The original documents are located in Box 32, folder "Science and Technology Policy, Office of (4)" of the James M. Cannon Files at the Gerald R. Ford Presidential Library.

To: Jim Cannon

From: Henry Simmons 18 March 1975

Re: Presidential Science Advice

"The creation of a scientific advisory apparatus in the White House was like a heart transplant," one ~~mmm~~ insider recalls. "It met a hell of a need, but in the end it was finally rejected."

The idea for a Presidential Science Adviser first surfaced in 1950 during the Truman Administration. Because of opposition within the science community as well as from the well-entrenched Research and Development Board of the Pentagon, the proposal never got anywhere. A low-profile Scientific Advisory Committee was established for the Office of Defense Mobilization (a special White House office set up to handle Korean War production, economic stabilization and related policy questions), and this was the only source of independent scientific advice available to the White House on Oct. 4, 1957, when the "Sputnik Crisis" broke on the second Eisenhower Administration.

Within a month, President Eisenhower transferred the languishing scientific advisory group from ODM to ~~mmm~~ the White House and named James R. Killian, President of MIT, chairman of this group as well as the first Presidential Science Adviser.

In retrospect, the science advisory role at the White House enjoyed its honeymoon period of maximum influence during the last three years of the Eisenhower Administration. Although neither Killian nor his successor, George Kistiakowsky, a chemistry professor at Harvard, were personally close to Ike, they enjoyed his deepest ~~mmm~~ respect as well his ~~mmm~~ determination to see that the new mechanism was used in a ~~mm~~ visible way to reassure a shaken public that the direction of the U.S. ballistic missile and space programs was in firm hands and proceeding with all reasonable dispatch to redress a perceived "technological gap" between the U.S. and the Soviet Union.

Both Killian and Kisty had easy and direct access to the President, and they routinely attended meetings of the National Security Council. Their prestige and that of the members of the early [redacted] President's Science Advisory Committee (PSAC) was a political shot-in-the-arm for the White House, and their standing redounded to the benefit of the entire scientific community. Because of the tight focus on defense and space policy, the White House science advisory mechanism was not then seen as a threat or competitor to the departments and other mission-oriented agencies of the government.

A major factor in the success of the early advisory apparatus was the fact that all of the men had worked closely together in the [redacted] war -- either at Los Alamos on the Manhattan Project or at MIT's Radiation Laboratory, where the principle advances in radar took place in the U.S. "It was an old boy network," recalls one observer. "They had a common background. They knew each other's strong points and weak points. They could work together well, and, of course, they happened to be on the [redacted] same wavelength with Eisenhower in the areas of greatest concern."

It is fair to say that the scientific advisory apparatus of this period had a seminal force both on the organization of the government's scientific and technology effort and in the goals and emphasis of the programs to be pursued. The creation of NASA in 1958 to pursue an independent civilian space program was one early accomplishment, but the White House scientists also made the initial recommendations to [redacted] set up the Arms Control and Disarmament Agency in the State Department. The recommended major improvements in the ICBM program, including important new emphasis on solid-propellant rocket engines, acceleration of ballistic missile early warning capabilities, and advances

in anti-submarine warfare capabilities and photographic reconnaissance from espionage satellites.

A PSAC panel chaired by Prof. Hans Bethe, for example, provided the scientific underpinning for the U.S. negotiating posture in Geneva talks with the Russians on total nuclear test ban. It was the work of this group which led to Ike's proposal in May, 1959, that all future nuclear testing be confined to underground detonations with no escape of radiation -- and after one last spasm of atmospheric testing in 1960-61, this proposal was agreed to by the Russians and became the 1963 Nuclear Test Ban Treaty.

Even in these early years, the Presidential Science Advisers and PSAC were not totally concerned with space, defense and arms control matters. They began to issue reports, studies and recommendations for strengthening the education of scientists and engineers in the U.S., improving the availability of scientific and technical information (to avoid duplicative research and inventions), expanding high energy physics research in the U.S. and dealing with such problems as food additives and environmental health.

With the Kennedy Administration came in Dr. Jerry Wiesner of MIT, a close associate of JFK who, unlike all the other Science Advisers, enjoyed a close and informal relationship with the Presient. With a "RadLab" background like Killian (who was President Compton's assistant at MIT during the war), Wiesner continued the tradition of a prominent wartime scientist filling the advisory role.

But he was considerably more abrasive than his predecessors, and far more assertive of the role of the Science Adviser in government decision-making. He used to boast that he could make a better evaluation of Defense Department development projects than Defense Secretary Robert McNamara because he could pick up from PSAC and its specialized panels far sounder information than McNamara could get from the military

services or, indeed, from his own "E-Ring" Defense Director of Research and Engineering (in those days, Dr. Harold Brown). One of Jerry Wiesner's more celebrated battles was with NASA over the selection of the "lunar orbit rendezvous" technique for the Apollo lunar landings. Wiesner and PSAC wanted to pursue a more conservative approach, in which a very large spacecraft would be assembled in Earth orbit and then flown to the moon for a direct landing, followed by a direct return to the Earth. He lost that struggle and publicly remonstrated with Dr. Wernher von Braun before a group of reporters. There has always been some question as to whether Dr. Von Braun's Nazi background played some role in this spat.

Curiously, Wiesner and his PSAC seemed to play little part in the most momentous JFK decision in the scientific area -- the decision to land Americans on the moon by 1970. According to the best information I have been able to develop, the venue for that decision was the National Aeronautics and Space Council and the driving figure behind that JFK decision in May, 1961, was the Council's statutory Chairman, Vice President Lyndon B. Johnson.

Despite Kennedy's repeated requests for an understandable explanation of how a radio worked, and his great respect and admiration for people who actually understood this phenomenon, and Wiesner in particular, forces began to work in the Kennedy White House and in the scientific advisory apparatus which would pull it away from its intellectual foothold at the peak of American government and power.

One of these erosive forces was organizational in character -- JFK's appointment of McGeorge Bundy as his Special Assistant for National Security.

At the same time, the professional staff of the National Security Council expanded sharply relative to its bare-bones condition in the Eisenhower White House. While Wiesner continued to attend the NSC meetings, his direct access to Kennedy on national security matters was curtailed. But the apparatus under Wiesner continued to make important inputs on defense, notably on some of the more outlandish Pentagon white elephants, like the Dynasoar spaceplane (a predecessor of the Space Shuttle), Project Saint (a satellite interceptor spacecraft), the Manned Orbiting Laboratory (finally abandoned in 1969 after it was found that an automated version of the large espionage satellite -- now called Big Bird -- could do the job far more cheaply), and Project Westford (a scheme for orbiting millions of tiny copper wires or "dipoles" to produce an artificial "backboard" for radar and radio telescope scrutiny of the Soviat Union's activities).

A second erosive force was the wide-ranging interests and assertive character of Wiesner. This set in motion alarm and hostility in both the academic and government scientific community. Phil Abelson, the editor of the AAAS magazine Science warned: "Dr. Wiesner has accumulated and exercised more visible and invisible power than any scientist in the peacetime history of this country." Others were less moderate, blasting Wiesner for his "high-handed" and "take-charge" manner and an alleged ambition to become the "czar" of American science. One of the things which troubled the scientific community both in academe and government was the expansion of the Office of Science and Technology within the White House to support both the Presidential Science Adviser and PSAC. OST had been created by Executive Order in Eisenhower's time, but Kennedy, at Wiesner's behest, gave it a statutory blessing through the Executive Reorganization Act.

With this new status plus an inevitable expansion in size and interest (paralelling the broader interests of Wiesner himself, who pressed into new areas like the role of science in international affairs and the quality of research in such sancrosanct preserves as the National Institutes of Health) the OST came to be perceived as a threat to the overall science community in the same way that the initial proposal in 1950 for a Presidential Science Adviser had been perceived during the Truman Administration. The problem was that OST could not be at one and the same time an unbiased and impartial staff supporting the Science Adviser and PSAC as well as an operational unit advocating specific interagency programs and approaches. Its credibility got hurt in this exercise, in much the same way that National Science Foundation Director Guy Stever is hurting at the present time because he is both wearing the NSF hat and the Science Adviser hat.

A third erosive force which began in Wiesner's time, but was not to become important until later years, was a change in the character of PSAC. Under Killian and Kisty, it was essentially a monolithic, "hard science" group with a wartime background in common. But as the Science Advisory function began to range into other areas like the role of pesticides (incited by the Rachel Carson book), environmental quality, food, energy, and many other areas of concern to the "soft scientists," it was necessary that PSAC become broadened and diversified. In time it was to become a group of comparative strangers, both in a personal and a disciplinary sense. This loss of a common background, of cohesiveness, and of a fundamental commitment to national security objectives was to prove disastrous for the science advisory apparatus later on.

Just prior to the Kennedy assassination, Wiesner made known his desire to leave government and return to MIT. JFK agreed to the appointment of Donald Hornig as Wiesner's successor. Hornig was chairman of the Chemistry Department at Princeton. Like Kisty, he had been involved in the explosive lens program at Los Alamos during the Manhattan Project. LBJ could have withdrawn the nomination but he let it go through, and Hornig was confirmed in January, 1964.

