the Electronics Research Laboratory. In 1968, he was named Vice President for Research at the Sandia Laboratories and served in a number of different capacities. He returned to Bell Laboratories in 1971 as an Executive Director. In 1976 he became Vice President, Network Planning and Customer Systems.

Dr. Buchsbaum is a member of the National Academy of Sciences and of the National Academy of Engineering. He was the recipient of the President's National Medal of Science in 1986.

CHARLES L. DRAKE

Charles L. Drake, of Vermont, has been the Albert Bradley Professor of Earth Sciences at Dartmouth since 1984 and Professor of Geology since 1969. Dr. Drake's professional career began at Columbia University in 1953. He joined the staff at Dartmouth in 1958 after receiving his Ph.D. in geology from Columbia University where he has continued his career, including service as Professor and Chairman of the Department, 1967-69; as Dean of Graduate Studies and as Associate Dean of the Science Department, 1978-81.

Dr. Drake is a recipient of the G. P. Woollard Award, Geophysical Division of the Geological Society of America.

RALPH E. GOMORY

Ralph E. Gomory, of New York, is President of the Sloan Foundation and, until his recent retirement, was Senior Vice President for Science and Technology, IBM Corporation. He received his Ph.D. in mathematics from Princeton in 1954.

Dr. Gomory's professional experience includes teaching and research at Princeton from 1957-59. In 1959, he joined the Research Division of IBM and was named Director of the Mathematical Sciences Department in 1965. In 1970 he became IBM Director of Research and held that position until 1985, becoming IBM Vice President in 1973, Senior Vice President in 1985, and IBM Senior Vice President for Science and Technology in 1986. He has been awarded a number of honorary degrees and prizes, including the John von Neumann Theory Prize in 1984 and the National Medal of Science in 1988.

BERNADINE HEALY, VICE CHAIRMAN

Bernadine Healy, of Ohio, is Chairman of the Research Institute of The Cleveland Clinic Foundation, a position she assumed in 1985, and is a staff member of the Clinic's Department of Cardiology. Prior to that time, she was Deputy Director of the Office of Science and Technology Policy at the White House, and until that appointment had been a Professor at The Johns Hopkins University School of Medicine and Hospital. Dr. Healy received her medical degree from Harvard Medical School in 1970. Her medical career continued at Johns Hopkins from 1976 to 1984, where she was Professor of Cardiology and Medicine, Director of the Coronary Care Unit, and Assistant Dean for Postdoctoral Programs and Faculty Development.

Dr. Healy is a member of the Institute of Medicine of the National Academy of Sciences. She is the immediate Past President of the American Heart Association and a former President of the American Federation for Clinical Research.

PETER W. LIKINS

Peter W. Likins, of Pennsylvania, has been President of Lehigh University since 1982. His professional career began as a development engineer with the Jet Propulsion Laboratory, California Institute of Technology, in 1958. In 1964 he joined the faculty at the University of California, Los Angeles, where he became Professor of Engineering and later, Associate Dean. Dr. Likins received his Ph.D. in engineering mechanics from Stanford in 1965. In 1976 he became Professor and Dean of Columbia University, serving until 1980, when he became Provost of the University.

THOMAS E. LOVEJOY

Thomas E. Lovejoy, of Virginia, is the Assistant Secretary for External Affairs, The Smithsonian Institution. His previous experience includes service as a research assistant at the University of Pennsylvania, 1971-74, after receiving his Ph.D. in biology from Yale University in 1971; as Executive Assistant to the Science Director and as Assistant to the Vice President for Resources and Planning of the Academy of Natural Sciences, 1972-73; as the Vice President for Science of the World Wildlife Fund-U.S., 1973-87; and as Executive Vice President, 1985-89.

Dr. Lovejoy is President of the Society for Conservation Biology.

WALTER E. MASSEY

Walter E. Massey, of Illinois, has been the Vice President of the University of Chicago for Research and for Argonne National Laboratory since 1984. He has also been Professor of Physics at the University since 1979.

Dr. Massey previously served as a physics instructor at Morehouse College, 1958-59; and after receiving his Ph.D. in physics from Washington University in 1966, as a staff physicist with the Argonne National Laboratory until 1968; as Assistant Professor of Physics, University of Illinois, Urbana, 1968-70; Associate Professor of Physics and Dean of the College, Brown University, 1975-79. He is Vice President, and President-elect, of the American Physical Society and is the Past President and Chairman of the American Association for the Advancement of Science.

JOHN P. MCTAGUE

John P. McTague, of Michigan, is Vice President-Research, Ford Motor Company, and has served in that position since 1986.

In 1983 Dr. McTague was appointed Deputy Director of the Office of Science and Technology Policy, becoming Acting Science Advisor to the President and Acting Director of OSTP in 1986. Prior to that, he was Chairman of the National Synchrotron Light Source Department, Brookhaven National Laboratory, 1982-83. He was Professor of Chemistry and a member of the Institute of Geophysics and Planetary Physics, University of California, Los Angeles, 1970-82. Dr. McTague began his professional career as a member of the Technical Staff, North American Aviation Science Center, on receiving his Ph.D. in physical chemistry from Boston University, and remained there until 1970. He is U.S. Chairman of the U.S. Japan Joint High Level Advisory Panel on Cooperation in Research and Development in Science and Technology.

DANIEL NATHANS

Nobel Laureate Nathans, of Maryland, is Professor of Molecular Biology and Genetics at The Johns Hopkins University Medical School and Senior Investigator of the Howard Hughes Medical Institute. He has been on the faculty of The Johns Hopkins University Medical School since 1962.

After receiving his Medical Degree from Washington University in 1954, he served as Medical Resident at the Columbia-Presbyterian Medical Center in New York, 1955, 1957-59; as Clinical Associate at the National Cancer Institute, 1955-57, and Guest Investigator in biochemistry at the Rockefeller University, 1959-62.

Dr. Nathans received the Nobel Prize in Physiology or Medicine in 1978 for his research with enzymes that cut DNA into specific pieces, one of the basic tools of genetic engineering.

DAVID PACKARD

David Packard, of California, has been Chairman of the Board of the Hewlett-Packard Co. since 1972. Mr. Packard received his B.A. and B.S.E.E. degrees from Stanford University in 1934 and 1939, respectively.

His professional experience includes service as an engineer with the Vacuum Tube Engineering Department, GE Co., 1936-38; co-founder and partner, the Hewlett-Packard Co., 1939-47; President, 1947-64; and Chairman and Chief Executive Officer, 1964-69. Prior to his present position, Mr. Packard served as U.S. Deputy Secretary of Defense from 1969-71.

Mr. Packard received the Vannevar Bush Award of the National Science Board in 1987 and the President's National Medal of Technology and the Presidential Medal of Freedom in 1988.

HAROLD T. SHAPIRO

Harold T. Shapiro, of New Jersey, has been President of Princeton University since 1988.

Dr. Shapiro's previous academic experience has been with the University of Michigan, after receiving his Ph.D. in economics from Princeton in 1964, first as an Assistant Professor of Economics. His career progressed from Associate Professor, 1967-70; Professor, 1970-76; Chairman of the Department of Economics, 1974-77; Professor of Economics and Public Policy, 1977; Vice President for Academic Affairs, 1977-79.

Dr. Shapiro was President of the University of Michigan from 1980 until 1987. He has served as a member of many industrial, governmental and academic boards and commissions.

# # #

THE WHITE HOUSE
WASHINGTON, DC

Date: March 14

TO: Holly Williamson

FROM: Ken Yale

	ACTION	CONCUR	FYI		ACTION	CONCUR	FYI
Bates	☒	☐	☐	Jackson	☐	☐	☐
Danzansky	☐	☐	☒	McBee	☐	☐	☐
Adair	☐	☐	☐	Schall	☐	☐	☒
Buchholz	☐	☐	☐	Wethington	☐	☐	☒
D'Andrea	☐	☐	☐	Williamson	☐	☐	☒
DeWitt	☐	☐	☐	Yale	☐	☐	☐
Duggan	☐	☐	☐	______	☐	☐	☐
Evans	☐	☐	☐	______	☐	☐	☐
Farrar	☐	☐	☐	______	☐	☐	☐
Heimbach	☐	☐	☒	______	☐	☐	☐

☐ URGENT ☐ BY NOON ☐ C.O.B.

Comments:

THE WHITE HOUSE

WASHINGTON

March 14, 1990

MEMORANDUM FOR DAVID Q. BATES

FROM: KEN YALE KY

SUBJECT: Second Meeting of the Federal Coordinating Council on Science, Engineering and Technology (FCCSET)

The second meeting of FCCSET was held today. In attendance were Secretaries Cavazos, Lujan, Sullivan, Watkins; Undersecretaries Herzfield, Murrin, and Principi, Administrator Reilly, Director Bloch, and Allan Bromley. Various other agencies and White House offices had staff representation.

Dr. Bromley announced that the Department of Education was made an official member and that the Presidential Council of Advisors on Science and Technology had been formed and met at Camp David last month.

Dr. Bromley next turned to the FCCSET charter. He gave special thanks to the Cabinet Affairs staff (naming David Bates and Stephen Danzansky) for their assistance in improving the draft so as to effectively coordinate activities with the Cabinet Councils. The revised draft was reviewed and Dr. Bromley asked that changes be forwarded to OSTP in the near future.

The committees were discussed. A list of the standing committees is attached. An wide ranging discussion ensued of the various issues that could be discussed by the committees. Those present agreed that the agency chairing each committee would be responsible for its staffing and expenses. He then asked those in attendance to send the names of suggested chairpersons for each committee. In response to a question he stated that anyone could chair, the higher the better, even a Cabinet member. He also stated that he envisioned membership at the Assistant Secretary or above.

Potential overlap with other policy councils was also discussed. Dr. Bromley said that had been worked out with Cabinet Affairs. Dr. Bromley also mentioned the creation of the new Competitive Council group on commercialization as an example of other activities. He indicated that Bill Phillips of his staff could chair that group.

Listing all working groups in the Administration was suggested, and Dr. Bromley agreed to develop a list. After the meeting I told OSTP staff that we had already begun compiling such a list (the EPC and DPC issues lists), and would meet with Competitive Council staff to determine issues on their horizon.

cc: Stephen Danzansky
Olin Wethington

Sci & Tech

THE WHITE HOUSE

WASHINGTON

February 6, 1990

MEMORANDUM FOR BOB PELLICCI

FROM: KENNETH P. YALE KY

SUBJECT: FDA Orphan Drug Testimony

Thank you for sending the testimony on Orphan Drugs to us for clearance. I apologize for the delay in our response, however we just received a draft at 9:30 this morning.

The comments we have deal with the related issues of competition in the drug market and the cost of drugs. In order to expedite your process, we have cleared our concerns with FDA. They have addressed these issues to our satisfaction in their question & answer materials. As the issues are indirectly related to those addressed by the testimony, we do not suggest any changes at this time. We would, however, like to follow the progress of this issue.

Again, thank you for your assistance.

CALENDAR OF UPCOMING INTERNATIONAL SCIENCE AND TECHNOLOGY EVENTS

Revised: February 14, 1989

February	--	[Tentative] U.S./FRG Non-Proliferation Bilaterals, in Bonn (OES/N)
February	--	[Tentative] U.S./U.K. Non-Proliferation Bilaterals, in London (OES/N)
February	--	U.S./Mexico International Boundary and Water Commission, in El Paso (OES/ENV)
Mid/Late February	--	[Tentative] Round I of U.S./New Zealand Science and Technology Agreement Negotiations, in Wellington or Washington (OES/SCT)
Feb 13-15	--	ECE VOC Working Group, First Session, in Geneva (OES/ENV)
Feb 13-17	--	[Tentative] UNEP Meeting on Prior Informed Consent for Chemicals Trade, in New York (OES/ENV)
Feb 13-17	--	Annual Meeting of the U.S./Canada Pacific Salmon Commission, in Portland (OES/OFA)
Feb 13-17	--	UNEP Meeting on Prior Informed Consent for Chemicals Trade, in New York (OES/ENV)
Feb 14	--	U.S./Mexico Fisheries Consultations, in Mexico City (OES/OFA)
Feb 15-16	--	6th Annual Meeting of the North American Commission, NASCO (North American Salmon Conservation Organization), in Hilton Head, South Carolina (OES/OFA)
Feb 15-17	--	63rd Session of the OECD Fisheries Committee, in Paris (OES/OFA)
Feb 16-17	--	NATO Science Committee, in Brussels (OES/SAT)
Feb 20-22	--	Policy and Legal Experts on Climate, in Ottawa (OES/ENV)
Feb 20-24	--	Bilateral Consultations with USSR on Navigation and Related Law of the Sea Issues, in Washington (OES/OLP)
Feb 21-22	--	February IAEA Board of Governors Meeting, in Vienna (OES/NTS)