The two men were simply not on the same wavelength. Hornig had no access. His attempts to communicate by memos were disastrous, partly because of their length and partly because they were too complicated for Johnson. (LBJ's staff finally had to resort to short covering memos explaining the substance of Hornig's long, rambling communications.) Hornig got blistered by Johnson for one memo he took to be critical of NASA Administrator James Webb. And because of his efforts to insulate NSF's basic research program from economies forced by the Vietnam War, he lost credibility with Johnson, the White House Staff and the Budget Bureau (now OMB, of course.) Johnson became infuriated because Hornig espoused programs which would help "draft dodgers" hide out in graduate schools, and the other elements of the White House became dubious of the science advisory apparatus because of Hornig's apparent lobbying efforts on behalf of the scientific community.

As hostility to the Vietnam war crystallized on campus and within the intellectual community, it was inevitable that relations between LBJ and Hornig's operation would deteriorate. According to one report, LBJ had one of his famous tantrums when former science adviser Kistiakowsky severed all his long-standing advisory ties with the Defense Department because of his opposition to the Vietnam War.

If he could not operate vertically in a one-on-one relationship with the President, Hornig could still try to operate horizontally, through

other staff elements of the White House. When he could get the backing of someone like Joe Califano, he could move a project or an idea. But usually these were little things which did not cost anything -- like setting up an A. D. Little research consulting organization for Pakistan or Korea. The general impression of Hornig was that while he was industrious and diligent, he was not brilliant or imaginative like Wiesner, and he fell in love with the "perqs" of office -- the limousine, the trips abroad, and the like.

Hornig soldiered for five years in this hostile climate, and it was during this period that PSAC came out with some of its most impressive long-range studies in areas like restoring environmental quality, the potential of the oceans, the world food problem, and the like. Also, OST in 1965 came out with the first truly comprehensive study of the U.S. energy situation. While these scholarly works were remarkably predictive, they did not exert great influence on policy.

With the advent of Dick Nixon in the White House, the new science adviser became Lee DuBridge, yet another of the wartime coterie of hard scientists. Like Wiesner with Kennedy, DuBridge enjoyed a fairly close personal relationship with Nixon. But he swiftly came to grief when he relied on this relationship and made end-runs around OMB and other staff power centers in the White House. There were also a number of unfortunate incidents which got DuBridge and PSAC crosswise with the new President and the White House ingroup. One was the appointment of Dr. Franklin Long to head NSF -- a nomination the President extended on DuBridge's recommendation, withdrew on the objection of the political staff, and then re-extended -- only to have Long refuse the appointment. Another was the PSAC panel on the supersonic transport, which rejected the SST on both environmental and economic grounds at a

time when Nixon was going like gangbusters for an American SST program. A third incident was the appearance of two former Presidential Science Advisers (Kistiakowsky and Wiesner, I believe) to testify in open Congressional hearings against the anti-ballistic missile program in 1969. While the President got his way with the ABM, he lost the SST on a close Senate vote in 1971, and the PSAC role in this struggle proved most damaging to the science advisory institution.

DuBridge was replaced by Dr. Ed David in 1970. David. Unlike all of his predecessors in the post, David was a young man without wartime background. He came from the Bell Telephone Laboratories. The scientific community was always dubious about the fact that he was accepted for membership in the National Academy of Engineering before the National Academy of Sciences. Though he was a cool, realistic type, with a more "practical" background than his predecessors, and quite willing to tell the scientific community that the palmy days of a regular annual 15% hike in R&D appropriations was a thing of the past, and although he soldiered loyally for dogs like the SST, the damage had been done and there was no way to reverse the downhill course of the advisory apparatus.

In the fall of 1971, the White House cranked up an abortive effort called New Technological Opportunities under the leadership of Bill McGruder, the man who had been running the ill-fated SST project. The goal of this program was to shift the scientific and engineering emphasis of the government to projects of more immediate benefit to the citizens, things which would show a visible and prompt return for tax dollars. Though OST and David worked like Trojans to find gimmicky and appealing ideas in support of McGruder's NTO program, the result

was disappointing. It seemed that the only thing the advisory apparatus could generate were proposals to spend more money on existing projects, and this solidified its reputation as "input" rather than "output" oriented, to use the jargon of the Nixon White House.

Creation of the NTO was the hand-writing on the wall for the advisory apparatus. In the fall of 1972, following his re-election, Nixon decided to junk the whole business. By Executive Order and by proposals under the Executive Reorganization Act he wiped out the Science Adviser post, PSAC, and OST. And for good measure he knocked off the Office of Emergency Planning (the descendant of the Korean War ODM) and the National Aeronautics and Space Council (created in the same 1958 statute that set up NASA).

I think all this tells us that the Presidential scientific apparatus was a splendid tool in the early days, when it visibly met a need in an area of government which the public feared was weak and inadequate. The early apparatus was an important political plus for Eisenhower. Not only was there a convergence of views sympathetic and supportive of the President's goals, but there was a tight focus of concern and interest which made the effort administratively manageable and acceptable within the government as a whole.

But in time the weaknesses which had required the mobilization of the scientists were (corrected ⊙) New institutions appeared to deal with specific problems, like the Council on Environmental Quality and the National Council on Marine Resources and Engineering Development, and old institutions like the National Security Council and the OMB were strengthened in areas where they were previously weak. As the scientific advisory apparatus shifted its gaze to other long-range

problems outside the national security area, like food and energy, its work became diffuse and of less apparent urgency to a President and a White House staff struggling with daily problems. Proposals to prevent ills which had not yet materialized invariably lost out to the greater demand for remedial programs to deal with troubles already at hand.

But the greatest difficulty for the scientific apparatus in the later years was the politicization of the scientific community during the Vietnam War and its willingness to speak out on other issues like the ABM and SST in a manner calculated to drive a President up the wall. Since the science advisory mechanism was so thoroughly identified with the entire scientific community in eyes of both LBJ and RMN, it was inevitable that this mechanism would come to be seen as a whole problem area in itself rather than -- as was the case in the early days -- a brilliant White House invention to help the President handle some of his own problems.

-v-v-

THE WHITE HOUSE

WASHINGTON

March 19, 1975

JMC:

This has been acknowledged in letter to Diamond 3/19/75.

You may want to add with other science info.

p.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF POLITICAL SCIENCE

CAMBRIDGE, MASSACHUSETTS 02139

March 13, 1975

Dear Jim,

Among the best pieces written on science advice for the President is the enclosed. Both Skolnikoff and Brooks are up here in Cambridge and you might have your reporter--when you name one--talk to them.

Cordially,

Edwin Diamond
Lecturer

ED/mmc
Enclosure

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SCIENCE

Science Advice in the White House? Continuation of a Debate

Eugene B. Skolnikoff and Harvey Brooks

Science Advice in the White House? Continuation of a Debate

Eugene B. Skolnikoff and Harvey Brooks

A new debate over the purpose and structure of a science advisory apparatus in the White House is now well under way, spurred by the apparent interest of President Ford in some kind of structural change. An important article by G. B. Kistiakowsky in *Science* in April 1974, the report by a select committee of the National Academy of Sciences (NAS) chaired by James R. Killian, the recent hearings of the House Committee on Science and Astronautics, S. 32 sponsored by Senator Kennedy (D–Mass.) and passed by the Senate, and assorted items in the pages of this and other journals have contributed to the debate (*1*). So far, the consensus seems to favor creation of a modified Office of Science and Technology—a three-member Council for Science and Technology patterned after the Council of Economic Advisers and the Council on Environmental Quality. The existing arrangement in which the director of the National Science Foundation (NSF) also serves as science adviser to the President is given short shrift, as are other possibilities.

We agree with the proposal for a three-member Council for Science and Technology (CST); but we believe the detailed structure is much less important than the nature of the tasks to be performed and the arguments that justify such a council in the first place. The case for the CST has not been made adequately, in our view, by any of the contributors to the debate, although the Kistiakowsky article comes closest. The NAS study, the most widely quoted, fails to deal with the politics behind the issue or to examine the real and critically important lessons of the rise and fall of the President's Science Advisory Committee (PSAC) and the Office of Science and Technology (OST). It is essential that we be clearer about the possibilities and limitations of a science office at the White House level if a successful and stable office is to be achieved.

For analytical purposes it is useful to divide the functions that must be performed into (i) the science advisory function for the President, and (ii) the science policy function for the Executive branch. Although they overlap, there is a difference between an intimate advisory role for the President, and a broader science and technology "management" or policy role for the government as a whole. The first involves a close personal association with the President in a White House staff relationship, bringing to his attention scientific and technological aspects of policy issues under consideration, and representing him in dealings with other parts of the government. The second implies all the problems of allocation of resources for science and technology, reconciliation and integration of multiagency programs, evaluation of the quality of agency R & D programs, early warning of technology-related problems, and concern for the health of the R & D community, for science education, and for other policy issues directly related to or bearing on science and technology.

In practice a sharp demarcation between these two functions is not possible; there is a difference of emphasis only. The PSAC and later the OST clearly felt responsible for both. Yet one of the two could be represented at the White House level without the other, depending on a given President's preferences. In fact, we would argue that it was the statutory identification of, and, indeed, confusion between the two functions, and OST's persistence in attempting to fill both simultaneously when the advisory function was withering on the vine, that contributed to the ultimate demise of the office. The science policy function, if justifiable at the presidential level, can give an institution permanence; the advisory function will always depend on the variations of presidential style and politics.

Dr. Skolnikoff is a professor of political science and director of the Center for International Studies, Massachusetts Institute of Technology, Cambridge 02139. He served on the staff of the science adviser to the President from 1958 to 1963. Dr. Brooks is dean, School of Engineering and Applied Physics, Harvard University, Cambridge, Massachusetts 02138. He was a member of the President's Science Advisory Committee from 1959 to 1969.

Science Advisory Function for the President

There is presumably no reason to debate at this time the need for scientific and technological advice at the presidential level. The significance of the various technology-rich security, energy, environmental, and other issues that a president personally must face are obvious. Equally evident is his difficulty in obtaining technical judgments that he can grasp and then interpret in relation to the political and other considerations which he must also weigh in these issues.

But agreeing that there is such a need does not determine how that need should be met. This science advisory function could be performed within the National Security Council (NSC) and domestic council structures or as part of Office of Management and Budget (OMB), through a single person with a small staff in the White House, or through a CST. Whatever mechanism is established, it will have to take into account that every President has his own working style and pattern of White House relationships, and that these cannot be determined by others. The primary political lesson from the OST experience is that it is not possible to legislate an intimate advisory function for the President. In fact, institutions at that level with political power independent of the President almost certainly will be ignored and probably will be destroyed.

Ultimately the President's test of a successful science advisory apparatus is whether it helps him politically while still preserving its own intellectual integrity and unique perspective. It can help him by suggesting new policy or program initiatives for which he can take personal credit or by being foresighted about science and technology issues that are likely to cause controversy. The science adviser can keep the President from allowing problems to fester until they can be used by critics and from putting the President's political prestige behind projects and policies that are likely to fail eventually because they are unsound scientifically. In many cases the science adviser can retain credibility not by directly opposing presidential views on policy grounds, but rather by clearly and forcefully warning the President of the political consequences before and not after he embarks on certain courses. Or, the adviser can help provide a scientific evaluation and justification for initiatives a President might desire to take on political grounds, or make sure after the fact that the implementation of such initiatives is technically sound and not undermined by the biases of the departments and agencies. The PSAC played that role with respect to the early bilateral science agreements with Japan and the Soviet Union and many aspects of the space program, and it could, if it still existed, be continuing that role in relation to Project Independence and to the growing number of bilateral agreements for science cooperation.

The most difficult problem is in the national security area. Here the President's need for scientific and technological advice independent of the Defense Department and other security-related agencies is crucial. In fact, the primary contributions of PSAC were not only in advice to the President, but often in direct relations with the Pentagon. But the special assistants for National Security Affairs since 1960 were never fully comfortable with a role for PSAC in this area and increasingly tended to reduce PSAC influence. Over time, PSAC's influence in the security area was far less than it was in the late 1950's and early 1960's, and far less than was in fact needed.

There may, however, be alternatives. If there is no science advisory office close to the President, another possibility for security issues could be the creation of a science advisory staff within NSC, although such a staff would be hard to establish with adequate size and continuity. However, if there were a science advisory office, joint staff assignments between NSC and the science office, as developed between OST and NSC for a time, could be a valuable coupling. One way or the other, a science advisory function in the security area for the President is critical.

In sum, for the presidential advisory function we believe that some mechanism is essential but that it must be established anew by each President. It can take many different forms; but if a stable, politically savvy, high-quality staff in the Executive Office of the President was already performing the science policy function, and, therefore, was ready at hand, it could be the likely candidate for a personal advisory role. But such a staff must have a continuing reliable foundation if it is to be "ready at hand" for each President, and it must be competent to carry out both functions, recognizing that they can compete as well as be mutually supportive.

Science Policy Function for the Executive Branch

One component of the role for which PSAC and later OST were created was to oversee a burgeoning federal responsibility for science and technology. The situation today is not basically different from what it was in the late 1950's and early 1960's as far as R & D is concerned. The federal budget for R & D is larger, though not in relation to the gross national product. R & D allocations continue to be made annually at department levels based on the missions of those departments. Scientific and technological competence is much more widespread throughout government, but science and technology are also more intimate parts of all policy issues than ever before.

However, there are some other changes as well. In contrast to defense and space programs, technical programs in support of the solution of social problems tend to conform much less easily to the functional organization of the Legislative and Executive branches. Whereas high technology programs in defense and space are largely concerned with means to serve agreed goals, technical programs to solve social problems more often are concerned with alternative goals as well as means to achieve goals. These programs characteristically cut across agency objectives and capabilities in ways that make overall planning both more essential and more difficult. The fact that political, economic, and other nontechnical or semitechnical considerations are much more prominent in the key decisions regarding future directions in such policy areas as energy, transporta-

tion, environmental planning, health care delivery, and food supply, adds to the need and difficulty of overall planning.

As the pace of both social change and expectations accelerate, planning for future needs, assuring timely investments in specific technologies, and avoiding premature commitment to the wrong large-scale systems loom as much greater imperatives than even 15 years ago. An early warning capability to foresee problems requiring R & D investment well before the problems require crisis treatment thus takes on immensely important proportions.

The growing complexity and resulting inertia of government make it increasingly critical that policies once decided have adequate oversight and are then followed through. For all the well-understood reasons, the political forces at work in multiagency issues, aided and abetted by the pattern of organization and influence of Congress, tend to dilute or divert changes of policy direction unless continuous oversight is maintained.

The slow but hopefully real signs of change in the Congress, where there is a developing capability to examine scientifically and technologically related issues on a broader base than in the existing committee structure, calls, in turn, for a matching capability in the Executive branch. The Office of Technology Assessment and the new congressional budget office could become powerful factors in challenging Executive branch policies or the lack of them. Or, the argument can equally be turned the other way: A strong science policy focus in the Executive branch would contribute significantly toward bringing forth a competent congressional response, thus strengthening the Congress' capabilities in science and technology, and in turn assuring a more intelligent and relevant public debate on such issues.

Perhaps there is no area of government activity where the conflict between immediate needs and long-range capabilities for problem-solving is more evident than in the application of science and technology to immediate needs. The growing pressure for visible, measurable, usually short-term payoffs of research at the expense of long-range research, while not confined to one Administration, may, in fact, require continuous vigilance and political mobilization on the part of leaders of the scientific community if long-term injury to the national scientific potential is to be avoided.

But even for this function, it is not self-evident that a new office is needed. At least some of the needs mentioned above, in particular those involving budgetary and related allocation questions, could fall quite naturally within the purview of the OMB. Others, such as "early warning," do not necessarily have to be carried out above the level of the departments and agencies. In fact, some needs, such as concern for the health of the scientific and technology community, may require advocacy roles that conflict with other functions in which a more disinterested approach is necessary.

A strong argument, moreover, could be made for an effort to build the right kind of scientific and technological competence within the OMB and the Domestic Council and to strengthen the NSF Science and Technology Policy Office to perform long-range analyses. Such a solution would avoid creating a new Executive Office agency and would more importantly bypass some of the inevitable problems of an office at the White House level having both management and advocacy roles.

On balance, however, we believe the case is stronger for re-creating an instrument in the Executive Office of the President with science policy functions as we have outlined them.

1) Over many years OMB has never shown a willingness or ability to build the kind of staff able to oversee with substantial technical insight the science and technology activities of the government. This is particularly evident with regard to defense programs, on which OMB has had little influence overall. Even if OMB attempted to build an adequate in-house technology competence, such an office would likely be so tied to the annual budget cycle and so sensitive to pressures to limit expenditures that it would be difficult to carry out those functions requiring a different time perspective. In addition, multi-agency program initiation and oversight, usually involving other issues beyond budgetary matters, would be exceedingly difficult to carry out reasonably from an office with predominantly budgetary concerns.

2) Whatever value the science policy office in NSF can have, and that can be substantial, it simply cannot be expected to perform politically difficult management functions that involve influencing or controlling programs of large rival departments. If nothing else, the key to flushing out problems and evaluating progress and potential is access to detailed, accurate information from the working level. As difficult as it is for a White House office to get accurate information when agencies do not want to give it, it would be impossible for NSF, which must work largely through approved channels.

3) The foreign policy role that is needed, discussed below, cannot be carried out at all adequately from either OMB or NSF.

4) A strong focal point in Congress requires a strong focal point in the Executive Office where all the threads can be gathered together.

5) Our last argument for a strong science policy office is simply our hope that such an office would in fact also be used as a close presidential adviser. It cannot be used, however, if it does not exist.

Thus, we believe an Executive Office mechanism for science policy is the best solution, although there are important problems that must be faced. The precise structure is not as important as its mandate, though we believe a three-man office or council makes sense as a way of dividing what will quickly become difficult burdens. It should be a council serving at the pleasure of the President, to insure his acceptance of it as part of his Administration, though the staff might well be a continuing one.

To make it possible for such a council to serve in a presidential advisory role, the science policy function must be distinguished from operational responsibility for specific interagency programs. The OST got into difficulties when its operational responsibilities conflicted with its advisory responsibilities and it found itself in the position of being both the promoter and critic of particular scientific programs in such areas as atmospheric sciences, oceanography, and water resources. Even with the most conscientious efforts to be objective, it was seen by operating agencies with different priorities, and by congressional committees, as having a particular program axe to grind; and this tended to erode its credibility as a disinterested advisory body even in areas where no such conflict of interest existed.