Feb 21-22	-- U.S./Polish Science and Technology Experts Working Group, in Washington (OES/SCT)
Feb 21-Mar 3	-- Science and Technology Sub-Committee of the U.N. Committee on the Peaceful Uses of Outer Space, in New York (OES/SAT)
Feb 21-Mar 3	-- 25th Session of the U.N. Population Commission, in New York (OES/CP)
Feb 23-24	-- International Tropical Timber Organization Experts Meeting on Forest Management, in Paris (OES/EHC)
Feb 27-Mar 1	-- Meeting of Contracting Parties to the International North Pacific Fisheries Commission, in Vancouver (OES/OFA)
Feb 27-Mar 3	-- CITES Standing Committee, in Lausanne (OES/ENV)
Feb 27-Mar 3	-- LASCAR (Safeguards For Large Reprocessing Plants) Working Group I (Spent Fuel Storage), in Sellafield, U.K. (OES/NTS)
Feb 28	-- Yukon River Salmon Negotiations, Government-to-Government Meeting, in Ottawa (OES/OFA)
Feb 28-Mar 2	-- OECD Committee for Scientific and Technological Policy, in Paris (OES/SAT)
Feb 28-Mar 3	-- ECE Senior Advisors Meeting on Environment and Water Policy, in Geneva (OES/ENV)
Feb/March	-- [Tentative] Round I of U.S./Thai Science and Technology Agreement Negotiations, in Bangkok or Washington (OES/SCT)
Feb/March	-- Critical Loads Working Group of the Long-Range Transboundary Air Pollution Convention, in Europe (OES/ENV)
Spring	-- U.S./USSR Bilateral on Climate Change, in Moscow (OES/ENV)
Spring	-- Ad Hoc LRTAP Working Group on Volatile Organic Compounds, in Europe, (OES/ENV)
Spring	-- ESCAP Expert Working Group to Prepare for the 1990 ESCAP Ministerial (OES/ENV)
Spring	-- Proposed Foreign Science Counselors' Seminar, in Washington (OES/SCT)
March	-- [Tentative] Round II of U.S./India Negotiations on IPR in Science and Technology, in Washington (OES/SCT)

March	--	Safeguards Technical Bilateral with Japan, in Tokai Mura (OES/NTS)
March	--	Review of Physical Protection for Nuclear Material Criterion, in Vienna (OES/NTS)
March	--	Intergovernmental Steering Committee Meeting on South Pacific Regional Environment Programs, in Noumea (OES/ENV)
March	--	[Tentative] Inter-American Tropical Tuna Commission/National Marine Fisheries Service (IATTC/NMFS) Meeting on Dolphin Protection in Eastern Tropical Pacific Tuna Purse-Seine Fishery (OES/OFA)
March	--	Intergovernmental Steering Committee Meeting on South Pacific Regional Environmental Program, in Noumea (OES/ENV)
March	--	[Tentative] Round III of U.S./ROK Science and Technology Agreement Negotiations, in Washington (OES/SCT)
March	--	U.S./Japan Discussion of Flag Tracking, in Tokyo (OES/NTS)
Mar 5-7	--	U.K./UNEP Ministerial on Substitutes and Alternatives to Ozone-Depleting Substances, in London (OES/ENV)
Mar 6	--	Executive Committee Meeting of the Board of Governors of the Binational Science Foundation, in Washington (OES/SCT)
Mar 7-9	--	OECD Chemicals Group/Management Committee Meeting, in Paris (OES/ENV)
Mar 9-10	--	OECD Group on Energy and the Environment Meeting, in Paris (OES/ENV)
Mar 9-10	--	U.S./Pacific Island States Annual Meeting Under South Pacific Fisheries Treaty, in Suva (OES/OFA)
Mar 12-17	--	International Maritime Organization (IMO) Marine Environment Protection Committee Meeting, in London (OES/OLP)
Mar 13-15	--	Caribbean Land-Based Sources Protocol Meeting, in San Juan (OES/ENV)
Mar 13-22	--	UNEP Hazardous Waste Negotiations and Diplomatic Conference to Sign Convention, in Basel (OES/ENV)
Mid/Late March	--	[Tentative] Round III of U.S./PRC Science and Technology Agreement Negotiations, in Beijing (OES/SCT)

Mar 19-23	--	Bilateral Negotiations with France on Legal Status and Preservation of CSS Alabama (to serve as a prototype for dealing with other historic wrecks within foreign jurisdictions), in Paris (OES/OLP)
Mar 20-Apr 7	--	Legal Sub-Committee of the U.N. Committee on the Peaceful Uses of Outer Space, in New York (OES/SAT)
March-April	--	[Tentative] Round II of U.S./Thai Science and Technology Agreement Negotiations, in Bangkok or Washington (OES/SCT)
April	--	[Tentative] U.S./Turkey Science and Technology Agreement Negotiations, in Ankara (OES/SCT)
April	--	[Tentative] U.S./Spain Science and Technology Agreement Negotiations, in Madrid (OES/SCT)
Apr 3-6	--	OECD Waste Management Policy Group Meeting, in Paris (OES/ENV)
Apr 3-7	--	Yukon River Salmon Negotiations, in Anchorage (OES/OFA)
Apr 3-7	--	Conference to Negotiate Indian Ocean Tuna Commission, in Rome (OES/OFA)
Apr 3-12	--	International Maritime Organization (IMO) Marine Environment Protection Committee Meeting, in London (OES/OLP)
Apr 5-7	--	Monitoring Committee/Bureau Meeting on Caribbean Environment Program, in Kingston (OES/ENV)
Apr 9-15	--	U.S./Polish Science and Technology Joint Commission, in Poland (OES/SCT)
Apr 10-14	--	LDC Scientific Group, in London (OES/ENV)
Apr 10-14	--	FAO Committee on Fisheries, 18th Session, in Rome (OES/OFA)
Apr 10-14	--	SPAW Protocol Negotiating Session, in Kingston (OES/ENV)
Apr 16-28	--	International Conference on Maritime Salvage, in London (OES/OLP)
Apr 19-21	--	OECD Environment Committee Meeting, in Paris (OES/ENV)
Apr 24	--	Consultative Meeting on Safeguards Termination Criteria For Waste, in Vienna (OES/NTS)

Apr 24-27	--	LASCAR (Safeguards For Large Reprocessing Plants) Working Group 2 (Process Areas), in Paris (OES/NTS)
Apr 25-26	--	U.S./Canada Beaufort Sea Environmental Discussions, (OES/OSP)
Apr 26-29	--	First Meeting Parties to Vienna Convention on Protection of the Ozone Layer, in Helsinki (OES/ENV)
Apr 27-28	--	OECD/NEA Steering Group Meeting (OES/NTS)
Apr 27-28	--	[Tentative] U.S./Japan Working Level Committee, in Tokyo (OES/SCT)
Early May	--	[Tentative] Special Executive Secretaries Working Group Meeting on Umbrella U.S./PRC Science and Technology Cooperation Agreement, (OES/SCT)
May	--	[Tentative] Interim Meeting of the U.S./USSR Intergovernmental Consultation Committee on Fisheries, in Moscow (OES/OFA)
May	--	ECE VOC Task Force, in Karlsruhe (OES/ENV)
May	--	IEA Ministerial (OES/ENV & SAT)
May 2-5	--	First Meeting of Parties to Montreal Protocol on Ozone-Depleting Substances, in Helsinki (OES/ENV)
May 5-10	--	International Hydrographic Organization - Law of the Sea Technical Workshop, in Monaco (OES/OLP)
May (2nd week)	--	Board of Governors Meeting of the Binational Industrial Research and Development Foundation, in Washington (OES/SCT)
May 8-12	--	Intergovernmental Panel on Climate Change in Geneva, (OES/ENV)
May 8-12	--	Preparatory Antarctic Treaty Consultative Meeting, in Paris (OES/OSP)
May 10-12	--	Annual Meeting of Inter-American Tropical Tuna Commission, in Paris (OES/OFA)
May 15-26	--	UNEP Governing Council, in Nairobi (OES/EHC & ENV)
May 16-24	--	6th Session of the International Tropical Timber Organization, in the Ivory Coast (OES/EHC)

May 17-24 -- 34th U.S./Yugoslav Science and Technology Joint Board, in Yugoslavia (OES/SCT)

May 22 -- U.S./USSR Joint Committee on Peaceful Uses of Atomic Energy, in Moscow (OES/NTS)

May 22- June 2 -- U.S./USSR JCM Peaceful Uses of Nuclear Energy, in Washington (OES/NTS)

Summer -- Preparatory Committee Meeting for ECE WCED 1990 Bergen Conference, in Oslo (OES/EHC)

June -- ECE VOC Working Group, in Geneva (OES/ENV)

June -- U.S./U.K. Safeguards Technical Bilateral, in Washington (OES/NTS)

June -- IAEA Board of Governors Meeting, in Vienna (OES/NTS)

June -- [Tentative] U.S./USSR Non-Proliferation Bilaterals, in Moscow (OES/NTS)

June -- LDC Task Team on Liability, in London (OES/ENV)

June -- Caribbean Land-Based Sources Protocol Meeting, in Panama (OES/ENV)

June 5 -- U.S./USSR Joint Coordinating Commission on Civilian Nuclear Reactor Safety, in Washington (OES/NTS)

June 5-9 -- U.N. Development Program (UNDP) Governing Council Review of U.N. Population Fund (UNFPA) Activities, in New York (OES/CP)

June 5-17 -- WMO Executive Council, in Geneva (OES/SAT & ENV)

June 13-16 -- North Atlantic Salmon Conservation Organization Meeting, in Edinburgh (OES/OFA)

June 19-23 -- LASCAR (Safeguards For Large Reprocessing Plants) Plenary, in New York (OES/NTS)

June 26-28 -- Board of Governors Meeting of the Binational Science Foundation, in Jerusalem (OES/SCT)

June 28-30 -- Intergovernmental Panel on Climate Change, in Nairobi (OES/ENV)

July -- U.S./FRG Safeguards Thermonuclear Bilateral, in Washington (OES/NTS)

July	--	London Dumping Convention Liability Meeting (OES/ENV)
July	--	U.S./France Safeguards Thermonuclear Bilateral, in Washington (OES/NTS)
July	--	U.S./Euratom Safeguards Thermonuclear Bilateral, in Washington (OES/NTS)
July 3-7	--	CITES Elephant Working Group, in Botswana (OES/EHC)
July 3-19	--	Intergovernmental Oceanographic Commission Assembly, in Paris (OES/OSP)
Aug 14-15	--	Midnight Group Discussions on Deep Seabed Mining, in Ottawa (OES/OLP)
September	--	FAO Committee on Forest Development in the Tropics, in Rome (OES/EHC)
September	--	OECD Chemicals Group (OES/ENV)
Sep 25-29	--	International Maritime Organization (IMO) Legal Committee Meeting on Maritime Liens and Mortgages, in London (OES/OLP)
Sep 25-29	--	[Tentative] Science Counselors' Conference, in Washington (OES/SCT)
October	--	Strategic Trade Officers Conference - Asian Post not yet selected (OES/SCT)
October	--	[Tentative] Joint Commission Meeting, U.S./PRC Science and Technology Cooperation (OES/SCT)
Oct 9-20	--	CITES Conference of Parties, in Lausanne (OES/EHC)
Oct 23-27	--	International Oil Pollution Compensation Fund Meeting, in London (OES/OLP)
Oct 30-Nov 3	--	London Dumping Convention Consultative Meeting, in London (OES/ENV)

OES - T. Snead

CALENDAR OF UPCOMING INTERNATIONAL SCIENCE AND TECHNOLOGY EVENTS

Revised: January 17, 1989

January	-- U.S./Japan Discussion of Flag Tracking, in Tokyo (OES/NEC, OES/NTS)
Jan 16-18	-- Joint High Level Advisory Panel (U.S./Japan Science and Technology Agreement), in Tokyo (OES/SCT)
Jan 18-20	-- Tolba Ministerial on UNEP Role and Plans, (OES/EHC)
Jan 24-27	-- Department of State/Department of Interior Meeting on Maritime Boundaries, in Denver (OES/OLP)
Jan 26-27	-- Intergovernmental Panel on Climate Change Working Group I (Science), in London (OES/ENV)
Jan 30	-- London Dumping Convention Annex Working Group, in London (OES/ENV)
Jan 30-Feb 1	-- Intergovernmental Panel on Climate Change Response Strategies Working Group, in Washington (OES/ENV)
Jan 30-Feb 1	-- Intergovernmental Panel on Climate Change Working Group II (Impacts), in Moscow (OES/ENV)
Jan 30-Feb 3	-- UNEP Hazardous Waste Agreement Negotiations, in Luxembourg (OES/ENV)
Jan 30-Feb 4	-- Second ASEAN Science and Technology Week, in Manila (OES/SAT)
Jan/Feb	-- [Tentative] U.S./FRG Non-Proliferation Bilaterals, in Bonn (OES/N)
Early Feb	-- [Tentative] Round I of U.S./New Zealand Science and Technology Agreement Negotiations, in Wellington or Washington (OES/SCT)
February	-- [Tentative] U.S./Spain Science and Technology Agreement Negotiations, in Madrid (OES/SCT)
February	-- [Tentative] Round III of U.S./PRC Science and Technology Agreement Negotiations, in Beijing (OES/SCT)
February	-- [Tentative] Round III of U.S./ROK Science and Technology Agreement Negotiations, in Washington (OES/SCT)