The initiative of the Executive Office will sometimes be needed to get important new programs off the ground, but any such initiative should be undertaken with the clear understanding that operational responsibility would be transferred as soon as possible to existing agencies or new interagency mechanisms separate from the Executive Office. The role of PSAC in the creation of the National Aeronautics and Space Administration (NASA) out of the old National Advisory Committee on Aeronautics (NACA) is the kind of proper transitional responsibility we have in mind. Except temporarily, an Executive Office agency should not be placed in the position of having to promote a new technical program while at the same time being expected to balance it in an objective way against existing programs within agencies.

Objectivity of Scientists and Engineers

The very intimate relation of scientific and technological factors with broader aspects of policy issues means that scientific and technological inputs alone are far from enough if a council is to do its job adequately, a point that the NAS study mentions but does not demonstrate that it fully appreciates. In fact, the NAS study points out how large is the group of qualified scientists and engineers who can "provide counsel with respect to major societal matters that entail a strong scientific and technological component." However, the study indicates only that they should have broad experience in administrative and political tasks within their professions and personal qualities of "intelligence, wisdom, judgment, humanity and perspective." These qualities are so obviously desirable for anybody in a high position that they are hardly helpful criteria for the selection of scientists.

The qualities required have to do more with the ability to understand the political and economic setting sufficiently so that the scientific and technological factors may be seen as intimate interacting parts. In other words, the individuals should be able to translate policy concerns into questions about relevant science and technology; should be able to relate scientific and technological uncertainties to political choices; should understand the impact of policy objectives on technological development; and should be able and willing to enter the political and institutional competition inherent in the making of policy. But all these abilities require a sophistication in the nontechnical aspects of policy issues, as well as in the scientific and technological components. These are not widespread talents, nor are they easily acquired. The subset of qualified individuals is not defined by the number of scientists and engineers in management posts in their professions, as the NAS report states. Nor, we might add, is the subset made up only of scientists and engineers. The need for such abilities is demonstrated by the PSAC and OST studies outside the national security area, studies that were both prescient and ineffective.

For almost every crisis problem of the 1970's there is a PSAC or OST report which foresaw the problem and recommended a research program to do something about it. But in almost every case OST failed to get the attention of top policy-makers sufficiently to raise the issue to the necessary level of political visibility to generate concern and action. Authoritative, scholarly reports were produced, but little else. And the subject tended to die after a little flurry of attention.

Why? Basic researchers and academic scientists have a professional bias which assumes that if only the facts and understanding are made available, society will automatically appreciate their implications and act accordingly. The PSAC has by-and-large represented this orientation, and most of its reports failed to translate their analyses sufficiently for politicians to understand their significance in their own terms. The energy report did not say how the energy supply situation might reflect on the American economy and our foreign policy goals. The food report did not demonstrate that the world food problem might produce tangible political and economic effects that could embarrass an administration. The civilian technology report did not explain adequately how a lag in the development of civilian technology might ultimately contribute toward undermining the U.S. international trade position and consequently the position of the dollar as a reserve currency. These failures were not merely failures of political skill and salesmanship; they represented deficiencies in analysis of the problems involved, because the understanding of political and economic implications was considered to be outside PSAC competence, in the province of the politicians. There remained a deep intellectual gulf between the scientific analysis and the policy pressures and options faced, or soon to be faced, by decision-makers. This was a real intellectual gulf, not just political naiveté.

Of course, a difficult dilemma is faced here. The more the political implications of scientific advice are explicitly dealt with, the more it is necessary to depart from the domain of "objective" and "value free" analysis, which has helped to make scientific advice acceptable to politicians and the public in the first place. But there is a fair amount of mythology on this question of objectivity and value-free analysis on the part of scientists and engineers that needs to be straightened out.

There is no question that in their professional capacities scientists and engineers must live by an ethic of objectivity. Whatever their intent, however, scientists and engineers are subject, on policy issues, to biases and prejudices just as are others. The issues on which advice is sought at the higher levels of government are almost always ones in which technical uncertainty is high, important evidence is lacking, and associated nontechnical issues are contentious and critical. Judgment on both technical and nontechnical issues and on their interaction is thus required; a logically reasoned single answer is not possible. Judgment is necessarily affected by biases, policy preferences, ignorance, differing estimates of the nontechnical factors, and other vagaries. There is nothing wrong with this; it is unavoidable.

But it must be recognized, contrary to the impression left by the NAS report, that a council of scientists cannot provide purely "objective" analyses. What such a council will do is give another view, a different and fresh perspective; and, on issues not involving its own institutional loyalties, it may in fact be a more disinterested view than that of the agencies of government whose bureaucratic interests are more directly involved. But its objectivity is only relative, and very much affected by the nature and implications of the particular question that is being considered.

On the other hand, we must be careful here not to imply a simple politicization of the science advisory function. There is a difference between purely political advice and the kind of analysis performed with a clear attempt to attain as much objectivity as possible. In scientific and technological matters this is often easier than in other fields because at least some part of every prob-

lem is factual and verifiable. Moreover, scientists and engineers often carry influence to the extent that they are seen to be objective and outside the normal policy battles. These are valuable attributes that deserve to be preserved and utilized, for increasingly society requires institutions that are seen to be in some sense disinterested and able to be relied upon for independent judgments.

Our point is that this is a matter of degree, and that it should not be assumed that the advice of scientists and engineers on policy questions is totally disinterested. Nor should it be accepted that science advice can be no more "objective" than any other personal or political input. There is a value to striving for objectivity; we just must recognize that it has its limitations, and that the greater the range of uncertainty in the technical answers, the wider the door for entry of differing policy perspectives.

The NAS committee itself demonstrates this problem. Its conclusions were surely influenced by the fact that a large majority of the committee members and its executive assistant had been heavily involved in PSAC in the past, yet this fact is never mentioned. It is also curious that the role of science and technology in society is referred to almost exclusively in positive terms. The widespread public concerns over the negative effects of technology are only hinted at, and never addressed directly.

On the other side of the same coin, it must be recognized that a CST will be assumed by others to be an advocate, whether intended or not. Moreover, it must and should be concerned with the health of science, which necessarily involves some advocacy. There is no avoiding this conflict between advocacy and objectivity; it can, in fact, be dealt with in practice, but it must be recognized if there is to be any chance of dealing with it.

The foregoing discussion suggests that advice about science and technology must somehow be better integrated into political and social thinking about the future of the country. There is a need for "interpreters" who think more like politicians and policy-makers, but are still not bound by the exigencies of short-term political considerations. The need is for people who can talk to both the scientists and the politicians continuously, but not feel themselves fully identified with either.

In the light of this discussion, the makeup of the three-man council is particularly difficult to define. Certainly, all or most of the members should have the confidence of the scientific and technological communities in the sense that they will insure the highest professional standards. But, the council members must not be simply representatives of the communities; their scientific credentials are a necessary but not sufficient condition for effectiveness in the advisory function. Perhaps one way to proceed would be for the President to seek lists of candidates from recognized bodies in the scientific and engineering communities, such as the NAS and the National Academy of Engineering (NAE), from among which he would hope to choose. He should not be bound by such nominations, but they would set a standard to help avoid the danger of appointing those whose views are regarded as extreme or eccentric among scientists and engineers, or those who are politically active but of low scientific quality of judgment.

It is also entirely reasonable that one or more members of the council not be scientists. Rather, they could come from a growing group who are sensitive to scientific and technological issues and have the experience and ability to relate these to the political environment and to political choices. Presumably, many on the staff of the council would also have these characteristics.

Public Access

One of the more difficult questions, much less pertinent in the early days of PSAC and OST than today, is the degree to which a science office at the White House level should be accessible to public scrutiny of its meetings and reports. In part, this is a matter of law as a result of the Federal Advisory Committee Act and the Freedom of Information Acts as well as the precedents set by the turmoil of Watergate. In part, too, it is a matter of policy as a result of the need for an electorate better informed on the implications and opportunities of science and technology.

Our judgment on this issue follows the distinction made between a science policy function for the Executive branch and the science advisory function for the President. The science policy function can more readily be and is now required to be a relatively open process with some public access to committee meetings, published reports, and the like. Without destroying the office's effectiveness and access to information it should not be too difficult to devise a pattern allowing considerable openness on some issues, or on some parts of the process.

This openness would also be particularly helpful in making it possible to obtain more inputs from nongovernmental sources, including more of the scientific "grass roots."

With the detached air of those not bearing the responsibility, we also heartily endorse the proposal often made that a science policy office should be required to issue an annual report on some aspects of the state of science and technology in the United States. That could be a powerful educational and policy tool, useful for the Congress and the public, as well as a vehicle for forming Administration science policy.

The presidential advisory function, however, cannot be open to any appreciable extent. Aside from problems of classified material, a president requires confidentiality of his advisers on substantive policy issues. When policy is being formulated, the President should consider the widest possible variety of options. Early disclosure can alert powerful lobbies to seek to block consideration of options adverse to their perceived interests. Premature publicity regarding options subsequently rejected can embarrass the President and ensure that he will not consult his advisers until his own mind is fairly well made up. The last thing that endears advisers to a President is their adding to his political problems rather than helping to solve them.