February -- Safeguards Technical Bilateral with Japan, in Tokai Mura (OES/NTS)

February -- [Tentative] U.S./U.K. Non-Proliferation Bilaterals, in London (OES/N)

February -- [Tentative] Preparatory Meeting for First Meetings of Parties to Vienna Convention and Montreal Protocol, in Geneva (OES/ENV

February -- U.S./Mexico International Boundary and Water Commission, in El Paso (OES/ENV)

February -- ECE Experts on Fluidized Bed Combustion, in Geneva (OES/ENV)

Feb 6-7 -- Intergovernmental Panel on Climate Change Bureau Meeting, in Geneva (OES/ENV)

Feb 6-9 -- First Meeting of the U.S./USSR Intergovernmental Consultative Committee on Fisheries, in Washington (OES/OFA)

Feb 13-15 -- ECE VOC Working Group, First Session, in Geneva (OES/ENV)

Feb 13-17 -- [Tentative] UNEP Meeting on Prior Informed Consent for Chemicals Trade, in New York (OES/ENV)

Feb 13-17 -- UNEP Meeting on Prior Informed Consent for Chemicals Trade, in New York (OES/ENV)

Feb 15-16 -- 6th Annual Meeting of the North American Commission, NASCO (North American Salmon Conservation Organization), in Hilton Head, South Carolina (OES/OFA)

Feb 15-17 -- 63rd Session of the OECD Fisheries Committee, in Paris (OES/OF

Feb 20-22 -- U.S./USSR Bilateral on Climate Change, in Moscow (OES/ENV)

Feb 20-22 -- Policy and Legal Experts on Climate, in Ottowa (OES/ENV)

Feb 20-24 -- Bilateral Consultations with USSR on Navigation and Related Law of the Sea Issues, in Washington (OES/OLP)

Feb 21-22 -- February IAEA Board of Governors Meeting, in Vienna (OES/NTS)

Feb 21-22 -- [Tentative] U.S./Polish Science and Technology Working Group, in Washington (OES/SCT)

Feb 23-24 -- International Tropical Timber Organization Experts Meeting on Forest Management, in Paris (OES/EHC)

Feb 21- Mar 3	--	25th Session of the U.N. Population Commission, in New York (OES/CP)
Feb 28- Mar 3	--	ECE Senior Advisors Meeting on Environment and Water Policy, in Geneva (OES/ENV)
Late Feb	--	Meeting of Contracting Parties to the International North Pacific Fisheries Commission, in Vancouver (OES/OFA)
Late Feb- March	--	[Tentative] Round II of U.S./India Negotiations on IPR in Science and Technology, in Washington (OES/SCT)
Feb 28- March	--	Yukon River Salmon Negotiations, Government-to-Government Meeting, in Vancouver (OES/OFA)
Feb/March	--	[Tentative] Round I of U.S./Thai Science and Technology Agreement Negotiations, in Bangkok or Washington (OES/SCT)
Feb/March	--	Critical Loads Working Group of the Long-Range Transboundary Air Pollution Convention, in Europe (OES/ENV)
Feb/March	--	CITES Standing Committee, in Lausanne (OES/ENV)
Spring	--	Ad Hoc LRTAP Working Group on Volatile Organic Compounds, in Europe, (OES/ENV)
Spring	--	ESCAP Expert Working Group to Prepare for the 1990 ESCAP Ministerial (OES/ENV)
Spring	--	Proposed Foreign Science Counselors' Seminar, in Washington (OES/SCT)
March	--	Conference on Stratospheric Ozone, in Tokyo (OES/ENV)
March	--	Review of Physical Protection for Nuclear Material Criterion, in Vienna (OES/NTS)
March	--	Intergovernmental Steering Committee Meeting on South Pacific Regional Environment Programs, in Noumea (OES/ENV)
March	--	[Tentative] Intergovernmental Panel on Climate Change in Europe, (OES/ENV)
March	--	[Tentative] Inter-American Tropical Tuna Commission/National Marine Fisheries Service (IATTC/NMFS) Meeting on Dolphin Protection in Eastern Tropical Pacific Tuna Purse-Seine Fishery (OES/OFA)
March	--	ECE LRTAP Working Group on Abatement Strategies, in Geneva (OES/ENV)

March	--	ECE Task Force on Integrated Assessment, in Geneva (OES/ENV)
March	--	[Tentative] U.S./Turkey Science and Technology Agreement Negotiations, in Ankara (OES/SCT)
March	--	Intergovernmental Steering Committee Meeting on South Pacific Regional Environmental Program, in Noumea (OES/ENV)
March	--	UNEP Climate Impacts Meeting, in Boulder (NCAR) (OES/ENV)
Mar 5-7	--	UK/UNEP Ministerial on Substitutes and Alternatives to Ozone-Depleting Substances, in London (OES/ENV)
Mar 6	--	Executive Committee Meeting of the Board of Governors of the Binational Science Foundation, in Washington (OES/SCT)
Mar 7-9	--	OECD Chemicals Group/Management Committee Meeting, in Paris (OES/ENV)
Mar 9-10	--	OECD Group on Energy and the Environment Meeting, in Paris (OES/ENV)
Mar 9-10	--	U.S./Pacific Island States Annual Meeting Under South Pacific Fisheries Treaty, in Suva (OES/OFA)
Mar 12-17	--	International Maritime Organization (IMO) Marine Environment Protection Committee Meeting, in London (OES/OLP)
Mar 13-15	--	Caribbean Land-Based Sources Protocol Meeting, in San Juan (OES/ENV)
Mar 13-17	--	UNEP Hazardous Waste Negotiations, in Basel (OES/ENV)
Mar 13-22	--	UNEP Hazardous Waste Negotiations and Diplomatic Conference to Sign Convention, in Basel (OES/ENV)
Mar 19-23	--	Bilateral Negotiations with France on Legal Status and Preservation of CSS Alabama (to serve as a prototype for dealing with other historic wrecks within foreign jurisdictions), in Paris (OES/OLP)
Mar 20-22	--	Diplomatic Conference to Sign Hazardous Waste Convention, in Basel (OES/ENV)
March-April	--	[Tentative] Round II of U.S./Thai Science and Technology Agreement Negotiations, in Bangkok or Washington (OES/SCT)
April	--	Consultative Meeting on Safeguards Termination Criteria For Waste, in Vienna (OES/NTS)

April -- First Meeting of Parties to Montreal Protocol, in Europe (OES/ENV)

Apr 3-6 -- OECD Waste Management Policy Group Meeting, in Paris (OES/ENV)

Apr 3-7 -- First Meeting Parties to Vienna Convention on Protection of the Ozone Layer, in Vienna (OES/ENV)

Apr 3-7 -- Yukon River Salmon Negotiations, in Anchorage (OES/OFA)

Apr 3-7 -- Conference to Negotiate Indian Ocean Tuna Commission, in Rome (OES/OFA)

Apr 3-12 -- International Maritime Organization (IMO) Marine Environment Protection Committee Meeting, in London (OES/OLP)

Apr 10-12 -- First Meeting Parties to Montreal Protocol, in Helsinki (OES/ENV)

Apr 10-14 -- LDC Scientific Group, in London (OES/ENV)

Apr 10-14 -- FAO Committee on Fisheries, 18th Session, in Rome (OES/OFA)

Apr 16-28 -- International Conference on Maritime Salvage, in London (OES/OLP)

Apr 17-21 -- SPAW Protocol Negotiating Session, in Kingston (OES/ENV)

Apr 19-21 -- OECD Environment Committee Meeting, in Paris (OES/ENV)

Apr 24-26 -- Monitoring Committee/Bureau Meeting on Caribbean Environment Program, in Kingston (OES/ENV)

Apr 24-27 -- LASCAR (Safeguards For Large Reprocessing Plants) Working Group 2 (Process Areas), in Paris (OES/NTS)

Apr 25-26 -- U.S./Canada Beaufort Sea Environmental Discussions, (OES/OSP)

Apr 27-28 -- OECD/NEA Steering Group Meeting (OES/NTS)

Early May -- [Tentative] Special Executive Secretaries Working Group Meeting on Umbrella U.S./PRC Science and Technology Cooperation Agreement, (OES/SCT)

May -- 34th U.S./Yugoslav Science and Technology Joint Board, in Yugoslavia (OES/SCT)

May -- FAO Committee on Forest Development in the Tropics, in Rome (OES/ENV)

May	--	ECE LRTAP Task Force on Exchange of Technology, in Geneva (OES/ENV)
May	--	ECE LRTAP Workshop on Effects of Water and Soil Acidification on Materials, in Sweden (OES/ENV)
May	--	ECE LRTAP Workshop on Effects of Water and Soil Acidification of Alpine Lakes, in Verbania-Pallanza (OES/ENV)
May	--	ECE LRTAP Program Task Force on Forests, in Helsinki (OES/ENV)
May	--	ECE LRTAP Task Force on Exchange of Technology (OES/ENV)
May	--	ECE VOC Task Force, in Karlsruhe (OES/ENV)
May	--	IEA Ministerial (OES/ENV & SAT)
May (2nd week)	--	Board of Governors Meeting of the Binational Industrial Research and Development Foundation, in Washington (OES/SCT)
May 5-10	--	International Hydrographic Organization - Law of the Sea Technical Workshop, in Monaco (OES/OLP)
May 8-12	--	Preparatory Antarctic Treaty Consultative Meeting, in Paris (OES/OSP)
May 15-26	--	UNEP Governing Council, in Nairobi (OES/EHC & ENV)
May 16-24	--	6th Session of the International Tropical Timber Organization, in the Ivory Coast (OES/EHC)
May 17-19	--	Annual Meeting of Inter-American Tropical Tuna Commission, in Paris (OES/OFA)
May 22	--	U.S./USSR Joint Committee on Peaceful Uses of Atomic Energy, ir Moscow (OES/NTS)
Summer	--	Preparatory Committee Meeting for ECE WCED 1990 Bergen Conference, in Oslo (OES/EHC)
June	--	ECE VOC Working Group, in Geneva (OES/ENV)
June	--	IAEA Board of Governors Meeting, in Vienna (OES/NTS)
June	--	[Tentative] U.S./USSR Non-Proliferation Bilaterals, in Moscow (OES/NTS)
June	--	LDC Task Team on Liability, in London (OES/ENV)

June	--	Caribbean Land-Based Sources Protocol Meeting, in Panama (OES/ENV)
June 5-9	--	UN Development Program (UNDP) Governing Council Review of UN Population Fund (UNFPA) Activities, in New York (OES/CP)
June 5-17	--	WMP Executive Council, in Geneva (OES/ENV)
June 13-16	--	North Atlantic Salmon Conservation Organization Meeting, in Edinburgh (OES/OFA)
June 26-28	--	Board of Governors Meeting of the Binational Science Foundation, in Jerusalem (OES/SCT)
June 28-30	--	Intergovernmental Panel on Climate Change, in Nairobi (OES/ENV)
July 3-7	--	CITES Elephant Working Group, in Botswana (OES/EHC)
July 3-19	--	Intergovernmental Oceanographic Commission Assembly, in Paris (OES/OSP)
Aug 14-15	--	Midnight Group Discussions on Deep Seabed Mining, in Ottawa (OES/OLP)
September	--	ECE Working Group on Critical Loads, in Geneva (OES/ENV)
September	--	ECE Working Group on Effects, in Geneva (OES/ENV)
September	--	ECE EMEP Steering Body, in Geneva (OES/ENV)
September	--	OECD Chemicals Group (OES/ENV)
Sep 25-29	--	International Maritime Organization (IMO) Legal Committee Meeting on Maritime Liens and Mortgages, in London (OES/OLP)
Sep 25-29	--	[Tentative] Science Counselors' Conference, in Washington (OES/SCT)
Oct 23-27	--	International Oil Pollution Compensation Fund Meeting, in London (OES/OLP)

OES - T. Snead

Sci & Tech

file

Language for the President's Science Speech on 3/3/89

Scientific and technological advancement have always been at the very heart of our Nation's pioneer spirit, pushing the boundaries of our knowledge, creating economic opportunity, increasing our standard of living, and making this a healthier and safer world in which to live. It is scientific advancements that made us aware of the damage to our Earth's protective ozone layer, and the need to reduce "CFCs" (chlorofluorocarbons) that deplete our precious upper atmospheric resources.

As a result of these advancements, the United States and other nations have led the way through the Montreal Protocol towards reductions of CFCs. That Protocol will reduce CFCs to 50 percent of 1986 levels by the year 1998. However, recent studies indicate that this 50 percent reduction may not be enough.

Thus, I have directed Bill Reilly, our EPA Administrator, to join with other nations this weekend in supporting the call for eliminating CFCs by the year 2000 provided that safe substitutes are available. Of course, such a phase-out must be guided by the scientific, economic and technological assessments under the Protocol.

plo file

issues,

science + technology

Mgmt & Admin:

Cooperative Production Ventures

STATEMENT

OF

CHARLES F. RULE
ASSISTANT ATTORNEY GENERAL
ANTITRUST DIVISION

BEFORE THE

SUBCOMMITTEE ON REGULATION AND BUSINESS OPPORTUNITIES
AND THE
SUBCOMMITTEE ON ANTITRUST
COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES

CONCERNING

COOPERATIVE PRODUCTION VENTURES

ON

FEBRUARY 27, 1989

Chairman Wyden, Chairman Eckart, and Members of the Subcommittees:

I appreciate the opportunity to appear before you today to present the views of the Department of Justice on proposals to encourage and improve the competitiveness of U.S. firms in worldwide markets by clarifying or altering the application of the antitrust laws to cooperative production ventures. Cooperative production ventures can frequently increase rather than diminish competition; thus, the antitrust laws should not be a barrier to their formation. Recently, the Department has worked to ensure that its antitrust enforcement policy does not chill the formation of legitimate cooperative ventures. The most significant part of that effort has been the recent publication of the Antitrust Enforcement Guidelines for International Operations, which describe in detail and by way of example, the Department's analysis of cooperative ventures.

Despite the Department's efforts and the considerable improvement in the sensitivity that the courts have shown toward cooperative ventures, there is reason to believe that the threat of private antitrust challenge may be deterring the formation of legitimate--perhaps even essential--cooperative ventures. There is concern in some parts of the business community and the government that uncertainty as to the standard for review of such ventures under the antitrust laws coupled with the threat of treble damage liability in private suits can provide a substantial disincentive to such ventures, even when they promise substantially to increase production efficiency and promote competitiveness. While the Administration has not as yet determined whether, or in what form, legislation in this area is necessary or appropriate, the Department of Justice wholeheartedly endorses congressional consideration of this problem at this time.

Scientific and technical advances have been made with dazzling speed in recent years. U.S. firms and government laboratories have been in the forefront of the research and development leading to many of these advances. U.S. strength in research, however, has not always been matched in bringing the products made possible by that research to the market. Today's increased pace of innovation has made it more imperative than ever that U.S. firms be in a position to respond quickly with state-of-the-art production facilities if the U.S. economy is to benefit fully from these technological advances.

Cooperative production ventures may be one of the most effective ways for U.S. firms to improve their competitiveness. The costs of commercializing new technology may be too high for any one firm to bear. In addition, the pace of innovation has resulted in short life-cycles for many products, increasing the risks of investing in short-lived production facilities and demanding extremely quick reaction time.

Perhaps even more importantly, the increasing "globalization" of markets, particularly those incorporating advanced technologies, dramatically reduces the risk that cooperative efforts among some competitors will result in higher prices to American consumers. For example, a venture among American firms to produce D-RAMs (dynamic-random access memory semiconductors) would not likely be able to exercise market power because of the overwhelming capacity of Japanese and European firms. The presence of foreign competition, then not only provides the stimulus for cooperative ventures--if American companies do not at times cooperate, they may find themselves driven from the market by their more efficient foreign rivals; foreign competition also often can protect U.S. consumers from anticompetitive activities that production joint ventures might otherwise allow.

Antitrust Uncertainty As A Possible Deterrent To Cooperative Production Ventures

U.S. firms may be deterred from the use of cooperative solutions to their problems by perceived potential antitrust liability. These firms should have nothing to fear from federal enforcement of the antitrust laws. As recently spelled out in the Department's Antitrust Guidelines for International Operations, we have developed a rational and sympathetic enforcement policy toward joint ventures of all types. Most significantly, those Guidelines do not automatically condemn joint production ventures. They require the recognition of foreign competition where it exists, and ensure that potential efficiencies will not be ignored. Regardless of the improvement represented by the Guidelines, however, our antitrust laws rely on private as well as public enforcement. The fear of a private action for treble damages (and attorneys' fees) can be an even more powerful deterrent to conduct than the fear of government action.

The cooperative effort involved in joint production ventures should not raise any presumptions of antitrust concern. The antitrust laws were enacted to protect U.S. consumers from the unilateral or concerted exercise of market power. Strong foreign challenges in many of today's markets--including particularly evolving markets employing new, sophisticated technologies--make it unlikely that cooperative production ventures among U.S. firms would give those firms the ability to exercise market power and harm competitors and consumers.

Indeed, cooperative production ventures often have the potential for substantial competitive and economic benefits that promote and enhance competition. The antitrust laws proscribe only concerted activities that unreasonably restrain trade. Over the years as those laws have been applied, some activities, such as price fixing and bid rigging, have been demonstrated virtually always to result in an unreasonable restraint and are properly considered unlawful per se. No procompetitive justifications may be presented in such cases. Other activities, including particularly joint ventures, often promote rather than restrain competition, and thus must not be analysed under a per se standard but rather under the "rule of reason" which requires consideration of the procompetitive benefits of any challenged activity.

Cooperative production ventures offer a number of potential procompetitive benefits: sharing the often substantial risks inherent in bringing new technology to the marketplace; realizing economies of scale where an efficient output for a production facility would be beyond the needs of any one firm; achieving efficiencies in the purchases of supplies or in transportation; garnering economies of scope where a joint facility may produce more efficiently a variety of products to meet the needs of different producers; utilizing synergies arising from complementary skills or assets of the parties;

and reducing transaction costs in transferring to the production process important research information belonging to the parties. In sum, cooperative production ventures can capture many of the efficiencies of a merger with the advantage of preserving the independence of the firms outside the production process.

These potential benefits should not be lost because of fear that the risk of antitrust liability is high. As the Attorney General recently stated, "The U.S. economy can ill afford the burden of such fear." Therefore, legislation may be needed to alleviate any chilling effect of the antitrust laws on the ability of U.S. firms to produce in most efficient manners, and become or remain effective competitors in evolving domestic and international markets. We support and commend the consideration being given throughout the public and private sectors to proposals to ameliorate antitrust uncertainty in this regard.

Possible Legislative Approaches

The Department does believe that legislation can be developed that improves the antitrust legal climate for cooperative production ventures but at the same time safeguards the interests of competition. Such legislation would remove any artificial barriers to procompetitive conduct, but take adequate care to protect consumers from unreasonable restraints of trade. Two basic approaches to such legislation recently have been much discussed. One could provide greater antitrust certainty for potential venturors through a high level of government involvement; the other could greatly reduce the potential risk of an antitrust challenge with minimal government intervention. These approaches are not necessarily mutually exclusive, and could be complementary.

Under the first approach potential venturors would seek prior review and approval by the government of their cooperative production venture. Such a review, conducted by one or more government agencies, (the Departments of Justice and Commerce and the Federal Trade Commission have been most frequently mentioned) would focus on the likely competitive consequences of the venture using a sound, market power oriented rule of reason analysis. All relevant information, including of course the potential procompetitive benefits discussed above, would be examined. Upon a determination that a venture would not be likely to affect adversely competition in the relevant markets, it would be certified.

Certification would insulate the covered conduct from challenge under the antitrust laws. This approach could thus provide a great deal of certainty to joint venturors who might otherwise be inhibited by the potential for costly antitrust litigation. The price of that certainty is a significant commitment of time and expense related to the review and certification process, and to monitoring a certified venture's competitive effects. Certification might also inhibit the flexibility of some cooperative ventures in adopting innovative structures in an attempt to enhance their efficiency, although care in designing and administering a certificate program might ameliorate this problem.

Consumers' interests would be protected in two ways under this approach. First, the careful competitive review by the government prior to certification should ensure that the proposed conduct was not anticompetitive. Second, the government would monitor the actual effect of the venture through periodic review of its activities to discover and to ameliorate any emerging threats to competition. Upon finding that the venture or the surrounding circumstances had changed so as to threaten a restraint of trade, the government could modify or revoke a certificate. Subsequent conduct that was no longer certificated would be subject to antitrust challenge.

This first approach is similar in many respects to that enacted to encourage export trade activities by U.S. firms as part of the Export Trading Company Act of 1982. Under the ETCA, applicants may receive a certification from the Secretary of Commerce (with the concurrence of the Attorney General) that their proposed export trade conduct would not have any adverse competitive effects in the United States or injure any domestic export competitor. Conduct certified under the Export Trading Company Act is not subject to direct challenge under the antitrust laws. However, the Act does allow private parties to challenge export trading company conduct that does not comply with the statutory standards for certification and to obtain injunctive relief or actual damages. A number of firms have availed themselves of the provisions of the Act; there are currently approximately 90 export trade certificates outstanding. One of the Act's most valuable features for certificate holders is that it virtually eliminates uncertainty about possible private antitrust suits that threaten punitive treble damages. Moreover, I have been informed that the Department of Commerce believes that management of the ETC Act has worked smoothly, and that the Act appears quite successful in achieving its goal of encouraging beneficial cooperative exporting ventures that business otherwise would decline to pursue because of antitrust uncertainty.

The second approach would not completely immunize any activity from challenge under the antitrust laws, but would reduce the deterrent effect of such potential challenges by ensuring that the correct antitrust analysis is conducted and by providing an opportunity for cooperative production venturors to limit any possible antitrust liability to actual damages. Under this approach courts would be required to analyze any challenged joint production venture under the "rule of reason" rather than the more restrictive per se rule. This would guarantee that the venture's procompetitive benefits are given full consideration.

Venturors seeking further protection could notify the government as to the identity of the parties to the venture and the nature and objectives of the venture. The outlines of the venture would become public, and disclosure would reduce the parties' potential antitrust liability to actual damages plus a reasonable attorney's fee.

Under this second approach, consumers would be protected because no immunity from the antitrust laws would be conveyed and both public and private enforcers would retain their ability to bring suit against a particular venture when they have adequate proof that the venture actually would have anticompetitive effects. Moreover, because of the public notification provision, an antitrust suit seeking injunctive relief could be brought at the earliest possible time, before any substantial competitive harm had occurred. Joint ventures could then proceed with their legitimate business activities free from the threat of subsequent private treble-damage suits. In addition, the costs of this approach to both the government and the venturors would be minimal; virtually no government involvement or regulation in the structuring and supervision of the venture would be required. On the other hand, this second approach would not provide the same degree of certainty as a certification program.

This second approach was taken by Congress in 1984 in the National Cooperative Research Act (NCRA) to encourage innovation through joint research and development ventures. That Act could be extended with but limited revisions to cover joint production ventures as well.

The Department has been managing the implementation of the NCRA and we have found it to be quite successful. More than 125 notifications covering a wide range of research and development activities have been filed since the Act went into effect. We presume that an even larger number of ventures were sufficiently encouraged by clarification regarding the proper antitrust analysis of joint ventures under the rule of reason that they found the reduction of any possible damage liability through notification unnecessary. And as I mentioned earlier, these positive effects were accomplished without imposing regulatory burdens on private enterprise or the enforcement agencies.

To summarize, we have been told that U.S. competitiveness may be being inhibited by a perception that the antitrust risks of cooperative production ventures are too great. As I have discussed here today, most such ventures do not pose risks to competition and would not be held to violate the antitrust laws. To the extent that greater reassurance to U.S. firms is needed, a certification procedure or an extension of the NCRA could provide more certainty while fully protecting the interests of the public.

This concludes my prepared statement. I would be happy to address any question that the Members of the Subcommittees may have.

Prepared by Rep. Don Ritter for Jim Pinkerton & Bush Campaign.

Leading America to Quality

America still leads the world in many key products and services based on science and technology. In recent years great advances have been made in the ability of the American worker to compete with the best, worldwide. The American people have witnessed turnarounds of whole factories, whole companies and whole communities. But they also know that there is something wrong when the VCR, Compact Disc and now the remarkable advance in television, High Definition TV (HDTV), are wholly owned by the Japanese.

In so many cases the answer to foreign success, and ours too, is an abiding focus on Quality. Such Quality is within the reach of the entire American enterprise. It's part of a revolution that's already begun . . . a human resources revolution that changes the American workplace by placing new value on workers as important, thinking, caring, contributing human beings . . . .

That's is quite a change for corporations and management in America. The former president of Notre Dame, Rev. Theodore Hesburgh, intimated at what's needed to make Quality work when he said, "It's always struck me that there is only one letter difference between quality and equality."

This is an industrial revolution with emphasis on people, not machines . . . where worker training, education and teamwork lead to unprecedented mastery over the job to be done.

It is estimated that 25% to 30% of our work product is waste, scrap, mistakes and so on. Those are enormous losses in all walks of life . . . public as well as private. Reduce those losses, and gains follow naturally . . . tremendous gains.

By empowering American workers with the proper tools and training them in a work process that systematically reduces mistakes and constantly improves, we give them a tremendous boost to be creative and productive. We give them responsibility, recognition and reward . . . a new lease on work life -- union and non-union alike. And in so many instances, our workers have responded with striking enthusiasm and performance. When it's all said and done, remarkable gains are made at the bottom-line.

The movement towards Quality entails constant improvement as a way of work and as a way of life. "Be all that you can be" may apply far more to the job-site than to the U.S. Army as people in unprecedented ways take part in the success of the team, the group, the company, the institution. People given the chance to fulfill their God-given potential is what it's all about.

With respect, recognition, the right training and the right tools, the American worker is second to none. But even more encouraging, there are signs that if Quality principles are followed and teamwork and training serve as the base, the rugged individualism of the American worker propels him beyond even his vaunted Japanese counterpart. That's exciting!