This dichotomy does serve to create a possible barrier to a President's willingness to use as his personal staff advisers a council whose members operate with some public access to their deliberations. The problem should be manageable, however, with some clear rules of procedure. As with so many problems, this one can probably be dealt with effectively if it is recognized from the outset.

Relations with the Scientific Community

The relations between a CST and the scientific and engineering community in the country are important and not at all likely to be simple. The question is whether it is or seems to be representative of scientific and technological interests or whether it is in some sense independent and objective. As we have already said, the problem of objectivity and advocacy is unavoidable, but it must be acknowledged and plans should be made to avoid its pitfalls. With regard to relations with the community at large, a CST would have to go to considerable lengths and exercise unusual discipline to avoid responding directly to lobbying by scientists and their professional organizations. The NSF can much more appropriately perform that lobbying role, and with the existence of a council it would have an understanding ear at court.

Even in its relations with NSF, a CST should not simply treat NSF's proposals and budgets more sympathetically than others, but as critically as it treats other agencies. A council's influence with other White House bodies is likely to erode, as did OST's, if it is perceived, even unjustly, to be insufficiently critical with its "own" constituency.

The reorganized NAS and NAE and the Institute of Medicine (IOM) present a special situation. Their large and strong capability both for mobilizing scientific competence from outside the government for analysis of many public issues or for evaluating the state-of-the-art in fields of science and technology is too valuable not to be used heavily by a CST. But the work inevitably carries the tag of coming from the heart of the science "establishment" and does in fact tend to reflect the implicit biases of this group of scientists and engineers.

The CST's job, then, would be to use NAS, NAE, and IOM, but to recognize that inputs from those organizations are only one of those it must have. In any case, as we discussed earlier, the CST must be so acutely aware of the need to present its findings in terms useful to its immediate clients that it should never be in a position of uncritically adopting outside reports as its own.

International Dimension

When it comes to attempting to define the role of a White House science office in the nonmilitary aspects of U.S. foreign policy, and particularly with the Department of State, most observers are reduced to vague handwaving. The reasons are not hard to find.

The Department of State itself has never been able to build the level of internal science capability to which it has repeatedly committed itself. Its present science office is the strongest it has ever had, but we believe that even the last director, Herman Pollack, would agree that it needs substantial changes. With weak internal competence in State in the past, it was difficult for PSAC to relate effectively and usefully to the department.

A more fundamental reason for weakness in the Department of State is the fact that many of the foreign policy issues with important technological aspects—now covering an increasingly wider portion of foreign affairs—are issues in which other agencies of government have a large and often commanding voice. Space, atomic energy, food, environment, oceans, to say nothing of defense, are all subjects in which the technical agencies of government have money, large staffs, and dominant control of complex esoteric information. The Department of State has neither money nor large staffs in these areas nor great competence in the individual technologies. And yet it is expected to cover all issues while each of the other agencies can focus on its area of primary concern.

The situation is ripe for change. A new office, headed by an Assistant Secretary of State, has been created to be responsible for scientific, ocean, and environmental affairs. Dixy Lee Ray, recently head of the Atomic Energy Commission (AEC) has been named as the first incumbent. The office will have greater prestige within the department, and perhaps more personnel. A new advisory committee on Science and Foreign Affairs had earlier been established to help the Secretary of State; it now could be in a position to assist the new Assistant Secretary to tap outside expertise in order to avoid complete dependence on the technical agencies.

Thus, one possible answer with regard to CST's role in foreign policy is to wait until State is itself stronger so that there can be more effective interaction. But there are other factors that must be taken into consideration.

When one looks at the entire federal R & D budget, a curious fact emerges. A substantial portion of that budget, well more than half, is committed to missions which have strong foreign policy motivations and repercussions: primarily the Department of Defense, some of the AEC, and some of NASA. A good portion of the rest goes for work in subjects that will affect foreign policy quite directly: agriculture, energy, oceanography, foreign trade, and population to mention just a few.

However, given this strong foreign policy motivation for federal R & D, the Department of State, the one department of government most concerned with foreign policy below the President, has essentially no voice in the allocation of those R & D resources. Instead, other departments and agencies rely on their own interpretation of what serves foreign policy goals in setting their R & D objectives. The President and Executive Office agencies (NSC and OMB) oversee the process, but only in the most general terms. The Department of State merely has to cope with the consequences.

Perhaps the Department of State never can do much to become a real participant in R & D allocations, although we believe the attempt has never seriously been made. If it were undertaken, a CST at the White House level could be a powerful, even an essential ally.

Quite apart from what the Department of State does, however, it seems clear that a CST in its science policy role must attempt to fill this important gap. It must make a concerted, self-conscious effort, more than PSAC ever attempted, to keep foreign policy concerns constantly before it in all the subjects with which it deals. This will have implications for membership, for staffing, and for the agenda; but it is an important requirement not now being carried out adequately anywhere in government. There is no other candidate agency within the Executive Office of the President, and even if State were better able to participate, it would need help.

Last, it is well to point out that bilateral science and technology agreements are becoming a more frequently used tool of presidential diplomacy. While it would be a mistake for a White House science policy office to have operating responsibility for those agreements, there certainly needs to be a capability for overseeing the agreements and their execution at a level above that of the departments. The NSF director, in his capacity as presidential science adviser, is performing that function now; but operational responsibilities are scattered among sev-

eral departments and agencies, and in practice there is relatively little policy coordination. The overview of OST is now sorely missed by those most heavily involved in carrying out the agreements.

Other Issues

Many other issues deserve detailed attention, but these cannot be covered in a brief article. Let us mention just three: (i) How should the social sciences be represented, if at all? We believe it is essential that the social sciences be included in the science policy mandate of CST, although the means for doing so merit more discussion. (The NAS report does not mention the social sciences at all.) (ii) How is experience in other countries in their science policy structure relevant and useful for the United States? For example, is there merit in adopting the French practice of allocating a specific budget to the science policy office to be used for seeding new research areas or reorienting old ones? How has that actually worked in practice? To what extent is it applicable in the U.S. context? (iii) What of the recurring proposal for a cabinet-level Department of Science and Technology? We have not discussed this alternative in part because it does not seem to us to be either viable or desirable, but in any case because a new cabinet department would not solve the problem of Presidential advice or Executive Office oversight. If such a department were created, it certainly would be a powerful force in scientific and technological affairs, but the broader technology-related policy issues and the need for integration of programs across departments and agencies would remain. The actors would be different, but the essential factors similar.

Summary

Thus, we are skeptical of the commonly stated arguments for re-creation of a science office at the White House, but are ultimately convinced that such an office is justified. A three-man CST is a reasonable proposal, although the detailed structure is less critical than the mandate given to the office, and the general understanding within government of its functions and limitations and of its relationship to the President.

To give it permanence, the office should be grounded in a science policy management and oversight function that is critically needed today. That kind of strong office could lead a president to use it as his personal science advisory staff, but the decision must be made anew by each president. The President does have other ways of obtaining scientific advice, although the right kind of science office would be a preferable route in our view.

The importance of such an office being able to present its analyses and recommendations in policy terms useful to other policy-makers cannot be overestimated. This has important implications for the kind of competence required to staff and work with such a council; it also requires recognition of the fact that policy-relevant studies and advice can never be value-free, even when carried out by scientists and engineers.

And finally, such a council could bring intensive and continuous attention to the international dimension of U.S. science policy, which seems to us to be particularly neglected.

It is not yet clear whether there will be any structural changes in the new Administration. But it is not too soon to be clearer about the essential factors that should underlie a sensible proposal for this or the next Administration.

References

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JAMES R. KILLIAN, JR.

77 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS 02139

March 20, 1975

The Honorable Nelson A. Rockefeller
Vice President of the United States
The White House
Washington, D. C.

My dear Mr. Vice President:

In response to your request, I have prepared the attached list of some of the contributions to Presidential policy-making in the Eisenhower administration made by the Special Assistant for Science and Technology and the President's Science Advisory Committee. At the beginning of this list, I have summarized the longer statement which follows. In listing these contributions made during the period when I was a participant, may I express some personal views bearing on the study you are making of proposed science advisory arrangements.

I fully recognize that present circumstances differ from those of the Eisenhower years both in the organization of the Presidential staff machinery and in the diversity and complexity of the issues faced by the President.

President Eisenhower looked to his science advisory mechanism for assistance in the national defense area and for supporting the work of the National Security Council. I am aware that the National Security Council now has staff competence and consultant panels which are providing a technological dimension to the examination of national security issues. These did not exist in the Eisenhower period. This arrangement appears to be working

effectively and to have the confidence of the Special Assistant for National Security Affairs. I personally do not recommend that these arrangements be supplanted by a new science and technology advisory mechanism but I do feel that the proposals for the new mechanism are no less essential because these NSC panels exist. The existing NSC arrangements have a national security policy focus on a very limited number of problems, and I am convinced that there are important issues involved in assuring a healthy scientific and technological foundation for military research and development, and the proposals of the National Academy Committee are directed toward providing this foundation.