Just like certain managers have motivated their sports teams to win championships or their companies to be the best in the world, political leaders must begin to do the same for this country. I believe the political leaders who lead America to Quality will ultimately lead America. That's what I'd like to do as the next President of the United States.

As President, I will bring this Quality message, that has made believers out of workers and top executives alike, to the entire nation . . . not just to business, but to education and government as well.

And, what about government? Can anyone think of a better place to apply Quality principles? The federal government spends over one trillion dollars a year and given the nature of bureaucratic inefficiency, we're talking about a raw potential of hundreds of billions in savings! Realistically, potential savings are a lot less but we could be talking about tens of billions, plus better service to the people plus a reformed reward system that makes government workers not only more productive but happier as well.

In sum, we Americans need not shrink from competition. We're up there in the economic Olympics and competition is good; it has brought us better cars, TV's, computers, homes and so much more that contributes to the standard of living we enjoy. Competition has shown us the need for Quality. And, it is through a commitment to Quality that we will improve our jobs, our standard of living and our future.

America, let's go get it done!

For more information please contact Congressman Don Ritter (202) 225-6411

Quality Plank for GOP Platform

A new industrial revolution is sweeping the American workplace, a revolution that involves people more than machines. It's the Quality revolution and it places new value on workers as important, thinking, caring, and contributing participants. Through proven road maps to Quality, employees, at all levels, constantly improve the way work is done. Errors are reduced and the work process is made more efficient, more productive and more enjoyable. The result is a higher quality product and service that is also less costly. In short, a Quality emphasis makes American workers more competitive and provides better places to work. We are committed to encouraging American business and government to adopt Quality principles. Through Quality, our nation can become more competitive and government services can be improved and made less costly. The potential is enormous for "Made in the USA" to be the label of choice worldwide. Through Quality, we strengthen our nation.

Hardin County Chamber of Commerce
Elizabethtown, Kentucky March 20, 1989
Keynote Address
U.S. Rep. Don Ritter

Quality and American Competitiveness - Create a Revival in Your Community.

Introduction

It is a great pleasure to be here as the keynote speaker for Community Quality Kick-Off Day and to talk about Quality. As most of you know, the term Quality refers to a whole new management and work philosophy, based ultimately on common sense and a belief in the value of individual workers fulfilling their potential as members of a larger team.

What is Quality ?

Quality is part of a new industrial revolution which emphasizes people as more important than machines and which gives people real power to use technology to its fullest--an industrial revolution where worker involvement, training, education, teamwork, and reward can lead to unprecedented mastery over the job to be done and satisfaction from doing it well. Workers become more their own managers and automation or technology simply expands their power. That is a revolutionary idea.

Quality puts less emphasis on directly cutting costs to increase profits and instead focuses on improving the whole process by which a product is manufactured or a service is delivered. Perfecting the process perfects the product--a simple but stunning conclusion. The prime goal is to empower people to be active players, not cogs in a machine. Constant improvement is built into the process which delivers products or services that more and more meet customers' needs and expectations.

What Does Quality Mean to Us ?

Experts estimate that from 25% to 40% of the average company's resources are wasted in "production" or on correcting mistakes. That means vast billions of dollars down the drain. Companies that focus on Quality gain the advantage because, through improvements in the way they work together to produce or to service, they waste fewer resources. They do things right the first time.

Not enough Americans understand that the main driving force behind Japan's success is its almost 40-year commitment to continuous improvement and Quality. VCRs, compact discs, Toyotas, and now HDTV didn't just happen by dumb luck in Japan. Quality principles originating in America and refined in Japan had a lot to do with it.

Quality, then--in services as well as in manufacturing--gives us an opportunity to make our workers happier and more productive, our nation more competitive and our government more efficient.

The Lehigh Valley

Quality is particularly important to me because I represent one of the most manufacturing-intensive districts in the nation. The Lehigh Valley of Pennsylvania has been heavily dependent on manufacturing since the days of the industrial revolution, when the Lehigh Canal carried coal to America's emerging iron and steel industry.

My district is the home of big companies like Bethlehem Steel, Mack Trucks, AT&T, plus Bell Labs, Air Products and Chemicals and cement firms. There's still plenty of basic manufacturing like Fuller Company for cement equipment and Stanley Vidmar for industrial storage. We make Crayola crayons

Since its founding, Quality Valley, USA has had four major accomplishments.

The first is to organize some 40 top executives from business and leaders in education into a Leadership and Policy Group to provide commitment, resources, and guidance to the overall efforts. The members of the Leadership and Policy Group include the chairmen of such diverse companies as Air Products & Chemicals, Fuller, Pennsylvania Power and Light, and the Lehigh Valley Bank, to name just four. This diverse membership demonstrates that Quality is important to all sectors of the economy, not just manufacturing.

The second is to establish periodic quality familiarization meetings for representatives from local businesses and other institutions. Associated with this is a "self help" group of executives and quality managers who seek to share, pool, and learn from their counterparts. Group members meet to compare quality programs and to learn from each other's experiences, their successes and mistakes. Nationally recognized speakers, including Tom Peters, author of In Search of Excellence, have shared their expertise with local leaders. Specialists from industry have presented programs on technical topics such as "process cost driver accounting." The 3M Company, who were originally responsible for getting Air Products going on Quality, put on a workshop titled "Managing Total Quality." Local executives organized a workshop on "Top Management Commitment to Quality Improvement." Training activities and opportunities have begun out of Quality Valley.

We have also increased the quality consciousness of local educational institutions so that they themselves could begin to offer coordinated quality training This tied in nicely with the emerging interests of Northampton Community College and of Lehigh University, which developed a new training program in response.

The fourth (which is still in process) is to begin working to establish a **Quality Valley, USA headquarters** to serve as a focal point for nurturing and expanding this effort. Working through the larger Chambers of Commerce, this headquarters will be responsible for extensively communicating the quality message to the Lehigh Valley. It has created bumper stickers and decals for windows to be distributed to advertise Quality and Quality Valley, USA. This group will become the regional operations arm, continuing to conduct the lecture series with important speakers.

Most interestingly, the group will have the responsibility for coming up with a panel to pass judgment on Lehigh Valley Quality programs so as to give the "Quality Valley" seal of approval to Lehigh Valley products and services "shipped" locally, over the USA, and the world (another product/service from Quality Valley!).

Chambers of Commerce Can Initiate Similar Regional Movements to Accelerate the Onset of Quality Principles in the U.S.

If our nation is to compete effectively, we'll need regional movements to accelerate the broad societal acceptance of quality improvement. Our focus on the region is based on the contention that competition requires American business to learn about Quality quickly, and that work with educational institutions, local governments and private groups can help. Business, by itself, cannot offer all the educational support or marshal the community's diverse leadership to promote a culture of Quality.

To compete effectively in the world market we must find more ways to work together as a community toward common goals with common means. Chambers of Commerce and their members can play a role in encouraging and facilitating such movements. Allow me to offer some advice as to how to make such an effort successful.

How To

and Lutron dimmers. Our area incorporates some of America's leading industrial parks for an area its size, replacing job contraction with job expansion. It is the home of one of the most industry-oriented, research and engineering universities in America, Lehigh University, and the nationally recognized, State-sponsored, program of smaller business support, the Ben Franklin Partnership. It is the home of a dynamic new, state-initiated, public-private effort, the manufacturing services extension center (MSEC). Both the Ben Franklin Partnership and MSEC are getting deeply involved in Quality.

The Origin of Quality Valley, USA

Like much of the rest of the country, the traditional industries in the Lehigh Valley have been hard hit by international competition. While government policies relating to budgets, taxes, investment and regulation can all play important roles in helping American business in the Lehigh Valley and elsewhere meet this competition, it has become obvious to a lot of people that the first answer to the problem of competition is in the Quality of the work product. On this, our jobs, our standard of living, and our future all depend.

That means the work product from the chairman to the janitor . . . from the president of a company to a file clerk in the mail room . . . and each and every worker in between. The value of each job, of each worker, to the team is much more important than we ever used to think or were taught.

In 1987 I and a number of CEOs set out to initiate a movement in the Lehigh Valley to promote quality. Borrowing on California's "Silicon Valley," we dubbed the effort in the Lehigh Valley "Quality Valley, USA". I thought of it as an experimental laboratory where, if it was successful in accelerating a broad-based quality movement, it would not only help existing companies turn to Quality but also help to attract the best jobs and the best companies to the area, and it could be a model for other regions to follow. Its mission is "to promote Quality in the Lehigh Valley as a way of work and as a way of life, and to have the Valley recognized for this commitment."

Quality Valley's Goals.

Our idea in forming Quality Valley, USA was that the organization would have an impact on people as individuals in their workplaces, in government, in education, and in the community. Specifically it would do these things:

• First, provide an organized community approach to stimulate institutions to adopt total Quality management.

• Second, provide a mutual support system for individuals and companies involved in Quality.

• Third, provide a central bank of information and resources for people involved in Quality.

• And fourth, build a sense of community purpose for economic strength and continued growth. . . To have the Lehigh Valley recognized regionally and nationwide for Quality (Quality Valley, USA).

These goals are expressed in Quality Valley's formal statement of principles:

"We believe dedication to the quality principles of continuous improvement, satisfying customer expectations, using the insights and strengths of employees, and measuring conformance with stated product or service goals, will improve the quality of work-life and work-product in the Lehigh Valley, making area workers, businesses, and educational institutions more competitive in national and international markets."

What Quality Valley Has Done

carefully with whom you work. Get yourself some additional CEO or community leader champions and help them get out front.

Involve the media. Publicity won't educate in-depth, but it will attract interest while you attempt to sell the message. Some media themselves will wish to participate. That's what happened to the largest news medium from our region, the MORNING CALL newspaper.

Big events that people enjoy attending, and publicizing of key successes, will help attract others to your effort. Should meetings be open to the press? It's a judgment call, and we didn't do it initially, but looking back on our experience, I'd say yes. This is something that, in large part, belongs to the community and that only the community can accomplish.

Rewarding Quality - The Malcolm Baldrige National Quality Awards

It is extremely important to reward and promote outstanding Quality work in your own company. Reward and recogntion are mother's milk to Quality achievement. Beyond internal reward is the reward that society places on Quality. The outstanding example is the new Malcolm Baldrige National Quality Award. Named for the late Malcolm Baldrige, Secretary of Commerce from 1981 until 1987, this award recognizes businesses which have achieved excellence in manufacturing or in services. Jointly administered by the federal government and the private sector, the Baldrige Award is America's highest recognition for achieving Quality. It could in time rival the Nobel Prize in capturing the imagination of the American people. In former President Reagan's words, the Baldrige Award ". . .offers a vehicle for companies, large and small, in manufacturing and in services, to examine their own approaches to Quality. It offers companies a standard with which to compare their own progress to that of the country's very best. . "

Baldrige Awards were first made in 1988--the first winners were Motorola, Westinghouse's Commercial Nuclear Fuel Division, and Globe Metallurgical. Motorola was recognized for a highly successful program that began in 1981 to achieve a tenfold improvement in the Quality of its products and services. Its target was what is called "Six Sigma Quality," a statistical term that translates into no more than 3.4 defects per million products, including customer service.

Westinghouse Commercial Fuel Division took as its objective to be recognized as the world's best supplier of nuclear fuel. It adopted a policy of making every action by every employee a Quality initiative. The guiding principle was customer satisfaction, whether the customer was the ultimate recipient of the product or the next person in the process. The payoff has been truly impressive. At a time when the nuclear power industry is widely perceived as declining, the values of Westinghouse's new orders in 1987 were the highest in a decade.

Globe Metallurgical decided to become the lowest cost and highest quality producer of ferroalloys and silicon metal in the U.S. They did this at a time when most of their domestic competitors were closing plants. The entire company joined in an improvement system called Quality, Efficiency, and Cost. Quality committees were established at all levels. The result was a dramatic rise in sales and market share and the return of profitability to a company that could have been part of an overall decline in its industry.

Quoting former President Reagan again, each of these corporations reflects

"American industry's dedication to Quality. Each of them and thousands of others help keep America strong by making American products the best products available. They and others like them exemplify the belief that Quality counts first, foremost, and always. The one trait that characterizes these winners is a never-ending process, a company-wide effort in which every worker plays a critical part. They realize that customer satisfaction through better Quality is the goal. They know that America's economic strength and future depend more and more upon the Quality of its products . . ."

From the outset, make the goals and implications of quality improvement understandable and meaningful to the average person. Most people in our communities don't understand quality the way we do, as a way of work, a way of life. And they are very wary of catchy terms that promise big results. Words and phrases like "quality," and "new and improved," are to many people just another way of providing some kernel of truth for a marketing campaign or a new exhortation of the workers to achieve higher productivity.

Start to organize your community efforts with assistance from the other top leaders from your local industry. Many of them will know what you're talking about and some will actually be doing it. Then they can help to recruit educational leaders from different levels of the education system to, at the least, expose them. Enlist the leaders and resources of local business groups, trade associations, and educational institutions. Certain elected officials on your advice or urging may wish to adopt a Quality approach for their jurisdiction.

Develop meaningful ways for people to take action within their respective institutions. Make certain the groups you are trying to reach have action options. Be ready to answer the question, "So, I'm interested; what can I do?"