I am also convinced that the scientific and technical feasibility and soundness of major weapons systems developments evaluated by objective panels of the proposed advisory mechanism could serve the needs of the President and the Office of Management and Budget as well as the National Security Council as the NSC might request. In my view it would be a mistake to exclude the Science Adviser from the national security area and from the deliberations and studies of the National Security Council because of the inseparability of policy and program considerations and the special perspective and judgments that a science advisory group could contribute to Presidential-level discussion of national security issues.

In the Domestic Council area there is, of course, much greater emphasis on problems in the civilian sector, where developments in science and technology in many instances offer the best hope of long-term solutions. The existence of the Domestic Council means that there is a focus for scientific and technological assessments of domestic problems and an opportunity to couple scientific and technological considerations with economic, sociological, institutional, and political factors, all of which must

be brought to bear in developing options for Presidential consideration. The effectiveness of the Special Assistant for Science and Technology in the national security area in past years was in no small measure attributable to the existence of the National Security Council as a mechanism for assuring serious consideration of scientific studies.

In the latter days of the Special Assistants and the President's Science Advisory Committee many of the excellent, farseeing studies which were made by the advisory setup were not systematically considered and followed up because there was no mechanism such as the Domestic Council and its staff to receive and assess them. During the Kennedy, Johnson, and Nixon administrations there were numerous important studies made by PSAC and its panels which dealt with environmental matters, energy policy, and the world food problem which could have been of great value to the administration in the formulation of policy and the taking of initiative in areas that later came to be of great national concern. There was a national loss in the fact that these farseeing studies did not receive the necessary follow-through attention.

In making these observations, I am mindful of the arguments that by strengthening the scientific and technical capabilities of the National Security Council, the Domestic Council, and the Office of Management and Budget, there may be less need for a separate White House level science and technology mechanism and that a separate mechanism might have difficulty in relating its scientific and technological analyses to the issues as they are perceived by those staff agencies. These arguments were carefully examined by the National Academy of Sciences Committee on Science and Technology, which I chaired. The membership

of that Committee included a former Assistant Director of the Office of Management and Budget and a former member of the Council of Economic Advisers, both of whom were experienced in the operations of the White House staff. It was the strongly held view of the Committee that the scientific and technical capabilities of the National Security Council, Domestic Council, and OMB should be strengthened and by so doing there would be a more effective interaction achieved and a two-way coupling between those offices and a new science and technology mechanism. The new mechanism proposed can look at the totality of the nation's scientific and technical resources in relation to national needs and by having this broader view, can help to offset a fragmented approach occasioned by the differing missions of the executive agencies, both at operating and Presidential staff levels.

The reasons supporting the establishment of a new science and technology mechanism have been intensively treated in the National Academy and other excellent reports and articles in the past year. My interest in making the foregoing observations is to emphasize a few points arising out of the discussions which were prompted by the Academy report.

I am in full accord with the comments made by President Handler of the National Academy of Sciences when he wrote you recently emphasizing that the mission of the new science and technology advisory mechanism which has been proposed should be to serve the needs of the President. "It should," as he wrote, "not be a privileged means to represent special interests of the scientific and technological communities. Nor should it be a privileged advocate

for science and technology per se. To be useful, its analyses must recognize the essential interdependence of science, technology and fiscal, economic, social, political, and institutional factors in developing policy alternatives."

I am grateful for this opportunity to provide supplemental information and to recall the many ways in which the scientific mechanism established by President Eisenhower served him and successive Presidents and assisted greatly in the formulation of sound national policies.

Yours respectfully,

J. R. Killian, Jr.

JRK:cp
enclosure

THE WHITE HOUSE

WASHINGTON

March 20, 1975

JMC:

Art Quern prepared the attached for you today.

p.

THE WHITE HOUSE

WASHINGTON

DRAFT

March 20, 1975

MEMORANDUM FOR THE PRESIDENT

FROM: JIM CANNON

SUBJECT: Contributions of Science Advisors to Previous Presidents

The following is a brief outline of some of the accomplishments of science advisors to previous Presidents and some of the problems caused by their existence on the White House staff:

EISENHOWER ADMINISTRATION

James Killian of MIT became science advisor to President Eisenhower in 1957 and was later succeeded by George Kitiakowski, a Harvard chemist. This was probably the most effective and influential period for science advisors.

ACCOMPLISHMENTS:

1. Following SPUTNIK, helped assure the U. S. public that the country's missile and space program was in good hands and moving ahead.

2. Prompted creation of National Aeronautics and Space Administration.

3. Laid the groundwork for the limited underground nuclear test proposal which eventually became the 1963 Nuclear Test Ban Treaty.

4. Major impact on ICBM program including emphasis on solid fuel rockets.

5. Helped expand and direct scientific education and research.

PROBLEMS:

No major problems other than some criticism of the limiting of their focus to defense and space-related questions.

KENNEDY ADMINISTRATION

Dr. Jerry Wiesner of MIT was President Kennedy's science advisor. Some of the successes and most of the problems of this period were a product of Wiesner's personality and his assertive attempts to seek a role in government decision making.

ACCOMPLISHMENTS:

1. Provided valuable guidance leading to the rejection of a number of Pentagon proposals which subsequent research has shown would have indeed been mistakes.

2. Introduced interests beyond space and defense and focused on many other areas of government scientific research such as health.

PROBLEMS:

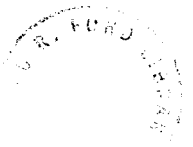
1. Bitter public debates with NASA over techniques to be used in moon landing became personal struggle between Wiesner and Wernher von Braun.

2. Alienated science community by high-handed attitude.

3. Broadening areas of interest had the negative impact of spreading capabilities too thinly and preventing a cohesive approach and a consistent perspective.

JOHNSON ADMINISTRATION:

President Johnson's advisor was Donald Hornig, a chemist from Princeton. Hornig had a stormy and unfriendly relationship with the President and therefore appears to have had very little influence on policy.



ACCOMPLISHMENTS:

1. Instituted many significant long-range studies, e.g. the potential of the oceans; the world food problem; restoring the environment.

2. In 1965 conducted the first major assessment of the U. S. energy situation.

PROBLEMS:

1. Hornig did not work well with the rest of the White House staff partly because he was considered a lobbyist for the scientific community rather than an advocate of scientific ideas and issues.

2. Scientific community's position on the Viet Nam war, particularly as it was publicly voiced by President Eisenhower's former advisor, George Kitiakowsky, made it difficult for Hornig to serve as an advisor.

NIXON ADMINISTRATION:

Lee DuBridge was President Nixon's first science advisor and was succeeded by Ed David of Bell Laboratories in 1970. The decline of influence started during the Johnson Administration accelerated until in 1972 President Nixon did away with the science advisor.

ACCOMPLISHMENTS:

1. Attempt to place greater emphasis on the practical aspects of research and focus on the return for tax dollars so spent.

PROBLEMS:

1. Presidential Science Advisory Committee strongly and publicly opposed SST proposal at a time when the Administration was actively seeking support for the SST.

2. Former White House science advisors publicly opposed the President's ABM proposal.

3. Scientific community regarded Ed David

as lacking credentials because of his background as an engineer.

SUMMARY

An obvious but accurate summary is that science advisors appear to have been most successful when they provided advice which was not available from other sources within the government. The greatest problems were encountered when advisors took positions which differed with Administration policy.

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Hold.

OFFICE OF THE VICE PRESIDENT

Correspondence Control Unit

From James R. Killian, Jr.
77 Massachusetts Avenue
Cambridge, Massachusetts 02139

Addressed To

The Vice President

Subject Letter is in response to request by the V.P. for list of some of the contributions to Presidential policy-making in the Eisenhower administration made by the Spec. Asst. for Science and Technology and the President's Science Advisory Committee.

Remarks

Information copy for the Vice President via Mrs. Whitman

Date of Corr.	Date Received	Control Number
3-20-75	3-24-75	00540
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4-7-75		

Route To Peter J. Wallison Date 3-24-75

INFORMATION COPY—THE VICE PRESIDENT

CONTRIBUTIONS TO PRESIDENTIAL POLICYMAKING IN THE EISENHOWER ADMINISTRATION BY THE SPECIAL ASSISTANT TO THE PRESIDENT FOR SCIENCE AND TECHNOLOGY AND THE PRESIDENT'S SCIENCE ADVISORY COMMITTEE

Summary

In November, 1957, following Sputnik, President Eisenhower announced the appointment of a Special Assistant to the President for Science and Technology and the reconstitution of the ODM Science Advisory Committee, originally appointed by President Truman, as a White House committee reporting directly to the President. This science advisory arrangement was "to advise on scientific and technological matters at top-level policy deliberations."

Earlier, in 1954, President Eisenhower had asked the ODM Science Advisory Committee to undertake a study of ways to guard the United States against surprise attack. This led to the appointment of the Technological Capabilities Panel, which conducted a classified study that led the National Security Council to give "top national priority" to our missile program, to the accelerated development of intermediate ballistic missiles, to the development of the Polaris submarine program, to the U-2, and numerous other developments in the military and intelligence fields.

Among the activities and contributions of the science advisory mechanism established in 1957 by President Eisenhower may be included the following:

1) Recommendations for a civilian organization for the conduct of the U. S. Space Program, including the proposal that the National Advisory Committee for Aeronautics (NACA) be re-formed as NASA to conduct the national civilian space program. The Administration arranged for a bill to be introduced in

Congress which embodied these recommendations and which led to the Congressional actions which created NASA.

2) The Special Assistant for Science and Technology chaired a group of Department of Defense, Bureau of the Budget and NASA representatives to allocate missions and facilities in the civilian and military space programs following the creation of NASA.

3) Participation in the preparation of U. S. position papers for the NATO head of nations conference in December, 1957. This led to moves by NATO to strengthen science and technology in the Atlantic Community.

4) Recommendations by a President's Science Advisory Committee panel for organizational arrangements, subsequently adopted by Congress, for improving the translation, abstracting, indexing, and electronic storage and retrieval of scientific publications and information.

5) Formulation of recommendations which led to the successful Argus experiment to determine the effects of nuclear explosions, especially on world-wide communications, in the earth's magnetic field.

6) Assessments of the desirability and technical feasibility of a nuclear test ban which were to lead ultimately, in the Kennedy administration, to the successful confirmation of the atmospheric test ban treaty.

7) Study by a PSAC panel of ways in which the Government could improve the quality and effectiveness of its own work in science and technology. This study, which was presented to a full meeting of the Cabinet, recommended the establishment of the Federal Council for Science and Technology and the appointment by major government departments of assistant secretaries or other officers for science and technology.

8) Formulation of proposals for the establishment of a new office in the Department of Defense, the Director of Defense Research and Engineering, which the President subsequently recommended to Congress in his Reorganization Plan of 1958 and which was approved by Congress.

9) Kept the President informed about the progress of our missile program and made numerous recommendations to strengthen it, including the use of solid propellants.

10) Working in collaboration with members of the President's Board of Advisers on Foreign Intelligence, formulated recommendations which led to the achievement of important advances in photographic intelligence gathering, particularly through the use of reconnaissance satelittes.

11) A PSAC panel brought together various studies on the desirability of the Government's financing the proposed great Stanford Linear Accelerator. The recommendations of this panel were accepted by the President, and he subsequently recommended the financing of the project to the Congress.

12) The President's Science Advisory Committee made recommendations which were to result later in the establishment of the Arms Control and Disarmament Agency.

13) The Special Assistant to the President for Science and Technology was asked by the President to participate in the preparation of materials for Presidential press conferences and in briefing the President so that he was prepared to answer questions which might arise about weapons systems, space programs, and other matters involving complex technology.

14) Appraisal by the Special Assistant and his staff of the many proposals which were being made for new weapons systems and other developments in technology. The President was aided in distinguishing between impractical proposals and sound proposals and in defending these decisions.

15) Assistance was given to the President in appraising programs arising in the Department of Defense where interservice rivalries led to competing recommendations.

16) The advisory mechanism assisted other departments in the scientific and technological area. Several Secretaries of Defense made use of PSAC, and the State Department repeatedly called on the advisory mechanism for advice.

The Special Assistant and PSAC were able to undertake these studies and actions by a panel system to which was recruited a large number of outstanding scientists and engineers in the country. The number of experts who were working on these panels ranged from 200 to 300 at various times.

At no time was there any leak of privileged or classified information that could be traced to the White House science and technology mechanism, to its full-time staff, or to outside consultants.

Background

Prior to the Eisenhower administration, President Truman had appointed a President's Science Advisory Committee, which was located in the Office of Defense Mobilization, and this committee was continued by President Eisenhower. One of the major accomplishments of this ODM Committee was to organize, at the request of President Eisenhower, a task force to review the state of our

military technology. This Technological Capabilities Panel recommended the development, along with the ICBM, of intermediate-range missiles and it also recommended that our intercontinental missile program be given the rating "highest national priority." In his memoirs, General Robert Cutler wrote that this report of the Technological Capabilities Panel was the high point in the record of the National Security Council during the Eisenhower administration and that it influenced the accelerated development of nuclear-capable ICBM's. Recommendations by members of this Panel led to the decision to undertake the Polaris missile program and the development of a U-2 reconnaissance plane.

Following Sputnik, President Eisenhower announced the appointment of a Special Assistant for Science and Technology and the reconstitution of the ODM Science Advisory Committee as a committee in the White House reporting directly to the President. In a subsequent letter to Cabinet officers defining the duties of this Special Assistant, he asked that the Special Assistant have "full access to all plans, programs, and activities involving science and technology in government." He was directed to be available as an adviser to Cabinet officers and other officers of the government holding policy responsibilities "to try to anticipate future trends and developments, particularly as they affect national security and suggest future action in regard thereto," "to advise on scientific and technological matters at top-level policy deliberations," and to be concerned "with the interchange of scientific and technological information with scientists, officials, military and non-military, of our allies, and to encourage science in the Free World."

This letter authorized the Special Assistant to attend National Security Council meetings and other classified meetings and to be present at those Cabinet meetings where matters were being discussed in which science might be involved.

Actions taken by the Science Advisory Mechanism

1) One of the first tasks assigned to the Special Assistant for Science and Technology and the Science Advisory Committee was to formulate recommendations for the organization of the U. S. Space Program and to suggest the outlines of a National Space Program. A panel of the President's Science Advisory Committee was appointed which worked in close concert with the administrative section of the Bureau of the Budget and which recommended that the National Advisory Committee on Aeronautics be reconstituted to form NASA. This recommendation, subsequently approved by the Committee on Government Organization chaired by Mr. Nelson Rockefeller and by the Director of the Bureau of the Budget, was presented to the President in a memorandum signed by Messrs. Rockefeller, Brundage, and Killian and promptly approved by the President. The President's Science Advisory Committee strongly urged that our Space Program be managed by a civilian and not a military agency, and this proved to be very much in accord with the President's own wishes.

2) The Special Assistant for Science and Technology, at the request of the President, chaired a group of representatives of the Department of Defense, the Bureau of the Budget, and the newly created NASA in the allocation of responsibilities in the space field as well as the allocation of facilities. It was this group that made the recommendation to the President that NASA should

have the responsibility for the Man-in-Space Program and for the large rockets needed for this program. During the Congressional consideration of the Administration's bill providing for the creation of NASA, the Special Assistant worked closely with Congressional representatives.

3) In December, 1957, a heads of nations meeting of the NATO Alliance was scheduled in Paris, and one of the items which had been on the agenda was ways in which NATO could serve to strengthen science and technology in the Atlantic Alliance. The Special Assistant, together with Dr. Detlev Bronk, then President of the National Academy of Sciences, helped to prepare the Administration position papers on this point, and the Special Assistant for Science and Technology accompanied the President to Paris, where American proposals were approved at the heads of nations meeting.

4) Following Sputnik, there was much discussion of the need in the United States for the creation of a great, centralized national agency for the translation, abstracting, indexing, and electronic storage and retrieval of scientific information. Senator Humphrey had strongly supported Congressional action for the creation of such a centralized agency. A PSAC panel studied this problem and concluded that this was not the best solution for the United States and recommended instead that the National Science Foundation take the leadership in bringing about the coordination of scientific information activities in the Federal Government. The report of this PSAC panel led Senator Humphrey to withdraw his proposal, and Congress later accepted the recommendations of this Information Panel as presented by the President.

5) The President's Science Advisory Committee recommended to him that the Government undertake what came to be known as the Argus experiment to determine the effects of nuclear explosions within the earth's magnetic field. This test, requiring a joint effort by the Atomic Energy Commission and the Department of Defense, was approved, and the Navy was entrusted with the execution of the experiment. This was one of the greatest scientific experiments, in terms of scale, ever undertaken and proved to be wholly successful in the new scientific knowledge it provided about the earth's magnetic field, the behavior of radiation in space, and the effects on radar and radio of the interjection of electrons in the magnetic field.

6) Studies by a PSAC panel on the feasibility of detecting nuclear tests led the President to appoint an interdepartmental committee to review the feasibility of test detection and subsequently to reopen negotiations with the Soviet Government for discussions of a Nuclear Test Ban. This laid the foundations which later, in the Kennedy administration, led to an agreed-upon atmospheric test ban treaty.

7) A panel of PSAC undertook a study of the Government's own effectiveness in science and technology and reported to a full meeting of the Cabinet. It recommended that the President approve the establishment of the Federal Council for Science and Technology to coordinate federal research and development and other recommendations of the panel led to the appointment, in most of the major government departments, of Assistant Secretaries or other policy-level officers for science and technology.

8) In 1958, President Eisenhower asked the Secretary of Defense to appoint a committee to study ways of improving the organization of the Department of Defense. This committee asked the Special Assistant for Science and Technology and his associates to recommend ways for improving the management of research and development in the DOD. Recommendations made by the Special Assistant to this Committee led to the proposals for the establishment of the Director of Defense Research and Engineering in the Department of Defense.

9) A standing Missile Panel of the President's Science Advisory Committee made, along with the von Neumann Committee, periodic recommendations for the advancement of our missile program. The acceleration of the use of solid propellants resulted from these recommendations.

10) A panel of the President's Science Advisory Committee, working in coordination with members of the President's Board of Advisers on Foreign Intelligence, led to the achievement of important photographic intelligence gathering, particularly through the use of reconnaissance satellites.

11) A PSAC panel studying the desirability of the Government's funding the Stanford Linear Accelerator brought into agreement different agencies of the Government and recommended that the President support a recommendation to Congress to fund this important development in pure science.