Have realistic expectations. It may take years before people understand what Quality improvement is all about. Air Products & Chemicals, for example, has trained thousands of employees. It took them over two years just to get everyone to understand what the company wanted to do. Be prepared for the long haul. What we're talking about is culture change, attitude change. Those don't come easily, if ever. Don't lose hope. Remember, the Japanese, in their own way, have been at this for more than 30 years and they're still moving ahead. Some U.S. companies have been at it for a decade. You never really get there; it's a process, a way of life. Unrealistic expectations will rob you and the people you're trying to reach of the kind of commitment necessary to make a community-wide effort successful. This process is tough . . . This process doesn't have an end, just a series of beginnings. . .and continued follow-up.

You need to convey to your target audience that the key to competitiveness through quality is the understanding that the job must be continuously improved. As long as companies and their employees just do their jobs, they will not be viewed for long as quality performers in the market place. The workplace must allow workers to contribute, to create, to bettter manage themselves. Institutionalization of this concept is perhaps the greatest challenge American industry faces with respect to quality.

There is also a pervasive notion that quality has something to do with a particular level of performance or goodness of product or service when, rather, it has to do with continuously and incrementally improving from wherever you happen to be today.

That's how we got the better stereos, better color televisions sets, and better automobiles. . .whatever. And the only thing we can be sure of is that all of them will a lot "better" (that is better as the customer defines better) in 1995, and in the year 2000. The companies that will enjoy a share of those markets in the future will be those who are now learning to institutionalize the process of continuous improvement--from the board room to the janitorial staff.

Some U.S. firms are making great progress with systems which institutionalize the process of continuous improvement throughout every operation in the company. To the extent we can broaden the understanding of these principles among others, we will be able to keep our American markets supplied by American manufacturers and service providers. We will be able to export.

Try and organize your efforts in a quality way. If efforts are disorganized and unprofessional it can speak volumes about the idea being sold. Nevertheless, evolving a big new idea across a whole community is no small task. And, be prepared for turf battles, setbacks, and other obstacles. Consider elected officials at all levels who will promote Quality movements. With your visibility and your management expertise, you have the capability to encourage the expansion of successful private sector programs out to various levels of government. It's happened in Kingsport, Tennessee, Madison, Wisconson, and it's starting in Bethlehem, Pennsylvania. If the direction is towards a regional program, then it is important to focus first on those officials in the region who are personally interested and can make a commitment to follow through . . . and to seek success stories and build on them.

If people across the length and breadth of this country can convince state, local and federal government officials and elected representatives to put "quality first," the results would be phenomenal. Taxpayers would benefit from improved services and less expensive government, while the morale and performance of government employees would be vastly improved.

Those political leaders who help lead the nation to quality will ultimately lead the nation. Period.

The Bush Administration has already begun a commitment to Quality in government and its tie to competitiveness for American industry. Preeminent among its efforts is the Commerce Department's support for the Baldrige Award, which I discussed earlier, and which, as I said, I hope in time will rival the Nobel Prize in public perception. Commerce Secretary Mosbacher is committed to improving the competitiveness of American industry, and his department could play an important role in coordinating government-wide Quality efforts. The recently announced Competitiveness Council, headed by Vice-President Quayle, could also play a major role in this movement. It will join efforts already underway in other federal government agencies like the Office of Management and Budget and the Departments of Defense and Agriculture.

This U.S. Congressman will do all in his power to make it happen. Convincing government at all levels to pursue quality is going to take more than talk; it's going to take action. <u>I'm issuing a call to action to the Chamber of Commerce membership. Let's get to work!</u>

You may, in the future, like to involve your own companies in the competition for the Baldrige Awards. As my brief descriptions of the first winners indicate, competition for the Baldrige Award is open to several different kinds of companies. There are three categories: (1) manufacturing companies or subsidiaries, (2) service companies or subsidiaries, and (3) independently-owned small businesses with no more than 500 full-time employees. No more than two awards can be made each year in each category. Only three out of a possible six awards were made last year, indicating the truly high quality of the program.

Applications for this year's awards are due on May 5. I hope that some of your companies will consider applying and that you will encourage other companies with noteworthy Quality achievements to apply. My office will be pleased to help you obtain the necessary materials. It is a chance to recognize and reward true Quality. Just applying or getting ready to apply is a helpful, uplifting experience.

Quality in Service Industries

Two of the first group of Baldrige Award winners are manufacturers and the third delivers a product --nuclear fuel--even though its business has more of a service aspect than the other two. But let me turn now to Quality in service industries and in the biggest service industry of all, government.

The American Society for Quality Control commissions an annual Gallup survey of consumers' perceptions of the Quality of American products and services. The published results of the 1988 survey contain some interesting comments about Quality in the service industries that I would like to quote here. First, "when it comes to evaluating services, Americans are more concerned with attitude and courtesy, promptness, and having a general feeling that their basic needs are satisfied than they are with price, personal attention, accuracy, or convenience. Banks, hotels, and hospitals receive the highest satisfaction ratings among seven types of service rated by respondents. Auto repair and local government service receive the lowest ratings. Using a gauge the frequency of service problems recently encountered, auto repair and local government show improvement compared to 1985, while airlines decline by this measure."

Some segments of the airline industry--to give just one example--are actively working to reverse this trend. One of these was highlighted in the Summer 1988 issue of The Quality Review. British Airways has undertaken a program called "Putting People First". Quoting its chief executive, Sir Colin Marshall, "The purpose was to get all of us to understand that our first obligation was to our customers, not to a series of practices and rules laid down in a manual. We had to persuade ourselves that we were there as a service business, not just an airline--that we had to be concerned with making passengers feel that they would enjoy their travel with us more than they would with any other airline." As part of this program, experienced employees called "hunters" have been trained to roam Heathrow Airport, finding and helping people who need assistance. You can imagine what this has done for the airline's reputation and for its customers' satisfaction.

Quality in Government

The same Gallup survey that I quoted earlier showed that we have some Quality problems in government services. Quoting directly from the survey results,

"Satisfaction with the quality of government services is wide but neither deep nor enthusiastic. While 57% say they are somewhat satisfied, only 8% report they are very satisfied. And when a direct comparison can be made--comparing local government service with other types of services--government service quality comes out at or near the bottom by nearly every manner of comparison. The competence of government at all levels is a matter of concern to the public."

Obviously there are great opportunities out there to apply Quality principles to all levels of government. I think it's important for Chamber of Commerce members to support and encourage

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February 10, 1989

The Honorable Robert A. Mosbacher
U.S. Department of Commerce
14th and Constitution, NW
Washington, DC 20230

Dear Mr. Secretary:

I'd like very much to congratulate you on your appointment as Cabinet Secretary for the Department of Commerce. I have followed your public pronouncements and am a proponent of the policies you propose. As a former scientist, engineer and veteran of the global competitiveness debate, I'm convinced that with a Team America approach and with forceful leadership from people like yourself, America can do better.

As the new ranking Republican on the House Energy and Commerce Subcommittee on Commerce, Consumer Protection, and Competitiveness (C,CP&C), and as a member of the Telecommunications and Finance, and the Science, Research and Technology (SR&T) Subcommittees, I look forward to working with you and the Bush Administration to further your agenda in the Congress.

For example, I and my colleagues seek to create interest in some non-traditional issues crucial to U.S. economic success. Our Republican Task Force on High Technology and Competitiveness first brought what I call the "Quality Revolution" to Capitol Hill (see the enclosed report). Also, I've spoken on this issue a lot in my district, which is known as"Quality Valley, USA", around the country and in Washington.

During the presidential campaign, Jim Pinkerton and Craig Helsing really came to understand Quality, not only for its ability to drive the economy but also for its potential to influence politics. The Malcolm Baldrige Award is, as yet, an untapped vehicle for communicating this issue to the public.

I'll be introducing the 1989 National Quality Month Resolution shortly. This resolution has the American Society for Quality Control (ASQC) legions active across the country; both the resolution and the Baldrige Award can serve as vehicles. There's so much we could do with the Bush Administration committed to actively pursuing the Quality issue. Once again, I think Craig Helsing understands this very well.

COMMISSION ON SECURITY AND COOPERATION IN EUROPE
HELSINKI COMMISSION
RANKING HOUSE MINORITY MEMBER

I, along with my Subcommittee Chairman, Jim Florio (D-NJ), had the first amendment on Sematech - when it was in the Commerce Department - in our C,CP&P Subcommittee. Financial considerations have lately moved the debate to Armed Services and DoD, which unfortunately is the way all major civilian collaborative arrangements have gone, including high temperature superconductors and HDTV. Perhaps we can evolve some other kind of civilian-oriented modus operandi. I was the person who originally authored the bill creating the National Bureau of Standards and Industrial Competitiveness (NBSIC), which was a precursor to subsequent legislation in the Senate, on the SR&T Subcommittee, and on the full Space, Science, and Technology Committee creating NIST, and then it was reworked to create the Advanced Technology Program (ATP) in NIST. Could the ATP be more widely used as a vehicle in the future ?

HDTV is another area where, would you believe, three subcommittees on which I serve are involved. I got Markey fired up and have worked closely with the American Electronics Association in creating an HDTV agenda. I've also started a bipartisan HDTV Caucus with Mel Levine (D-CA); please see our enclosed "Dear Colleague" letter. The Department of Commerce should definitely be the facilitator on any collaborative strategy we might develop. I'd be pleased to know what you're thinking on HDTV.

Finally, the trade issue is of very pointed interest to the Commerce, Consumer Protection and Competitiveness Subcommittee, including both an overall review of the historic Trade Bill in general and then a focus on semiconductors, telecommunications, and the Kansai Airport controversy.

Then there's Europe 1992, and most of us don't have a clue about its eventual meaning. What I do know from discussions with business people and parliamentarians from the European Community is that if we don't have a reasonably co-ordinated Team America approach, we'll be in hot water. That also would be a good topic for a C,CP&C Subcommittee hearing.

Mr. Secretary, I'd like to help out in any way I can to ensure the success of our President. I'd very much appreciate the opportunity to meet with you in the near future. I realize it's late notice, but I'll be in D.C. on Tuesday February 14 and could meet either mid-morning or late afternoon or early evening.

I look forward to meeting you, and to a long and productive working relationship.

Sincerely,

Don Ritter

DON RITTER
Member of Congress

DR/cwb
Enclosures

DON RITTER
15TH DISTRICT, PENNSYLVANIA

ENERGY AND
COMMERCE COMMITTEE
SUBCOMMITTEES
COMMERCE, CONSUMER PROTECTION
AND COMPETITIVENESS
TELECOMMUNICATIONS AND FINANCE

SCIENCE, SPACE, AND
TECHNOLOGY COMMITTEE
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February 23, 1989

The Honorable John H. Sununu
Chief of Staff
The White House
1600 Pennsylvania Avenue, N.W.
Washington, DC 20500

Dear John:

This is a brief note regarding the task of getting more private sector, market-oriented steering and focus for the federal R&D economy. This week, CBS Evening News is reporting from Japan with the ostensible news hook, the Hirohito funeral. Actually, they're just trying to be first out of the gate on the really big story, Japan's incredible economic success. The most striking thing about the news was the blase way both the Japanese and Rather and Kuralt referred to Japan, not only as a superpower, but as "Number One, the number one industrial power", "having a higher per capita income than the U.S.", etc. It was shocking, and it will continue to be reported on by the media, with justified emphasis. Repeated over time, this is political bad news for a U.S. presidency.

John, the U.S.A. has done well against models of industrial democracy similar to our own (Europe et al.), but the Japanese are doing better because (there are lots of reasons and some we can learn from) they work smarter ("Quality") and they (MITI/ The Science and Technology Ministry/ CEOs/ Workers) set their sights higher, over the long term. They've integrated R&D into an accelerated product cycle like nothing we've seen and thus they're hitting first with new technology in new products across the length and breadth of high-value added manufactures.

I came away from watching the news convinced more than ever that President Bush has a golden opportunity NOW to better use the federal science and technology billions to underpin U.S. global competitiveness. That means we need to, at least, begin a systemic change. Our system can be modified so as to optimize our R&D strengths and our vast R&D investments. The President can also "lead America to Quality" at the workplace and in education. The political leaders who can lead America to Quality will lead America.

I enjoyed meeting Andy Card and sharing some of these ideas. It's heartening to know you've got a backup who understands some of these issues. Andy asked "Who's the political constituency for all this?" My

COMMISSION ON SECURITY AND
COOPERATION IN EUROPE
(HELSINKI COMMISSION)
RANKING HOUSE MINORITY MEMBER

CHAIRMAN—REPUBLICAN TASK FORCE
ON HIGH TECHNOLOGY
AND COMPETITIVENESS

answer was, "IRI, the Industrial Research Institute, representing U.S. global competitors with $1.5 trillion in annual sales." But, in thinking "inside the Beltway," I neglected the most important political constituency of all: workers, managers, families, and communities whose livelihoods and futures are tied to America's success against the Japanese powerhouse and other competition.

The CBS Evening News is doing us all a favor this week. They're making our task of changing the status quo a lot easier. Changes outlined in the "draft" I shared with Andy are do-able and do-able now.