12) Recommendations of the Science Advisory Committee led to actions which resulted in the establishment of the Arms Control and Disarmament Agency.

13) The Special Assistant for Science and Technology was asked to participate in the preparation of materials for Presidential press conferences and for briefing the President on the answers to questions which might arise about weapons systems, space programs, and other matters involving technology.

14) In the period following Sputnik there were many proposals arising in industry, in the defense establishment, and elsewhere for novel weapons systems and other developments in technology. Many of these, when studied thoroughly, proved to be infeasible, and one of the major jobs of the President's Science Advisory Committee was to give the President and his staff advice on what was practical and what was not. It was recommendations by PSAC that led finally to the cancellation of the nuclear-propelled aircraft program.

15) The President looked to his scientific advisers to appraise programs arising in the Department of Defense where interservice rivalries were involved and where services differed about numerous programs. PSAC helped to resolve some of these differences and to give technical guidance to the President in dealing with them.

16) It is interesting to recall that several Secretaries of Defense made use of the President's Science Advisory Committee as a source of judgments on military technology and its technological and strategic implications, unencumbered and undistorted by jurisdictional lines of thought. The Bureau of the Budget also made use of the Science Adviser as an independent, authoritative source of analyses and options that sharpened BOB's own assessments of programs, particularly in space and in defense.

In listing these examples of the contributions made by the Special Assistant and the Advisory Committee, it is important to emphasize that the advisory mechanism was effective because it was closely related to the President, to the National Security Council staff organization, and to the Bureau of the Budget. It worked in close concert with these organizations in the White House. The Director of the Bureau of the Budget and the Special Assistant for National Security Affairs regularly looked to the science advisory mechanism for assistance and welcomed its inputs. Finally, the Special Assistant had ready access to the President and, by the President's request, sat in on NSC meetings and on Cabinet meetings where matters involving science and technology were discussed.

It is important also to emphasize that one of the important devices used by the Special Assistant and the Science Advisory Committee was the creation of panels made up of the ablest people in the country who were highly competent to contribute to the study of complex scientific and technical problems. The number of scientists and engineers who were working on these panels ranged from 200 to 300 at various times, and this gave the White House deep roots into the nation's scientific and engineering community.

It is also notable that at no time was there any leak of privileged or classified information that could be traced to the White House science and technology mechanism, to its full-time staff, or to outside consultants on PSAC and its panels.

POST-EISENHOWER CONTRIBUTIONS

The above list is limited to those activities in which I was involved during the Eisenhower administration, which, I believe, is what you requested. I have added below, however, some examples of science and technology contributions to Presidential policymaking during the Kennedy, Johnson, and Nixon administrations:

A PSAC study on the effectiveness of biological warfare led directly to President Nixon's decision to propose an international ban on biological warfare.

PSAC studies on innovation and experiment in education led to the Model School concept and ultimately to the establishment of the National Institute of Education.

On the initiative of the Science Adviser, a paragraph was inserted into President Johnson's State of the Union Address in 1966 which legitimitized federal research on human reproduction and methods of fertility control.

The Presidential Statement on Government Patent Policy was drafted by the Office of Science and Technology, providing the first general guidelines for the disposition of rights to inventions made under government contracts.

A PSAC report in 1965 on the quality of the environment was the first comprehensive report on the subject prepared within the government. It influenced attitudes in the Executive and Legislative Branches and served as an important resource to guide policy and legislation.

A PSAC study on the effective use of the sea provided a head start for the National Commission on Marine Resources and Engineering Development.

Initiatives by the Office of Science and Technology led to the President's 1966 proposals to the Congress on highway and vehicle safety legislation.

A PSAC landmark report on The World Food Problem in 1967 emphasized the critical interdependence of increased food production and family planning programs in developing countries and the relationship of agricultural development to overall economic development.

The Office of Science and Technology prepared the first government-wide report on energy technologies in 1965, which was followed by a more comprehensive study that provided a point of departure for the Dixie Lee Ray report to the President in December, 1973.

The first Presidential Message to the Congress on energy was drafted by the Office of Science and Technology, followed by the establishment of an Energy Policy Office within the OST in 1971.

The Science Adviser prepared for President Nixon the first Message to the Congress on Science and Technology which set forth a coherent framework and strategy for relating federal science and technology programs.

Presidential actions in the international sphere initiated by the Science Advisers included new cooperative programs with Japan, Korea, Pakistan, and Eastern European countries, and the establishment of the U.S.-U.S.S.R. Commission on Scientific and Technical Cooperation agreed upon at the Summit Conference.

A series of classified studies by PSAC and the OST contributed to strategic weapons developments and defenses, to our naval warfare capabilities, and to the expedited introduction of sophisticated weapons systems such as the laser-guided bomb in Vietnam.

THE WHITE HOUSE
WASHINGTON

TELEPHONE MEMORANDUM

_____, 19___

	TIME PLACED	DISC	NAME	ACTION
OUT / INC	AM / PM		MUST CALL ON WEDNESDAY, MARCH 26, 1975	
OUT / INC	AM / PM		Riger Teague (back up attached)	225-2002
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THE WHITE HOUSE

WASHINGTON

March 22, 1975

ADMINISTRATIVELY CONFIDENTIAL

MEMORANDUM FOR: MAX FRIEDERSDORF

FROM: JERRY H. JONES

SUBJECT: Congressional Mail
March 19, 1975

Your memorandum to the President of March 20 on the above subject has been reviewed and the following notation was made:

-- House, page 3; Olin Teague
-- V.P.

Please follow-up with the appropriate action.

Thank you.

cc: Don Rumsfeld

March 19, 1975

Dear Mr. Chairman:

Thank you for your March 18 letter to the President requesting an opportunity to discuss Federal science policy with his designated spokesmen within the White House.

Please be assured your letter will be called to the President's attention at the earliest opportunity. You will hear further as soon as possible.

With kindest regards,

Sincerely,

Vernon C. Loen
Deputy Assistant
to the President

The Honorable Olin E. Teague
Chairman
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

bcc: w/incoming to Warren Rustand for further action.
bcc: w/incoming to Max Friedersdorf - for your information.

MLF VCL:EF:VO:vo

re Staff interview

COMMITTEE ON SCIENCE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

SUITE 2321 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, D.C. 20515

March 18, 1975

The President
The White House
Washington, D.C.

Dear Mr. President:

On March 6, 1975, Representative Mosher and I co-sponsored a comprehensive bill (H.R. 4461) dealing with Federal science policy, advice and organization. While we believe the proposals in the bill are basically sound and that a statutory base is necessary to a consistent and utilitarian approach to science and technology, we would very much like to have the benefit of your views before we begin consideration of the bill.

As you may know, we and our staff have for some weeks been developing a liaison with officials in the Executive Office concerning ways and means of arriving at a logical Federal role for handling scientific and technological issues. All parties have voiced a desire to discuss their respective ideas, beliefs and needs prior to any final action.

The purpose of this letter, therefore, is to request that we be informed as soon as possible of the nature of your thoughts on the matter and of the appropriate channels through which to discuss them. I know you will understand the indispensable need for me to inform members of our Committee on the views of the Office of the President before we take up any legislation. Since it is my intent to lay plans for hearings

promptly, I hope we will be able to meet with your designated representatives in the very near future.

I am taking the liberty of providing copies of this letter to the Vice President, Mr. Rumsfeld and Mr. Cannon.

With all good wishes,

Sincerely yours,

OLIN E. TEAGUE
Chairman

BACKGROUND ON OST

The Office of Science and Technology (OST), created in 1962 by President Kennedy, was headed by a Director who also had the title of Science Adviser to the President. This Office was preceded by the establishment in 1957, by President Eisenhower, of a Special Assistant for Science and Technology. The appointment of a Special Assistant was precipitated by concern over Sputnik and the perceived need for science advice at the highest levels in the government. At that time, most Federal agencies, including the Department of Defense, were weak scientifically, and the establishment of OST contributed to their significant upgrading.

Through the middle 1960's, OST focused much of its attention on military and space technological initiatives. In the late 1960's, however, as emerging national problems began to include components other than "hard" technology (e.g., economic and social issues), OST became less effective and less useful in contributing to Presidential-level decision-making. It evolved slowly into an organization whose role was less clear and not widely accepted in the Executive Office as essential.

Despite OST's efforts to change to meet the need for broader analysis and advice on civilian concerns of the 1970's, OST was criticized on:

- narrowly viewing science and technology as more important to solving civilian problems than was justified.

- promoting scientific and technical solutions to problems and, thus, advocating more R&D.

- not having broad enough capabilities to address economic, social and institutional factors in the social sciences.

In addition, OST, as the resident staff for the President's Science Advisory Committee, was criticized as not always

providing solid public support for the President on controversial issues involving scientific questions.

In a number of specific instances, OST did provide useful analysis to Executive Office staff. However, advice from OST was often ignored by the Executive Office as being irrelevant or overly biased toward support of R&D. OST tended to lack sufficient authority within the Executive Branch unless there was a special relationship between the President and the Science Adviser (e.g., President Kennedy and Dr. Weisner) or a special request for analysis from the President.

Initially, OST possessed more technical expertise than the agencies. However, as the agencies developed their own R&D capability and used outside scientific and technical review panels, OST was put in a position of secong guessing the agencies often resulting in disputes and competition.