I hope all is going well for you "out on point" and that you are enjoying the mighty task. I wish you Godspeed, energy, patience, and fortitude. Your sense of humor is your ultimate defense and offense. Keep it!

Sincerely,

Don

DON RITTER
Member of Congress

DR/cwb

P.S. I've had the good fortune to be working with a young fellow formerly with the transition team named Brad Mitchell (works for Roger Porter) who has done a lot of homework on these subjects and shares some of the same visions we do. He has helped get key players talking to one another and he helped me through the maze as well. Hopefully, you and Andy can make use of Brad's understanding of these issues, his independence from those jockeying and his ability to quietly navigate in mined waters.

(Rough Draft)

Proposal for Improved Federal Science and Technology Contribution to the Economy

I i) Science Advisory Leadership should come from someone who is a private sector combat veteran of the global competitive wars, not an academician or an administrator of academic enterpreneurial activity. Academia is currently very healthy as the existing Federal R&D economy works well for them. The Science Advisor should have some portfolio (i.e., turf and staff), the minimum being OSTP.

ii) Federal Science and Technology Cohesiveness should originate in some kind of advisory body, chaired by the Science Advisor, reporting to the President, and including private sector "stars" and workers, joined by the Undersecretary of Commerce for Technology, the NSF Director, the R&D chiefs of DoE and DoD, the Director of DARPA, the Administrator of NASA, and the head of NIST. Obviously these groups do not act in in a convergent manner since they're not asked to.

iii) Long-Range Science and Technology Policy: I agree with Keyworth *et al.*, that we will always be driven by the momentum of past issues - DoE by AEC and the "Labs", NSF by the needs of the university community, etc. Global competitiveness and the creation of national wealth and well-being will not be the primary driving forces until some hard changes are wrought systemically. It's probably time to think of a science/technology department (ministry) or someone with a lot of authority who could accomplish the same thing without going through the pain of "reorganizing" - which in D.C. usually means chaos. Until we are better organized, DoD will continue to make all big decisions on technological competitiveness as in Sematech and the recent DARPA initiatives on High Temperature Superconductors and HDTV.

One way to start this ball rolling is to select a Science and Technology Advisor and have him or her interact with the White House to help select the key players for the team - the new NSF Director, the new NIST Chief, (working with the Secretary) the new Undersecretary of Commerce for Technology, the new DoE R&D head, etc. If such an attempt is made it will be the first time ever that a science and technology leadership team is formed with allegiance to goals other than those set by respective agency constituencies. Attempts at evolving reorganization later would be a lot easier if such a serial personnel selection process were followed at the outset.

II Quality: Japanese success with technology is very much a function of a whole new way of managing enterprise to ensure "continuous improvement." Where U.S. firms have done this, results are stunning. The quality revolution is underway in the U.S.A. and the

Bush Administration can help further it. I've gone through this with the Bush campaign team for the last six months. Jim Pinkerton understands the substance and the politics completely, and I hear that Darman is interested (save money, improve services, etc.) This can work for the Administration, both in its role as a cheerleader for American efforts and inside the Federal Government agencies themselves. Bridgeheads already exist. Science and technology are not separate from the quality revolution. Just look at VCRs, compact discs, and HDTV as examples of where "continuous improvement" incorporated the very latest technological advances rapidly and over relatively long periods of time (decade plus). This helps put science and technology in context with the broader goals of health, well being of the U.S. economy, and global competitiveness.

III Create a Vehicle for Long-Range or "Patient" Capital Investment: Nowhere in our private system can the ten-year-plus project be pursued. Doing this fits right in with Bush Administration thinking on capital gains tax and fits right in with the quality revolution / continuous improvement strategies (the keys to Japanese success).

IV Foster U.S. Industry Collaborative Approaches: Loosen anti-trust restrictions to go beyond traditional R&D joint ventures to product and process development. (HDTV is a prime current example.)

THE WHITE HOUSE

WASHINGTON

January 31, 1990

MEMORANDUM FOR THE FILES

THROUGH: KEN YALE KY

FROM: DEAN SCHULTHEISS

SUBJECT: Meeting with Gilbert Fayl

The Counselor for Science and Technology to the Delegation of the Commission of the European Communities, Gilbert Fayl, requested a meeting with Ken Yale to discuss technology transfer and other policy issues.

For the record, I spoke with Richard Barth of the NSC at the suggestion of NSC's secretariat. Mr. Barth is NSC's staff person responsible for technology transfer issues. I asked whether there was any problem with Ken meeting Mr. Fayl. Mr. Barth said that if the discussions were very general or broad in nature, there should be no problem.

tech transfer

FOR RELEASE ON DELIVERY

Testimony by

Philip S. Chen, Jr., Ph.D.
Associate Director for Intramural Affairs
and Chairman, Patent Policy Board

National Institutes of Health
Public Health Service
Department of Health and Human Services

On the Commercialization of Federal Laboratory Technology

Before the

Subcommittee on Regulation, Business Opportunities and Energy

Committee on Small Business

United States House of Representatives

October 5, 1989

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to present testimony on the implementation by the NIH of its technology transfer program under the Federal Technology Transfer Act of 1986 (FTTA). Acting under a broad Congressional mandate to encourage commercial development of Government inventions, NIH created a policy-making and administrative structure to transfer technology and to collaborate with industry on appropriate research projects. My testimony will describe the organizational development of our program, discuss key elements of this program, provide examples of interactions with small and large business and summarize selected issues that affect the implementation of technology transfer programs at NIH and other Federal agencies.

The FTTA authorized and provided incentives for Government laboratories to enter into cooperative research and development agreements (CRADAs) with outside collaborators. Under a CRADA, Federal laboratories and private sector companies conduct research jointly and the collaborating company acquires an option from NIH at the outset of the collaboration to negotiate for exclusive patent rights. As an incentive and a reward, the FTTA also provides for the sharing of royalties with Government inventors from the licensing of inventions developed under CRADAs and from inventions made through an agency's "intramural" (i.e., independent, non-CRADA) research program. The licensing of intramural inventions is authorized by the patent law in Title 35 of the United States Code.

In addition to the responsibilities and opportunities for collaboration under the FTTA, NIH also develops and transfers technology to the private sector in several ways other than CRADAs and invention licensing, including training programs, published scientific literature, presentations at meetings, including Consensus Development Conferences, and informal scientific contacts. Certain guidelines for our implementation of the FTTA reflect numerous other policy objectives. For example, the review process for CRADAs, discussed in more detail below, requires careful attention to the mission of the institute involved and its approved research agenda -- CRADAs will be appropriate for some projects and not for others. Moreover, in order to maintain an independence from reliance on industry funding, the NIH does not view CRADAs as a general outside funding source or a mechanism for sponsored research.

The NIH/ADAMHA Patent Policy Board:

Following enactment of the FTTA in October, 1986, and delegation of authority from the DHHS Secretary and the Assistant Secretary for Health, the NIH/ADAMHA Patent Policy Board was established on April 7, 1987 by the Director of the NIH (and later endorsed by the Administrator of ADAMHA) to make recommendations on policy and model agreements, and to develop the administrative framework needed to implement the patent and CRADA process at the NIH/ADAMHA. I chair the Board, and its voting membership is composed primarily of senior scientists and administrators. Nonvoting members include the NIH and ADAMHA Legal Advisors, the Chief of the PHS Patent Branch and representatives of the other PHS agencies. Reference to the following, general aspects of technology transfer at NIH should also be understood to apply to ADAMHA, which is developing its technology transfer programs jointly with NIH.

The Board has established several working subcommittees to address specific issues and tasks:

- The CRADA Subcommittee reviews all CRADAs involving exclusive patent rights, and assesses their scientific acceptability and conformity with overall NIH and ADAMHA research policies. This Subcommittee also makes policy recommendations regarding CRADAs to the Board.

- The Royalty Distribution Subcommittee recommends policies on royalty distribution to the Board, as well as on the uses of royalty income as incentives for additional technology transfer.

- The Data Systems Subcommittee evaluates overall data management requirements for technology transfer matters, and vendor-supplied software for purposes of tracking and docketing PHS patent applications, CRADAs and licenses.

- The Training Subcommittee develops materials and programs to educate the NIH/ADAMHA community on the technology transfer process.

- The Technology Development Coordinators Subcommittee meets monthly with the Director of the Office of Invention Development (discussed below) to review procedures for implementing the FTTA and to share experiences. These Coordinators generally are responsible for the day-to-day activities under the FTTA within their respective Institutes.

Statement of Policy on CRADAs and Licensing

A key element of the Patent Policy Board's technology transfer program is the "Policy Statement on Cooperative Research and Development Agreements and Intellectual Property Licensing." This policy statement (previously submitted to Subcommittee staff) defines the agencies' missions in terms of conducting basic biomedical and behavioral research. It affirms our commitment to transfer technology within an overall framework that promotes the free exchange of ideas and information. For example, our investigators are free to publish the results of their research, and every attempt is made to safeguard the collegiality and integrity of, as well as public confidence in, the NIH/ADAMHA research programs.

Specific sections of the "CRADA/Licensing Policy Statement" treat questions of "fair access" by outside companies to the NIH/ADAMHA laboratories, and the handling of confidential or proprietary information. Also covered are our intentions to grant royalty-bearing exclusive or nonexclusive commercialization licenses in order to stimulate commercial development, and to grant nonexclusive, royalty-free licenses for research purposes in order to stimulate further basic research. These provisions are significant because they balance a number of competing policy requirements. The Policy Statement applies to inventions made through our intramural research programs as well as through cooperative research and development projects under the FTTA.

The Office of Invention Development

The Office of Invention Development (OID) provides staff support to the Patent Policy Board, and centrally coordinates and champions technology transfer activities at the NIH and ADAMHA. The OID primarily serves a management function as the "technology portfolio" manager for NIH and ADAMHA. Other major OID responsibilities include the development of technology transfer policy and procedures as recommendations to the Patent Policy Board or to implement Board decisions. In conjunction with the Training Subcommittee, the OID plays an active role in training and educational activities and hosts a regular speaker series.

The OID drafts model CRADAs, model material transfer agreements, model license agreements, and policy guidelines, and takes the lead in developing licensing strategies for all NIH/ADAMHA intramural inventions. The OID also serves as the principal conduit of information, advice and instructions between the NIH/ADAMHA and the Office of Federal Patent Licensing of the National Technical Information Service (NTIS), which acts as the licensing agent for most of the NIH and ADAMHA intramural inventions. The OID itself handles the licensing of inventions developed under CRADAs, and is presently involved in the first such negotiations.

A key element of the OID activities are the "Technology Management Team Meetings," convened to develop licensing strategies for intramural inventions on a case-by-case basis. These teams consist of a permanent nucleus of the OID Director, OID Technology Management Branch Chief, Patent Branch Chief and NTIS licensing specialists, joined by the appropriate Institute's Technology Development Coordinator and the involved inventors. These meetings seek to evaluate the fields of use in which patent rights might be granted, and possibly to "package" together related inventions for licensing as a unit.

The CRADA Approval Process

In accordance with NIH/ADAMHA policy guidelines, a CRADA generally is considered to be a basic research project rather than a commercialization project. The CRADA itself consists of a legal boilerplate section, and several appendices including a research plan. A separate appendix contains any modifications to the CRADA that may be negotiated with the collaborator.

The essence of a cooperative research and development project is its "Research Plan" which forms Appendix B to NIH/ADAMHA CRADAs. Use of the model CRADA in conjunction with the policy guidelines discussed above has reduced significantly both negotiation and review time for CRADAs. These documents have made it possible for our scientists to communicate clearly NIH/ADAMHA policies to potential collaborators.

The model CRADA was adopted by the Director of NIH and the Administrator of ADAMHA following internal development, discussions and review, and informal external review and extensive comments from academia, the pharmaceutical and biotechnological trade associations and several companies. As a result, the approval of CRADAs by collaborators and by NIH/ADAMHA has become a smooth and rapid process.

Equal Access

The Assistant Secretary for Health has promulgated a PHS policy on the development of CRADAs, which states that the process should ensure fairness and implement the preferences established by the FTTA, such as giving special consideration to entering into CRADAs with small business firms and preference to businesses located in the United States that agree to manufacture substantially in the United States. A basic objective is to ensure that all potentially interested organizations are given the opportunity to participate in a CRADA. Because of the large number of research projects underway in the laboratories of the NIH and ADAMHA and the relatively smaller number of CRADAs in effect or under negotiation, only rarely have multiple companies proposed an identical research effort. In some cases, however, comparable research has been undertaken by different companies under CRADAs with laboratories in different institutes. In other cases, such as where a substantial number of companies are likely to be interested or where the project lies in a previously unannounced research area, NIH/ADAMHA have sought or plan to seek collaborators competitively. For some cooperative projects, where the development and commercialization potential is of more immediate importance relative to the basic research aspects, NIH/ADAMHA considers and may seek (through Federal Register notice) a collaborator that has both the requisite scientific expertise and commercialization capability.

Many of the existing NIH/ADAMHA CRADAs appear to have resulted from the usual scientist-to-scientist contacts that occur at conferences and other places.

NIH/ADAMHA also have several formal mechanisms in place to notify the business and scientific communities of ongoing projects and research opportunities. For example, the NIH/ADAMHA publishes an annual directory (the "CRISP Intramural Research Index") of all intramural research projects, cross-referenced by key word and by principal investigator. Additionally, earlier this week, NIH/ADAMHA hosted the second annual NIH/ADAMHA-Industry Collaboration Forum. About 80 industry representatives were preregistered to attend the Forum and inspect posters of NIH/ADAMHA investigators who are seeking corporate collaborators. A special FTTA Directory, entitled "The NIH/ADAMHA-Industry Collaboration Directory" is being published in connection with the Forum and will be revised and updated annually.

Conflicts of Interest

The PHS recognizes that interactions with industry, the intentional absence of a formal competitive process under the FTTA for selection of collaborators, and the sharing of royalties with inventors, create a potential for conflicts of interest. The PHS fair access policies, mentioned above, and the NIH/ADAMHA policy of not performing product market analysis and negotiating royalty rates in advance under CRADAs help to avoid some real or apparent conflicts.

In order to evaluate and treat the resultant potential for conflicts of interest, the NIH/ADAMHA Patent Policy Board convened a "Retreat on Conflict of Interest in Collaborations with Industry" last December (1988) that was attended by senior PHS scientists and administrators and representatives from several corporations, foundations and universities. A summary of this retreat has been disseminated by the Board. Based in part on the discussions at the retreat, as well as a comprehensive review of legal authorities, legislative histories and guidelines from many Federal agencies, the OID has drafted a Manual Chapter for NIH and ADAMHA employees dealing with CRADA conflict of interest matters. This draft is undergoing internal review by my office and the OID and we expect to disseminate the draft in the near future for wider review.

Distribution of Royalties

Under NIH/ADAMHA policy, inventors share 25 percent of the first $50,000 of cumulative gross royalties on a licensed invention, 20 percent of the second $50,000, and 15 percent of the royalty income over $100,000. A portion of the royalties is used to pay for NTIS licensing services and to support the staff of the OID. Remaining royalty funds are distributed to the Institutes of the inventors named on a given patent application or patent. These royalties may be used for technology development purposes such as training, travel or cash awards to laboratory personnel.

Technology Transfer from NIH to Industry

Following are highlights of several of the most successful interactions of NIH with industry in the areas of collaborative technology transfer under the FTTA and the licensing of intramural inventions. In sum, NIH currently has over 100 CRADAs in effect, virtually all with U.S. companies, and about 100 additional CRADAs in various stages of negotiation with their submission and approval rates increasing dramatically. Of this total, about one-third of the CRADAs are in effect with small businesses.

At the present time, about 150 PHS patent(s) and patent applications have been licensed through the NTIS and earn royalties. According to the NTIS, which acts as the licensing agent for most of the PHS intramural inventions, only a few small businesses have obtained exclusive licenses to NIH inventions. Many of the PHS intramural inventions seem to require major expenditures of commercial expertise and development capital, and licenses appear to have been awarded to larger, more established companies that often submit more competitive license applications. These circumstances underscore the potential value that CRADAs will hold for small businesses since, under a CRADA, NIH promises options to negotiate exclusive invention rights in advance, without the requirement for a competitive licensing process. For all licenses to CRADA inventions, NIH and ADAMHA will require the submission of a commercial development plan and will closely monitor the efforts of their licensees.

The following cases illustrate several of NIH's successes in technology transfer interactions with industry.

Human Gene Therapy and CRADAs

Perhaps the most exciting clinical project at NIH at this time is the use of gene transfer techniques to mark a patient's antitumor cells in order to monitor the progress of an experimental cancer treatment. This project is conducted under one of NIH's first CRADAs. Gene therapy, which involves a technically similar transfer, but of therapeutic rather than marker genes, ultimately may revolutionize the practice of medicine. For example, a genetic disease caused by the absence of or defect in a gene coding for a necessary protein might be curable if properly functioning genes could be transferred into the patient's own cells. Through a group of CRADAs with the National Heart, Lung, and Blood Institute and the National Cancer Institute, Genetic Therapy, Inc. (GTI) is helping to explore the frontiers of medicine in clinical gene transfer and in product development for use in human gene therapy.

As a result of this collaboration, GTI, a two-year old Gaithersburg, Maryland, biotechnology company of 30 employees, is the only company producing the vector approved by the Food and Drug Administration for use in the present gene transfer experiments. GTI contributed substantially to these CRADAs in terms of intellectual expertise, as well as by providing essential materials and financial support for laboratory personnel. Several patent applications on inventions made under these CRADAs recently have been filed by NIH that relate to various aspects of human gene therapy.

Diagnosis of Sexually Transmitted Disease

While Chlamydia trachomatis (CT) may not be well known by name to the general public, it causes the most common sexually transmitted disease in the United States, causing an estimated ten million cases each year. Often producing asymptomatic infections, CT is further associated with 65 percent of the cases of pelvic inflammatory disease (PID), progressing sometimes to scarring of the fallopian tubes and sterility. Industry sources estimate that 85,000 women in the United States become sterile each year due to CT infections. Moreover, screening studies at major medical centers have shown that from 3-8 percent of pregnant women are CT positive, and CT can be transmitted during delivery to neonates to cause eye infections and pneumonia.

Even though CT is easily treated, only about one million diagnostic tests are conducted each year, in part because diagnostic testing has been difficult to perform. Recently, a 20-employee Texas company, Fairleigh Dickinson Laboratories, Inc., has developed, under a nonexclusive patent license on monoclonal antibodies reactive against CT, a new CT diagnostic test, invented by investigators at the NIH Rocky Mountain Laboratories. The license has been in effect since September 1988, and diagnostic test kits are currently being manufactured with product introduction scheduled for the last quarter of 1989. Fairleigh Dickinson also is discussing the private label manufacture of CT test kits, and joint developmental work for use of the licensed reagents in an alternative diagnostic format also is being conducted.

An important advantage of the diagnostic test is that it does not cross-react with other vaginal bacteria, a shortcoming that limits the clinical utility of conventional monoclonal antibody tests. The licensed monoclonal antibody also recognizes both CT as well as Chlamydia psittaci, which primarily infects birds, particularly imported birds; therefore, the test kit may have application to veterinary as well as human diagnostics.

Treatment of Leukemia

Hairy cell leukemia accounts for about two percent of all leukemias, and is treatable by interferon produced through recombinant DNA techniques. Based on a discovery made at NIH, T Cell Sciences, Inc., an emerging 95-employee pharmaceutical product company headquartered in Cambridge, Massachusetts, has licensed patent rights to a kit for monitoring the clinical progress of hairy cell leukemia patients. The FDA recommended approval of the test kit in November 1988, and final FDA approval is expected shortly.

Hairy cell leukemia is a malignant overgrowth of lymphocytes, or white blood cells. Lymphocytes themselves are a type of white blood cell covered with thousands of surface protein molecules that act as receptors for the body's chemical messengers, enabling lymphocytes to respond to various immune system stimulants. The test kit is based on an NIH discovery that the cancerous lymphocytes in hairy cell leukemia shed into the bloodstream large quantities of a receptor compound for interleukin-2, an immune system growth hormone. Quantifying the number of such molecules shed into the blood provides valuable information to aid oncologists in monitoring and evaluating the treatment of hairy cell leukemia patients.

This leukemia monitoring kit will be the first FDA-approved product based on the measurement of receptors released by lymphocytes into the blood stream. This device was developed under a nonexclusive license on an NCI invention.

Treatment of Pneumocystis

Pneumocystis carinii is a ubiquitous, infectious sporozoal parasite that occurs in epidemics in developing countries, primarily in malnourished infants and children. In the industrialized countries, such as the United States, pneumocystis is limited almost entirely to immunocompromised patients including those with congenital immunodeficiency, immunosuppression therapy (such as with steroids) for organ transplants, a malignancy (such as leukemia) in remission after treatment, and particularly AIDS.

Since 1981, the inherent susceptibility of individuals with AIDS has significantly increased the prevalence of pneumonia caused by pneumocystis. Current projections indicate that by 1991, at least 100,000 cases of pneumocystis pneumonia will have occurred in patients with AIDS. The rapidly growing incidence of this infection has led to a dramatic increase in demand for techniques to establish this diagnosis. Now, a licensed NIH invention will greatly enhance the speed and efficiency by which pneumocystis organisms can be detected.

Currently, a clinical diagnosis of pneumocystis is based on radiologic evidence and direct microscopic observation of respiratory tract specimens using nonspecific staining techniques. These techniques are complex and require highly trained technicians to conduct them. However, in 1986, two NIH scientists developed a monoclonal antibody that can be used in an indirect immunofluorescent assay, thereby greatly simplifying the diagnosis of pneumocystis.

Nonexclusive licenses under the patent application were awarded to three small companies -- Disease Detection International, International Cardiovascular Medicine, and Meridian Diagnostics, Inc. Of these companies, Meridian Diagnostics, an 88-employee Cincinnati business, has had the greatest success in commercializing the invention. Meridian has a product commercially available for the detection of pneumocystis in respiratory tract fluids and tissue.

Animal Models for AIDS Research

Another CRADA is presently underway between Dr. Thomas J. Kindt of NIH, in collaboration with Transgenic Sciences, Inc. of Worcester, MA. Their research will attempt to create transgenic rabbits that express the human CD4 protein, an important component of the normal immune response, but which also acts as a receptor for the AIDS virus. If successful, the research will produce another animal model for AIDS that should be highly useful in testing drugs and therapeutic strategies based on blocking the interaction between the AIDS virus and human CD4.

Treatment of AIDS

In response to the need for additional AIDS therapeutics, the Bristol-Myers Company was awarded an exclusive license to explore and possibly commercialize a method of treating AIDS utilizing a promising drug called dideoxyinosine, or ddI, initially developed by the National Cancer Institute. Clinical trials are now underway and the FDA is also permitting ddI to be made available more widely under a treatment IND and open safety protocol. This product inhibits replication of the AIDS virus by means of a chemical "Trojan horse" approach. The drug inserts an incorrect building block into the growing strand of viral DNA, thus halting viral replication.

National Cancer Institute officials have recently stated that ddI appears to be safe to use, noting that the drug prompted an early but statistically significant rise in immune system cells accompanied by a fall in levels of virus. Moreover, ddI appears to have a therapeutic effect on patients who no longer respond to AZT. Clinical efficacy studies are expected to determine whether ddI is as effective as these preliminary studies suggest.

Impediments to Technology Transfer

1. Copyright/licensing of software: Although the FTTA encourages the licensing of educational software, no mechanism is provided for the creation of copyright in software on the part of Government employees. In some cases, software may be patentable but, as a general proposition, copyright is viewed as the primary mode of software protection. Thus, although PHS scientists and administrators develop a substantial amount of commercially valuable software -- from molecular modeling to computer based expert systems in support of clinical decision-making to financial/accounting management -- no intellectual property right is available that would provide a "licensee" with a right to exclude others from copying such software. This tends to make the collaborative development and licensing of software from the Government less attractive to the commercial sector. The Department of Commerce recently reported to Congress on the first two years of the implementation of the FTTA, and concluded that the protection of

software through copyright by the Department of Energy's Government-owned Contractor-operated laboratories illustrates the importance of copyright protection in technology transfer.

2. Strengthening of internal organizations:

Soon after passage of the Federal Technology Transfer Act, we recognized that a strengthened management structure would be necessary for full and effective implementation of the various functions that would be needed: training, patenting, industry liaison, licensing and overall technology management.

- The Office of Invention Development was created in January 1988, and performs the technology transfer functions noted above. A full-time director for the OID, Mr. Reid Adler, Esq., was hired in January 1989 from the private sector, and working plans have been proposed for expanding the technology management and licensing staff within the OID.

- A similar staffing increase has begun for our Patent Branch. Presently, a Patent Branch Chief (and attorney), Ms. Glenna Hendricks, Esq., formerly of the Patent and Trademark Office, and one patent agent serve the patent prosecution needs of all PHS agencies in conjunction with outside contract attorneys. We are planning to hire an additional patent attorney and additional patent agents.

- Within the various NIH institutes, the Technology Development Coordinator, discussed above, is responsible for a growing number of technology management and CRADA-related assignments. Typically, these personnel are also responsible for various other assignments within the institute. As technology transfer programs at NIH mature, our experience to date has shown the importance of the institutes retaining the ability to handle certain aspects of the program on a decentralized basis.

In order responsibly to discharge our technology transfer obligations, we must go outside of the agency to hire technology management and patent professionals. Recruiting for patent attorney and technology transfer positions is hampered by the relative scarcity of highly trained and experienced technology transfer professionals and by the Government salaries which are low relative to those of the private, corporate and university departments with which we compete in hiring.

Concluding remarks

NIH encourages continued Congressional support for technology transfer efforts. We believe that the FTTA and the technology management program implemented at NIH have begun to play a vital role in the transfer of Government inventions to the private sector for commercial evaluation and development. In the critical area of biomedical and behavioral research, this process is an essential component of caring for the public health.

This concludes my prepared statement. I would be pleased to try to answer any questions that you or the other members of the Subcommittee may have.